POLITECNICO DI TORINO

Department of Ingegneria Informatica, del Cinema e Meccatronica

Master of Science in INGEGNERIA INFORMATICA (COMPUTER ENGINEERING)

Master's Thesis

Project and implementation of a multifaceted score system for online gaming

Adviser:
Prof. Giovanni Malnati

Candidate
Lina Maria Correa Cogua

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To my family, I will be forever in their debt.

"Sé valiente. Toma riesgos. Nada puede sustituir la experiencia"
Paulo Coelho

Summary

Nowadays, Gamification is a very effective technique used for any kind of business that seeks to maintain the interest and motivation of its members over time. Typically this concept applies to business that looks for keeping customers nearly from the business even they donât have to. This technique can encourage people to use a system in a voluntary and fun way, in which they can experience it in a game-like environment. Unfortunately, the implementation of the game design processes are complex and are not integrated in the software development processes of the organizations.

This work proposes the enrichment of the actual MAK07 system thanks to the integration of the Gamification technique on software development methodologies and designing of point system and levels. Additionally the classification of the input data by clusterization which is a data mining technique.

Contents

List of Figures

List of Tables

List of Algorithms

Chapter 1

Introduction

The first best known mobile game is Snake (1997) which was preinstalled in all devices of Nokia that arrives to 350 million. The limitations of that times are related to hardware, the game was shown on a screen of monochrome dot matrix and one single channel tone. since this point the evolution of mobile games grows in parallel with the improvement of the smartphone technology.

The Gamification technique [3] is widely used in contexts other than games in which it seeks to create changes in user behavior in front of a system, either for external or internal purposes of an organization. It is usually used to take advantage of human psychology behaviors against the game systems creating a sense of engagement or hooking of people experiencing the system as a game[3].

The use of Gamification has been growing rapidly in numerous software developments due to its efficiency, examples such as Facebook [8], Foursquare [9], LinkedIn [10] use elements of Gamification in their systems and it is how they have achieved great acceptance in all the world [7] [3].

Gamification can be present in any aspect of life for example Social media the 3 most popular are Facebook 78.804.144 , Instagram 67.932.248 ,Youtube 26.645.304, sports the 3 most popular are Nike+ Run Club 721.116, InstaFit 4.382, Runtastic 834.595, RunKeeper 504.407 Endomondo 570.057. The most popular Language learning apps are Duolingo 6.436.766, Memrise 1.126.271, Babbel 280.306, Rosetta Stone 175.891. Educational Games like Math Games 1.868, Maestro de matematicas 4.817, Mental calculation 775, Mental 17.296, Math games 40.760, Brain training 119.896, MathMaster 4.731, Math Master â Brain Quizzes Math Puzzles 4.083, Ruzzle 336.012 [1].

Nowadays everyone can develop mobile applications and sell or distribute it on a market like Play store for android or App store for iOS. At the time you create the product, you must know the type of customers target that the application wants to have. the most used are:

1. Buy and play it all: User buy the game on the market in order to get it. 2.

Advertisement income: Games that accept adds that generate money every time a user play and visualize them. 3. F2P or free to play: Game played for free, payment of some booster or additional elements can be done with real money. [2][4]

1.1 Scope of the thesis

1.1.1 Context description

is a game developed by Tonic Minds s.r.l. This game allows to the user to Combine the 7 numbers of a scheme using the four basic operations (addition, multiplication, subtraction and division) in order to get 0 as the final result. The idea with this thesis is to design a solution using elements of Gamification a new version of taking in count previous constraints and necessities of the client and game in order to increase downloads and generate incomes.

1.1.2 Actual achievements of MAK07

In v1 of the user was allow to play and know the score done by each schema, In v2 of the score was keep by the system, v3 of was develop the challenge mode game in which the user is allow to challenge another player to solve as much schemas as possible in certain time. v4 of was develop the chat. On v5 of was develop the tournaments.

1.1.3 Actual drawbacks of MAK07

has 43 users on play store and App Store is 500 which is not too much and also the application is free and has any mobile gaming business model in order to earn money. The points system is poor and the input combination and permutation of numbers are not classified in a way to classified them as easy medium or hard to play.

is classified as a math game and not many users has interest of this kind of games compared to adventure or strategy games.

1.1.4 Problem to solve

How to improve the number of downloads and generate some income with Gamification in a multifaceted score system for online gaming?

1.1.5 Justification

As many mobile applications in the world, the number of downloads, rating and feedback are important to improve and somehow earn money. [6] [11] the objectives are:

1. Incorporate elements of Gamification into MAK07 taking in count the already developed system

2. Improve the point system of MAK07
3. Establish the Level system of MAK07
4. Classify the input combination and permutation numbers of MAK07 in order to assign schema according with the level of difficulty and level of the player.
5. Improve the number of downloads of MAK07.

1.1.6 Impact expected

MAK07 users will download and play voluntary, fun and in a continue way. All kinds of players will play and discover elements of Gamification that supply their interest.

The documentation of MAK07 about analysis and design will be complete and it can remain as a reference material and as a deliverable for the client

Chapter 2

State of art

2.1 Gamification

Gamification is the use of game elements and game design techniques in non-game contexts [3] . Although it seems simple, Gamification is much more than its elements, since the game design techniques are not easy, much less obvious, a technical and strategic approach is needed to achieve the success of its implementation [3] [18] [12] . Gamification arose in the study of business from the need to find methods to motivate customers or employees of an organization using new techniques due to the high competitiveness and the changing context of the companies. Since the games are really effective in using human psychology to "hook" (better known as Engagement) to players [3] [7] using elements such as: Points, levels, rewards, progress bars, avatars, badges, social systems, among others; Many companies began to implement this series of elements to motivate customers or their employees in their businesses [3].

2.2 Benefits of gamification

Each business that wants to have employees or developed products that wants to have happy users should use Gamification. Following I describe 3 main reasons why Gamification can improve the business and product results.

2.3 Engagement

The objective of Gamification is to get engagement of users[7][3]. Being a game designer is thinking about how to get your target audience engaged by taking advantage of the elements of the games and managing to change the behavior of the target audience. Many times we have felt a certain addictive feeling towards a game, however simple it may be, since the games provide some pleasure and Gamification takes advantage of

this quality of the games to use it in contexts that are not games [3].

Gamification can offer a powerful set of tools to develop challenges for customers, employees, user, player, for example some stores give points for making purchases and reward them with discounts with certain limit of redeemable points, or airlines have a system of miles for their clients, examples like these are pure Gamification and they produce an increase in Engagement and loyalty of people towards the business, achieving high profits and productivity results in many organizations.

2.4 Experimentation

A second aspect of the game based on motivation is to open the space of experimentation, since to master the challenges presented in a game is all about experimentation for the player. For a player to feel a failure or loss is not so discouraging because you can always start from scratch and you will feel motivated to continue playing to improve your game experimentation. If the game is correctly designed, the player can not always lose, the game will lead him to strive to improve his skills and win [3] [7]. In systems with gamification, it is important to provide an environment of experimentation, not very complex or too easy, that produces motivation in the target audience to overcome a challenge. Gamification elements of real life that achieve experimentation are the levels, the medals, teams, challenges, among others [3] [7].

2.5 Results

The results is the third reason why Gamification is a valuable technique to use in numerous contexts other than games. Currently Gamification has taken great strength [3] [7] in organizations, which have obtained great results by incorporating game elements into their Business processes such as Nike [**?**], Facebook [8], American Express [20], Microsoft [21], Samsung [22], among others. The results that can be achieved with gamification are to maintain the motivation and interest of the users over time [3]. Organizations that have incorporated gamification have obtained great results [7] [23] translated into an increase in the number of clients, higher sales, advertising with voice to voice, customer loyalty, among many others.

2.6 Related works

In market there are many games related to education focused on maths operations, the following table describe the relation between level points and time after have played several times in order to find their gamification point system.

In addition, the devices' specifications are shown in table 2.1 2.2 2.3 2.4.

Game name	Formula found to assign points			Image
Math Games /Juegos de Matemáticas	Level	Points	Time	
	1 - 10	20	10	
	11 - 20	40	8	
	21 - 30	60	6	
	31 - ..	80	4	
Juegos Mentales: Entrenamiento Cerebral / Mental	Points	Hearts	Reaction	
	Number of correct questions - wrong questions done	(Number of correct questions * 100)/Total of questions	Milliseconds sends on gaming	

Table 2.1: Related Works

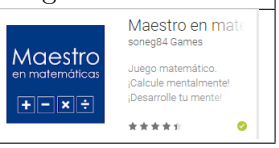
Game name	Formula		Images
MathMaster / Maestro en Matematicas	Points	Starts	
	7500 - (250 * number of penalties)	Max 3	

Table 2.2: Related Works cont. 2

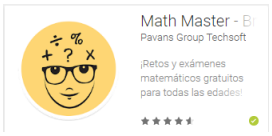
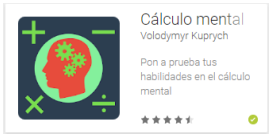
Game name	Formula		Images
Math Master - Brain Quizzes and Math Puzzles	Level	Range	
	1	0 - 250000	
	2	0 - 250000	
	3	0 - 250000	
	4	0 - 250000	
	5	0 - 250000	
	6	0 - 250000	
	7	0 - 250000	
	8	0 - 250000	
	9	0 - 250000	
	10	0 - 250000	
Mental Calculation	Points	Hearts	
	(100 * Number of hearts) + (-0,0491 (Time in seconds) * EXP(2) + 21,585 (Time in seconds) + 3853,5)	5 Herts which means 0 errors	
		4 hearts which means 1 error	
		3 Hearts which means 2 errors	
		2 Hearts which means 3 errors	
		1 Heart which means 4 errors	
		0 Hearts which means 5 errors	

Table 2.3: Related Works cont. 3

Game name	Formula found to assign points			Image
	Level	Coins	+Points	
Maestro de Matematicas	1	5		
	2 - 6	6		
	7- 13	7		
	14 - 19	8	Time (Milliseconds) + 100 * (Number of shields)	
	20 - 25	9		
	26 - 31	10		
	32 - 37	11		
	38 - 43	12		
	44 - 49	13		
	50 - 54	14		
	55	15		

Table 2.4: Related Works cont. 4

Chapter 3

Methodolgy

3.1 MAK07

MAK07 came from an idea of desider of a customer who wants to produce some income having fun playing a math game.Tonic Minds start to develop this game since 2017 The following image was the proposal to implement progressively the components of MAK07 [figure 3.1].

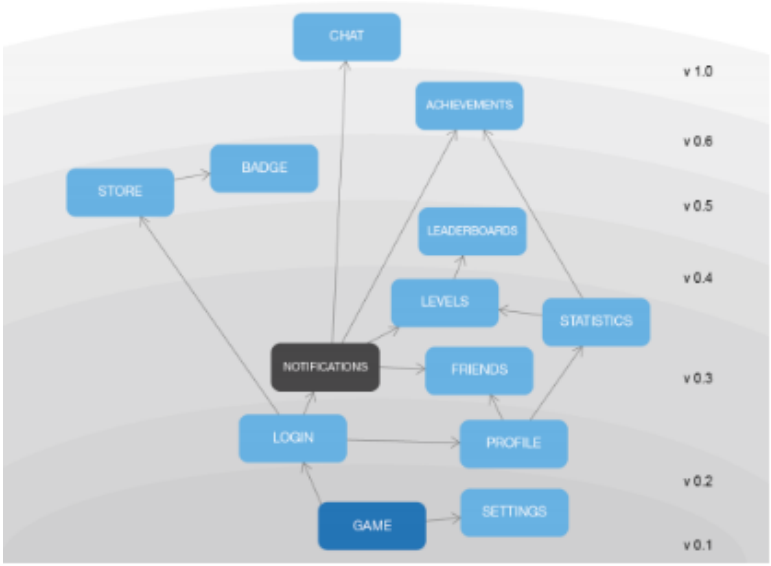


Figure 3.1: MAK07 proposal implementation

In v1 of MAK07 the user was allow to play and know the score done by each schema, In v2 of MAK07 the score was keep by the system, v3 of MAK07 was develop the challenge mode game in which the user is allow to challenge another player to solve

as much schemes as possible in certain time. v4 of MAK07 was develop the chat. On v5 of MAK07 was develop the tournaments. This is a navigation map of version 1 of MAK07 [figure 3.2].

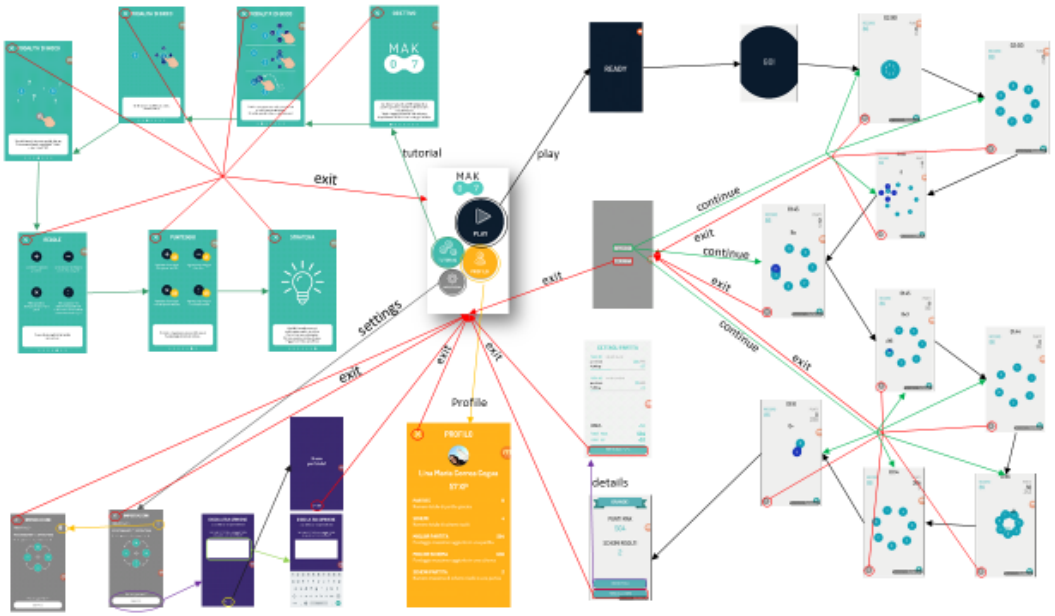


Figure 3.2: MAK07 version 1

The following image [figure 3.3] shows the progression of MAK07, notice that gamification components (orange lines) will be present and complement previous implementations.

Each of the following images will represent the gamified flow using all the gamification components inserted on MAK07 [figures 3.4, 3.5, 3.6, 3.7].

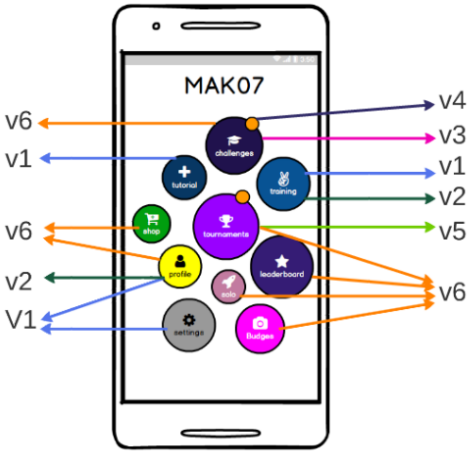


Figure 3.3: MAK07 visioning evolution

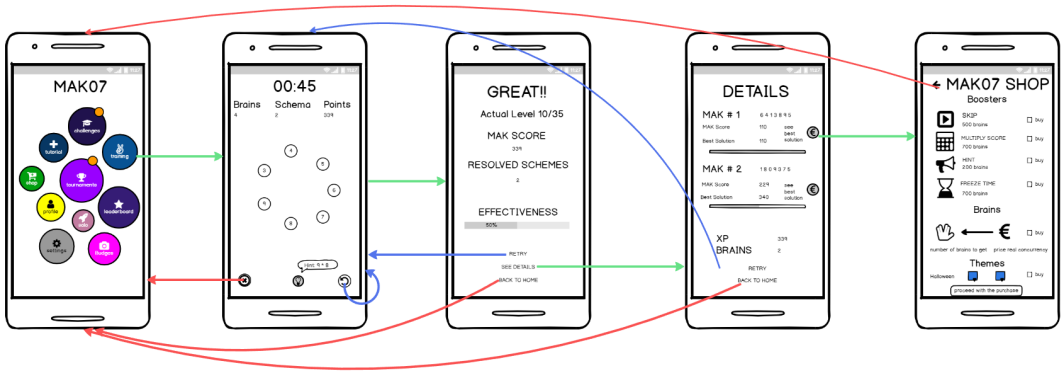


Figure 3.4: Training

3.2 Analysis and design

3.2.1 User cases MAK07

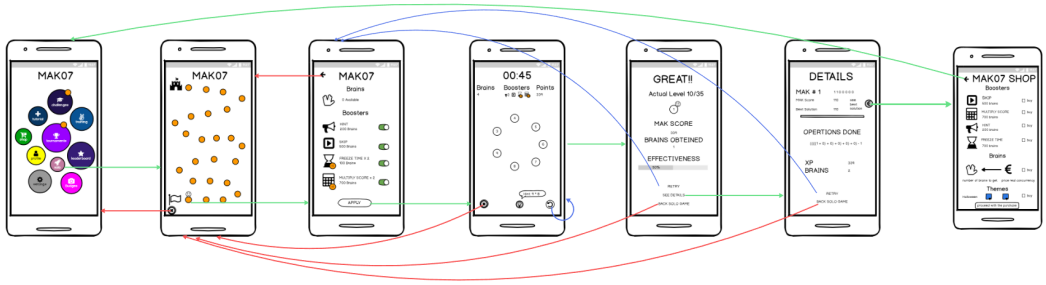


Figure 3.5: Solo Game

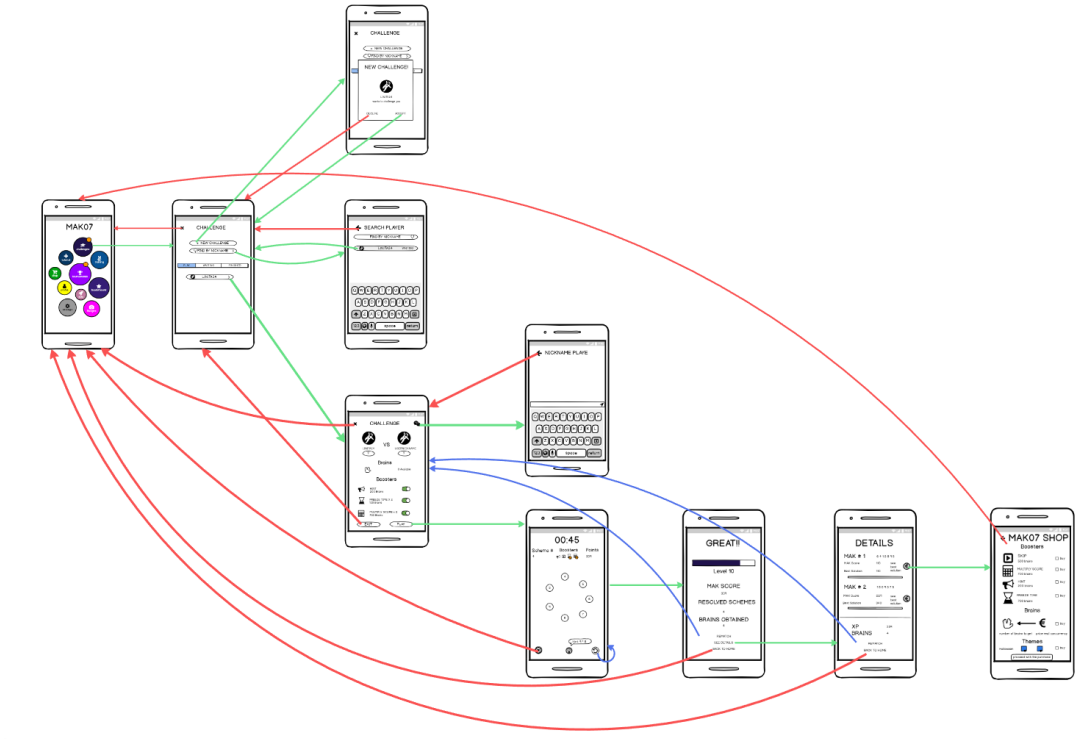


Figure 3.6: Challenge

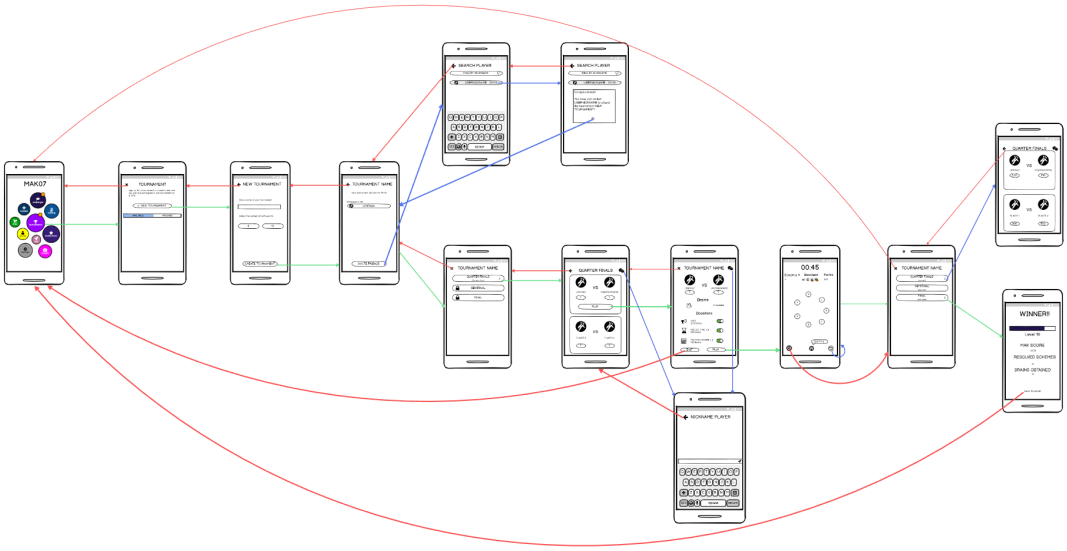


Figure 3.7: Tournament

User cases are classified in the following groups:

- UCH# that represents Home and general user cases [figures 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.26, 3.27, 3.28, 3.29, 3.30]
- UCS# that represents Settings user cases [figures 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 3.41, 3.42, 3.43, 3.44, 3.45, 3.46, 3.47, 3.48, 3.49, 3.50, 3.51]
- UCLOG# that represents Log in user cases [figures 3.52, 3.53, 3.54, 3.55, 3.56, 3.57, 3.58]
- UCP# that represents Profile user cases [figures 3.59, 3.60, 3.61, 3.62, 3.63, 3.64, 3.65, 3.66, 3.67, 3.68, 3.69, 3.70, 3.71, 3.72, 3.73]
- UCTU# that represents Tutorial user cases [figures 3.74,3.75,3.76,3.77,3.78,3.79,3.80]
- UC3-6P# that represents Progressive user cases [figures 3.81, 3.82, 3.83, 3.84, 3.85]
- UCSH# that represents Shop user cases [figures 3.86, 3.87, 3.88, 3.89, 3.90, 3.91, 3.92, 3.93]
- UCTR# that represents Training user cases [figures 3.95, 3.96, 3.97, 3.98, 3.99, 3.100, 3.101, 3.102, 3.103, 3.104, 3.105, 3.106, 3.107, 3.108, 3.109, 3.110, 3.111, 3.112, 3.113, 3.114, 3.115]
- UCSOLO# that represents Solo game user cases [figures 3.116, 3.117, 3.118, 3.119, 3.120, 3.121, 3.122, 3.123, 3.124, 3.125, 3.126, 3.127, 3.128]
- UCC# that represents Challenge user cases [figures 3.129, 3.130, 3.131, 3.132, 3.133, 3.134, 3.135, 3.136, 3.137, 3.138, 3.139, 3.140]
- UCTOUR# that represents Tournament user cases[figures 3.141, 3.142, 3.143, 3.144, 3.145, 3.146, 3.147, 3.148, 3.149, 3.150, 3.151, 3.152, 3.153, 3.154, 3.155, 3.156, 3.157, 3.158, 3.159, 3.160, 3.161, 3.162, 3.163, 3.164, 3.165, 3.166, 3.167, 3.168, 3.169, 3.170, 3.171, 3.172]
- UCLEAD# that represents Leaderboard user cases[figures 3.173, 3.174, 3.175]
- UCB# that represents Budges user cases[figures 3.176, 3.177, 3.178, 3.179, 3.180, 3.181, 3.182, 3.183, 3.183, 3.185]

UCH01	Consult Home		
Target of Use case	User can consult the home interface of MAK07.		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	Display the initial home or the unblocked home.		
Basic flow			
No	**User**	**No**	**System**
1	User start navigate to MAK07 functionalities		
		2	The system must display the unblocked or blocked home interface of MAK07
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02, UCH03, UCH04, UCH05, UCH6, UCH07, UCH08, UCH09, UCH10, UCH11, UCH12, UCH13, UCH14, UCH15, UCH21, UCH22.		

Figure 3.8: Use Case UCH01

UCH02	UNBLOCK FUNCTIONALITIES OF HOME		
Target of Use case	Unblock all functionalities (challenge, tournament, leaderboard, solo game, badges and shop) of home		
Inputs	User must already play the first tutorial and first training		
Outputs	Home interface functionalities will be unblocked		
Basic flow			
No	**User**	**No**	**System**
1	User play the tutorial game		
2	User play a training		
		3	System unblock challenge, tournament, leaderboard, solo game, badges and shop functionalities
Interface view FROM  TO 			
Alternative flow 1:	UCH21: Exit from MAK07		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02, UCH03, UCH04, UCH05, UCH6, UCH07, UCH08, UCH09, UCH10, UCH11, UCH12, UCH13, UCH14, UCH15, UCH21, UCH22.		

Figure 3.9: Use Case UCH02

<table>
<tr><th colspan="2">UCH03</th><th colspan="2">Consult tutorial</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Consult the tutorial of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">User visualize the tutorial interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select the tutorial from home</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the tutorial instructions</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCTU01</td></tr>
</table>

Figure 3.10: Use Case UCH03

<table>
<tr><th>UCH04</th><th colspan="3">Consult profile</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Consult user profile of MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">User visualize his profile of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select profile from home</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the user profile</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCP01, UCP02, UCP03, UCP04, UCP05, UCP06, UCP07, UCP08, UCP09, UCP10, UCP11, UCP12, UCP13, UCP14, UCP15</td></tr>
</table>

Figure 3.11: Use Case UCH04

UCH05	Consult settings		
Target of Use case	Consult the settings of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	User visualize the setting interface of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User select settings from home		
		2	System shows the settings
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCS01, UCS02, UCS03, UCS04, UCS05, UCS06, UCS07, UCS08		

Figure 3.12: Use Case UCH05

<table>
<tr><th colspan="2">UCH06</th><th colspan="2">Consult shop</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Consult the shop of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">User visualize the shop of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select shop from home</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the shop</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCSH01, UCSH02, UCSH03</td></tr>
</table>

Figure 3.13: Use Case UCH06

UCH07	Consult budges		
Target of Use case	Consult the collection of budges that a user has in MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the collection of budges of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User select budges		
		2	System shows the list of budges that a user has collected until that time, some are in gray which means are blocked and others has their authentic colors.
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCB01, UCB02, UCB03, UCB04		

Figure 3.14: Use Case UCH07

UCH08	Play solo game		
Target of Use case	Play the solo game of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the solo game interface with a starting and finish point and path game, pointing where the user is over the path		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game		
		2	System shows the interface of solo game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCSOLO01, UCSOLO02, UCSOLO03, UCSOLO05		

Figure 3.15: Use Case UCH08

UCH09	Play tournament		
Target of Use case	Play the tournament of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the tournament interface		
Basic flow			
No	**User**	**No**	**System**
1	User play tournament		
		2	System shows the interface of tournament
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCTOUR01, UCTOUR02, UCTOUR03		

Figure 3.16: Use Case UCH09

UCH10	Play challenge		
Target of Use case	Play the challenge of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the challenge interface		
Basic flow			
No	**User**	**No**	**System**
1	User play challenge		
		2	System shows the interface of challenge
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCC01, UCC04, UCC05		

Figure 3.17: Use Case UCH10

<table>
<tr><th colspan="2">UCH11</th><th colspan="2">Consult leaderboard</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Consult the player leaderboard of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows the user leaderboard interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select leaderboard from home</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the interface of leaderboard</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCLEAD01, UCP01, UCP2, UCP3, UCP4</td></tr>
</table>

Figure 3.18: Use Case UCH11

UCH12	Play training		
Target of Use case	Play the training of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the training interface		
Basic flow			
No	**User**	**No**	**System**
1	User select training from home		
		2	System shows the interface of training
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCTR01, UCTR02, UCTR03, UCTR04, UCH16, UCH17		

Figure 3.19: Use Case UCH12

UCH13	Show notification		
Target of Use case	Show notification of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the notifications of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User has done an activity that trigger the system to show a notification. An activity can be chat message, alert for remember to play, alert for challenge, alert for tournament.		
		2	System shows the notification of the activity of MAK07
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH114, UCH15, UCC02, UCC10, UCH18, UC3-6P05, UCH20, UCB01		

Figure 3.20: Use Case UCH13

<table>
<tr><th colspan="2">UCH14</th><th colspan="2">Show number of new chat messages on challenge</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the number of new chat messages on challenge of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows the number of new chat messages on challenges of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User start chatting with a friend</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the number of new chat messages for an open challenge</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCC10, UCC11, UCB08</td></tr>
</table>

Figure 3.21: Use Case UCH14

<table>
<tr><th colspan="2">UCH15</th><th colspan="2">Show number of new chat messages on tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the number of new chat messages on tournament of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows the number of new chat messages on tournaments of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User start chatting with a friend</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the number of new chat messages for an open tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCTOUR24, UCB08</td></tr>
</table>

Figure 3.22: Use Case UCH15

UCH16	Restart schema		
Target of Use case	Restart a schema of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows the same schema that was previously played		
Basic flow			
No	**User**	**No**	**System**
1	User select restart to play the same schema		
		2	System shows the same schema previously played
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UC3-6P01, UC3-6P02, UC3-6P03, UC3-6P04, UCH08, UCH09, UCH10, UCH12, UCTR01, UCTR02, UCTR03, UCTR04, UCTR05, UCSOLO10, UCSOLO11, UCSOLO12, UCC08, UCC09, UCC12, UCTOUR30, UCTOUR31, UCTOUR32		

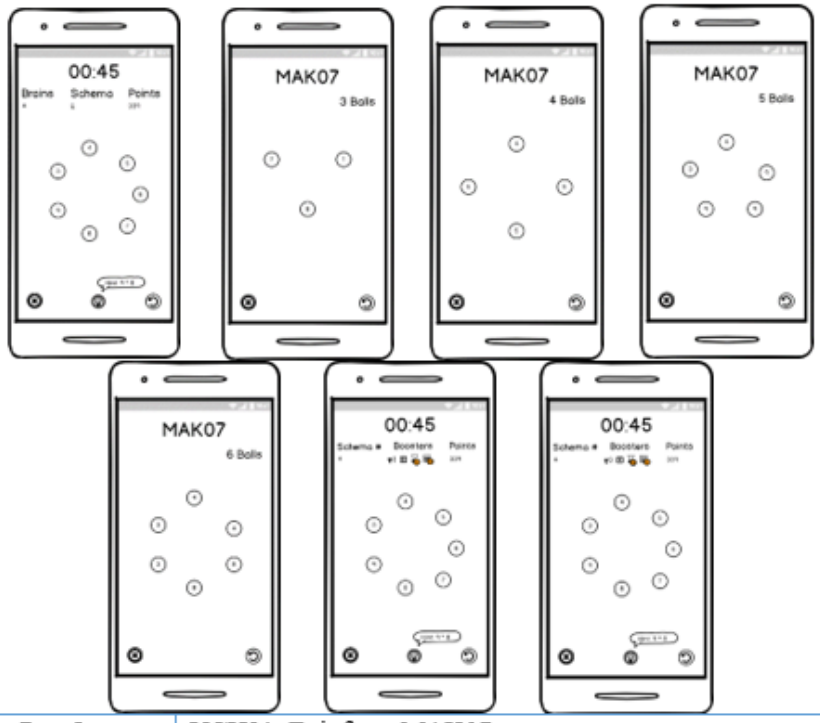


Figure 3.23: Use Case UCH16

UCH17	Exit to home		
Target of Use case	Exit to return home of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	System shows home interface		
Basic flow			
No	**User**	**No**	**System**
1	User select X button, back to home button or back arrow.		
		2	System shows home interface of MAK07
Interface view			

Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UC3-6P01, UC3-6P02, UC3-6P03, UC3-6P04, UCH08, UCH09, UCH10, UCH12, UCTR01, UCTR02, UCTR03, UCTR04, UCTR05,
	UCSOLO10, UCSOLO11, UCSOLO12, UCC08, UCC09, UCC12, UCTOUR30, UCTOUR31, UCTOUR32

Figure 3.24: Use Case UCH17

<table>
<tr><th colspan="2">UCH18</th><th colspan="2">Show new badge</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the new badge won in MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows home interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has completed some requirements to get the new badge</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the new badge won by the user on MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UC3-6P05, UCB01, UCB01, UCB03, UCB04, UCB05, UCB06, UCB08, UCB10, UCB11, UCH19, UCH20</td></tr>
</table>

Figure 3.25: Use Case UCH18

<table>
<tr><th colspan="2">UCH19</th><th colspan="2">Check requirements of player has reach new level</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Check the requirements of next level of plater in order to see if a player has reach a new level</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows unblocked badge of new level in case user have complete all requirements</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has completed all requirements to get new level</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the new badge won by the user on MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCB01, UCB01, UCB03, UCB04, UCB05, UCB06, UCB08, UCB10, UCB11, UCH20</td></tr>
</table>

Figure 3.26: Use Case UCH19

<table>
<tr><th colspan="2">UCH20</th><th colspan="2">Notify a player have reach new level</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Notify a player that have reach a new level of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows unblocked badge of new level in case user have complete all requirements</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has completed all requirements to get new level</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System shows the new badge won by the user on MAK07</td></tr>
<tr><td></td><td></td><td>3</td><td>System save the new level and new badge won on DB</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCB01, UCB01, UCB03, UCB04, UCB05, UCB06, UCB08, UCB10, UCB11, UCH19</td></tr>
</table>

Figure 3.27: Use Case UCH20

UCH21	Exit from MAK07		
Target of Use case	The user want to exit from MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	MAK07 is closed with all data saved until this point		
Basic flow			
No	**User**	**No**	**System**
1	User exit from MAK07		
		2	System save the information on DB
		3	System close the application MAK07
Interface view			

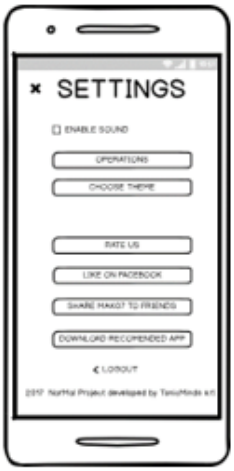


Figure 3.28: Use Case UCH21

<table>
<tr><th colspan="2">UCH22</th><th colspan="2">Switch application run in background MAK07</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Switch application allowing to run in background MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System runs in background MAK07 and display another application installed on device</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has switched the application from MAK07 to other installed on device</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System save the information in DB</td></tr>
<tr><td></td><td></td><td>3</td><td>System display the interface of the other application and run in background MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH21, UCH01, UCH23</td></tr>
</table>

Figure 3.29: Use Case UCH22

<table>
<tr><th colspan="2">UCH23</th><th colspan="2">Resume MAK07</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to resume the previous state on MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">System shows home interface or previous interface where the user was before</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has switched the application to MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System display the interface of MAK07 where the user was before</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH21, UCH01, UCH22, UCS(01-08), UCP(01-15), UCTU01, UC3-6P(01-05), UCSOLO(01,02,05,07,08,09), UCTR(01-10), UCH(03-15), UCC(01,04,05,06,07,10), UCTOUR(01-06,09,10), UCLEAD(01-03), UCB(01-06)</td></tr>
</table>

Figure 3.30: Use Case UCH23

<table>
<tr><th colspan="2">UCS01</th><th colspan="2">Enable sound</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to enable the sound of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The sound of MAK07 is enable.</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has enabled the sound of MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System enable the sound of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05, UCS09, UCS10</td></tr>
</table>

Figure 3.31: Use Case UCS01

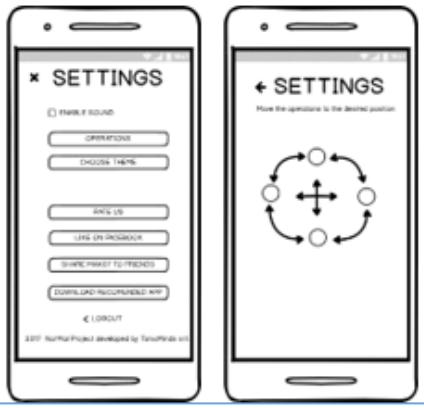
UCS02	Set operations		
Target of Use case	Allow the user to set the operations of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07 User must already have access to settings		
Outputs	The system displays the interface for setting the operations position of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User has set the position of operations for playing MAK07		
		2	System displays the interface for setting the operations position of MAK07
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Alternative flow 3:	UCH17: Exit to Home		
Alternative flow 4:	UCS09: Return to settings		
Extensions	UCH05, UCS (09,11-15)		

Figure 3.32: Use Case UCS02

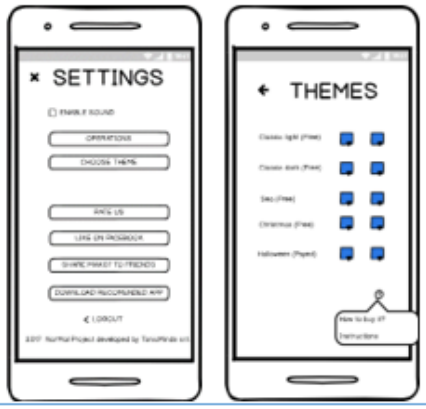
<table>
<tr><th colspan="2">UCS03</th><th colspan="2">Choose theme</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to choose the theme of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface for set the theme of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has click on choose theme of MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System displays the interface for choose the theme of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05, UCS16, UCS17, UCS09, UCSH01</td></tr>
</table>

Figure 3.33: Use Case UCS03

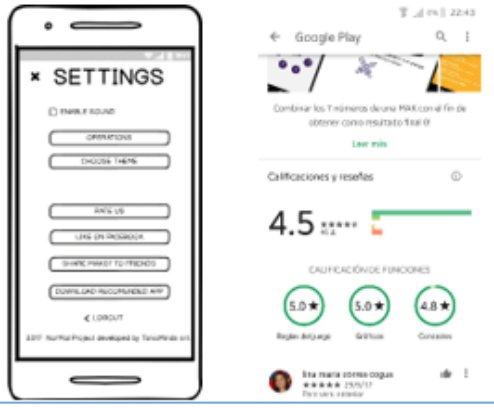
<table>
<tr><th colspan="2">UCS04</th><th colspan="2">Rate us</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to rate MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface of MAK07 on apple store or play store</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has click on rate us button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system saves the configuration and data on DB</td></tr>
<tr><td></td><td></td><td>3</td><td>MAK07 runs in background</td></tr>
<tr><td></td><td></td><td>4</td><td>The system displays the interface of MAK07 on apple store or play store</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH22</td></tr>
</table>

Figure 3.34: Use Case UCS04

<table>
<tr><th colspan="2">UCS05</th><th colspan="2">Like on Facebook</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">The user like the application on MAK07 official Facebook web page</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the MAK07 official Facebook web page</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User clicks on rate us</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the MAK07 official Facebook web page</td></tr>
<tr><td colspan="4">Interface view
  </td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCS22</td></tr>
</table>

Figure 3.35: Use Case UCS05

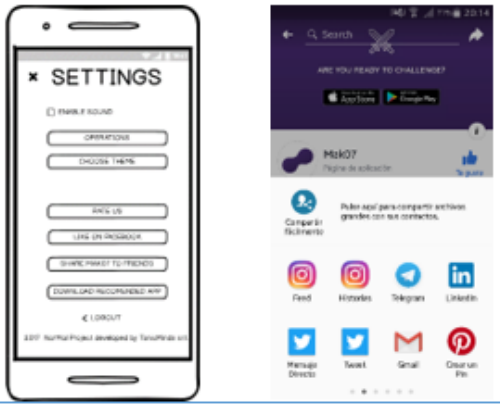
<table>
<tr><th colspan="2">UCS06</th><th colspan="2">Share MAK07 to friends</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">The user share MAK07 to friends using MAK07 chat or another device application installed</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">MAK07 is shared on a chat or on another application installed in the device</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User share MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>MAK07 is shared on a chat or on another application installed in the device</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05, UCS09</td></tr>
</table>

Figure 3.36: Use Case UCS06

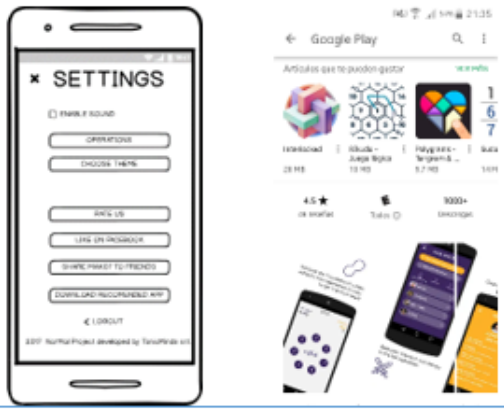
<table>
<tr><th colspan="2">UCS07</th><th colspan="2">Download recommended app</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">The user downloads a recommended application from MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">Apple store or play store is opened with the application recommended interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select the button to download the recommended app</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>Apple store or play store is opened with the application recommended interface</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05, UCS09</td></tr>
</table>

Figure 3.37: Use Case UCS07

UCS08	Logout		
Target of Use case	The user logout from MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	MAK07 is closed		
Basic flow			
No	**User**	**No**	**System**
1	User select the button to logout from MAK07		
		2	The system saves the configuration and data on DB
		3	MAK07 is closed
Interface view			

Figure 3.38: Use Case UCS08

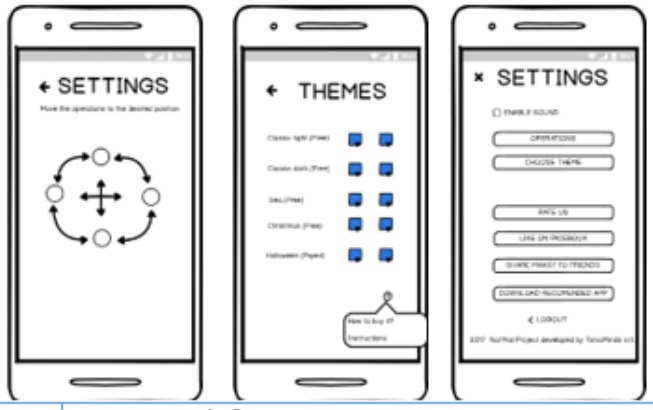
<table>
<tr><th colspan="2">UCS09</th><th colspan="2">Return to settings</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">The user returns to settings of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the settings interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select the button left arrow to comeback to settings</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the settings interface</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05</td></tr>
</table>

Figure 3.39: Use Case UCS09

<table>
<tr><th>UCS10</th><th colspan="3">Disable sound</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Allow the user to disable the sound of MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td>Outputs</td><td colspan="3">The sound of MAK07 is disable.</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has disabled the sound of MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System disable the sound of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Alternative flow 3:</td><td colspan="3">UCH17: Exit to Home</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH05, UCS01</td></tr>
</table>

Figure 3.40: Use Case UCS10

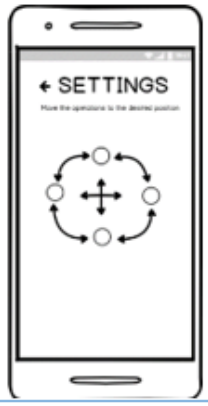
<table>
<tr><th colspan="2">UCS11</th><th colspan="2">Set + operation position</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to set the +operation to up, down, left or right</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface for setting the + operation position with the new position wanted by the user</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has set the position of + operation for playing MAK07 to (up, down, left or right)</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the interface for setting the + operation position with the new position wanted by the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCS(12-15)</td></tr>
</table>

Figure 3.41: Use Case UCS11

UCS12	Set - operation position		
Target of Use case	Allow the user to set the - operation to up, down, left or right		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07 User must already have access to settings		
Outputs	The system displays the interface for setting the - operation position with the new position wanted by the user		
Basic flow			
No	**User**	**No**	**System**
1	User has set the position of - operation for playing MAK07 to (up, down, left or right)		
		2	The system displays the interface for setting the - operation position with the new position wanted by the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Alternative flow 3:	UCS09: Return to settings		
Extensions	UCS(11,13-15)		

Figure 3.42: Use Case UCS12

UCS13	Set * operation position		
Target of Use case	Allow the user to set the * operation to up, down, left or right		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07 User must already have access to settings		
Outputs	The system displays the interface for setting the * operation position with the new position wanted by the user		
Basic flow			
No	**User**	**No**	**System**
1	User has set the position of * operation for playing MAK07 to (up, down, left or right)		
		2	The system displays the interface for setting the * operation position with the new position wanted by the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Alternative flow 3:	UCS09: Return to settings		
Extensions	UCS(11,12,14,15)		

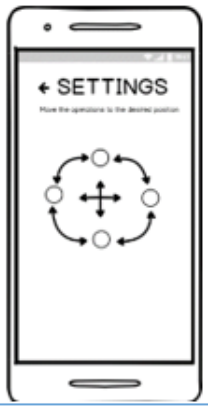


Figure 3.43: Use Case UCS13

UCS14	Set (/ :) operation position		
Target of Use case	Allow the user to set the (/ :) operation to up, down, left or right		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07 User must already have access to settings		
Outputs	The system displays the interface for setting the (/ :) operation position with the new position wanted by the user		
Basic flow			
No	**User**	**No**	**System**
1	User has set the position of (/ :) operation for playing MAK07 to (up, down, left or right)		
		2	The system displays the interface for setting the (/ :) operation position with the new position wanted by the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Alternative flow 3:	UCS09: Return to settings		
Extensions	UCS(11-13,15)		

Figure 3.44: Use Case UCS14

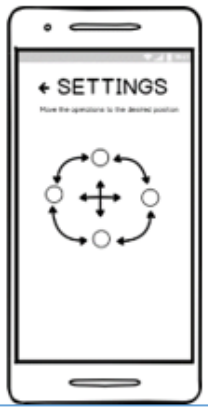
<table>
<tr><th colspan="2">UCS15</th><th colspan="2">Save new configuration of position operation controls</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Save new configuration of position operation controls</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">Playing any challenge, tournament, solo game or training game the operations are in the order that the user saved them</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has set the position operations</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the order of position operations as they saved them</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCS(09,11-14)</td></tr>
</table>

Figure 3.45: Use Case UCS15

<table>
<tr><th colspan="2">UCS16</th><th colspan="2">Select one theme</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Select one theme of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have access to settings</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface with the theme of MAK07 chosen</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has chosen a theme of MAK07</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System displays the interface of the chosen theme of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05, UCS16, UCS17, UCS09, UCSH01</td></tr>
</table>

Figure 3.46: Use Case UCS16

<table>
<tr><th colspan="2">UCS17</th><th colspan="2">Provide information how to buy</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Provide information about how to buy an item</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the information about how to buy an item</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User has click in the ? button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>System displays the information needed of how to buy an item</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Alternative flow 3:</td><td colspan="2">UCH17: Exit to Home</td></tr>
<tr><td colspan="2">Alternative flow 4:</td><td colspan="2">UCS09: Return to settings</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH05</td></tr>
</table>

Figure 3.47: Use Case UCS17

<table>
<tr><th colspan="2">UCS18</th><th colspan="2">Open store on device</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Open apple store or play store on device MAK07 profile</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface of MAK07 on apple store or play store</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system displays the interface of MAK07 on apple store or play store</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH22</td></tr>
</table>

Figure 3.48: Use Case UCS18

<table>
<tr><th>UCS19</th><th colspan="3">Open MAK07 profile on Facebook</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Open MAK07 profile on official Facebook web page</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the MAK07 official Facebook web page</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>System displays the MAK07 official Facebook web page</td></tr>
<tr><td colspan="4">Interface view
  </td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Alternative flow 3:</td><td colspan="3">UCH17: Exit to Home</td></tr>
<tr><td>Alternative flow 4:</td><td colspan="3">UCS09: Return to settings</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH22</td></tr>
</table>

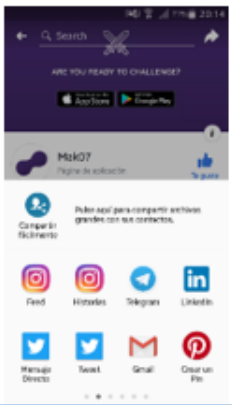
Figure 3.49: Use Case UCS19

UCS20	Generate petition to share MAK07
Target of Use case	Generate petition to share MAK07 in to other app installed on device
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07
Outputs	MAK07 is shared on a chat or on another application installed in the device

Basic flow

No	User	No	System
		1	MAK07 save the user data on DB
		2	Create a link to share the MAK07
		3	The system opens the multiple applications where the link can be shared.

Interface view



Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UCH05, UCS09, UCS06

Figure 3.50: Use Case UCS20

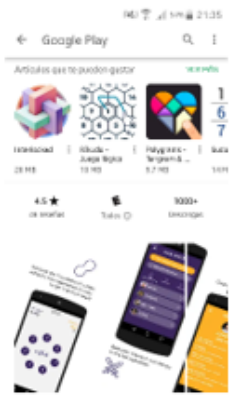
<table>
<tr><th>UCS21</th><th colspan="3">Open store on recommended app</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Open apple store or play store on a recommended application associated to MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">Apple store or play store is opened with the application recommended interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>Apple store or play store is opened with the application recommended interface</td></tr>
<tr><td colspan="4">Interface view
  </td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH05, UCS09, UCS07</td></tr>
</table>

Figure 3.51: Use Case UCS21

<table>
<tr><th colspan="2">UCLOG01</th><th colspan="2">Give user and password</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Give user and password for login</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The user is authenticated</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user fills up a form giving user and password</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>MAK07 has login the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCLOG(02,03,07)</td></tr>
</table>

Figure 3.52: Use Case UCLOG01

<table>
<tr><th colspan="2">UCLOG02</th><th colspan="2">Link Facebook</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Link Facebook to Login</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account on Facebook</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The user is authenticated</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>Click on login with Facebook button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>MAK07 has login the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCLOG(01,03,07)</td></tr>
</table>

Figure 3.53: Use Case UCLOG02

<table>
<tr><th colspan="2">UCLOG03</th><th colspan="2">Link Google</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Link Google to Login</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account on Google</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The user is authenticated</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>Click on login with Google button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>MAK07 has login the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCLOG(01,02,07)</td></tr>
</table>

Figure 3.54: Use Case UCLOG03

UCLOG04	Create nickname		
Target of Use case	Create a nickname		
Inputs			
Outputs	The user has a nickname for MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User type a nickname		
		2	The system checks the email and the nickname verifying the uniqueness account
		3	The system saves the nickname of a user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCLOG(01,02,03)		

Figure 3.55: Use Case UCLOG04

UCLOG05	Check unique account		
Target of Use case	Check uniqueness of account		
Inputs	User has an account		
Outputs	The system only has one account linked with the email		
Basic flow			
No	**User**	**No**	**System**
1	User type an email to link with		
		2	The system checks the email and the nickname verifying the uniqueness account
		3	The system saves the nickname and email of a user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCLOG(01,02,03,04)		

Figure 3.56: Use Case UCLOG05

<table>
<tr><th colspan="2">UCLOG06</th><th colspan="2">Save user information</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Save in MAK07 system the user information given by the user</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User has an account</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system only has one account linked with the email</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User type an email to link with</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system checks the email and the nickname verifying the uniqueness account</td></tr>
<tr><td></td><td></td><td>3</td><td>The system saves the nickname and email of a user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCLOG(01,02,03,04,05)</td></tr>
</table>

Figure 3.57: Use Case UCLOG06

<table>
<tr><th colspan="2">UCLOG07</th><th colspan="2">Login</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Login into MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system login a user and shows home interface</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User type email and password</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system login a user</td></tr>
<tr><td></td><td></td><td>3</td><td>The system shows home interface</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCLOG(01,02,03,04,05,06)</td></tr>
</table>

Figure 3.58: Use Case UCLOG07

UCP01	Show nickname		
Target of Use case	Show the nickname of a user		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the nickname of the user		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the nickname of the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (02-15)		

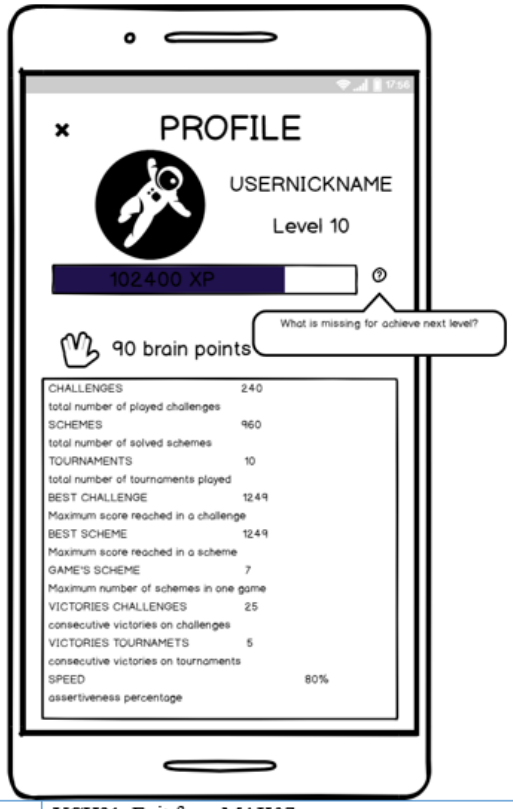


Figure 3.59: Use Case UCP01

UCP02	Show level		
Target of Use case	Show the level of a user		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the level of the user		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the level of the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01,03-15)		

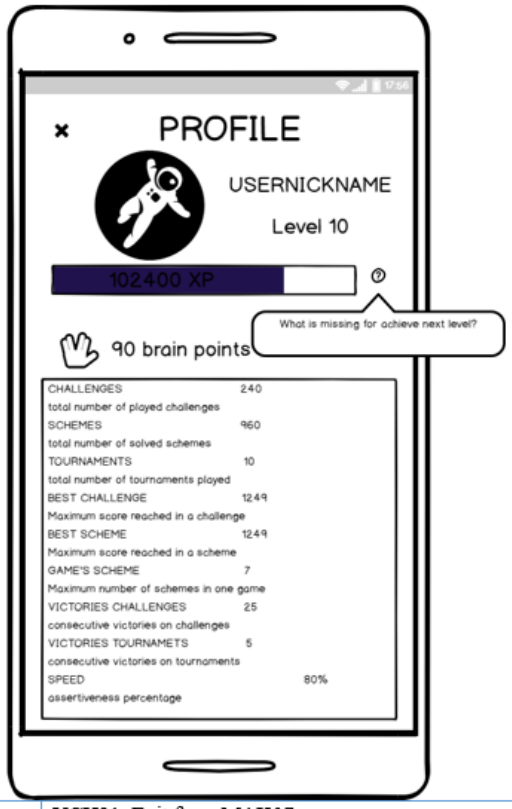


Figure 3.60: Use Case UCP02

UCP03	Show picture		
Target of Use case	Show the picture of a user		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the picture of the user		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the picture of the user
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01,02,04-15)		

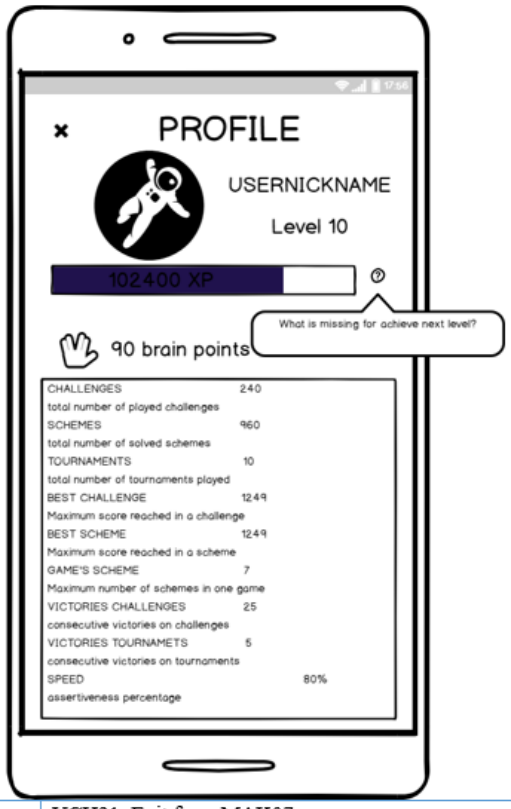


Figure 3.61: Use Case UCP03

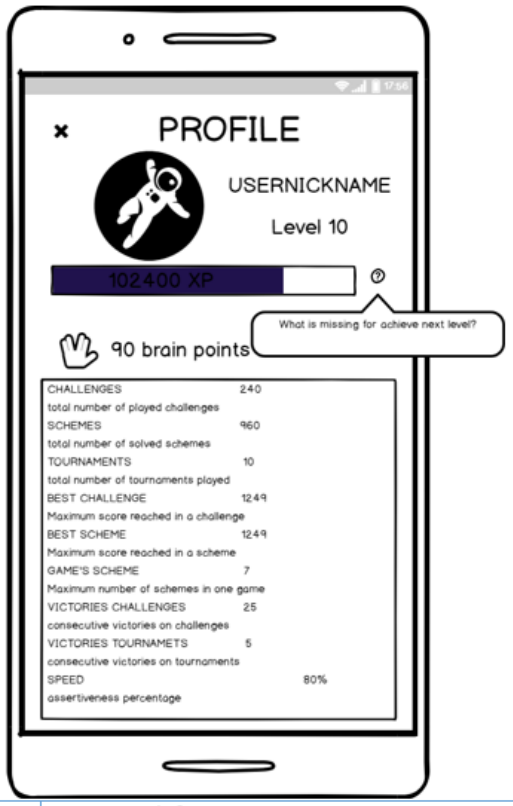
<table>
<tr><th colspan="2">UCP04</th><th colspan="2">Show progress bar with XP</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the progress on MAK7 of a user represented with a progress bar</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the progress of the user represented with a progress bar</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult his profile</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the progress of the user represented with a progress bar</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCP (01-03,05-15)</td></tr>
</table>

Figure 3.62: Use Case UCP04

UCP05	Provide information how to reach new level		
Target of Use case	Provide information about what is missing to complete the full bar progress to reach the new level when they click ? button		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the information that a user needs to know of how to reach a new level of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the information that an user needs to know of how to reach a new level of MAK07
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-04,06-15)		

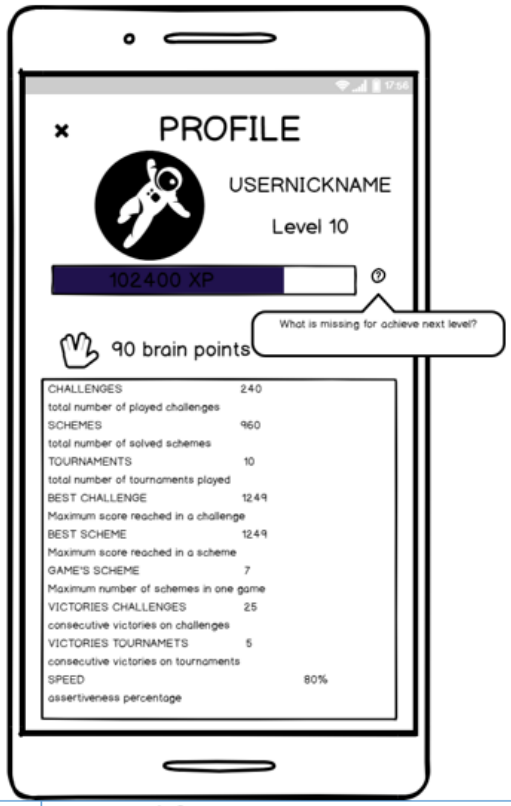


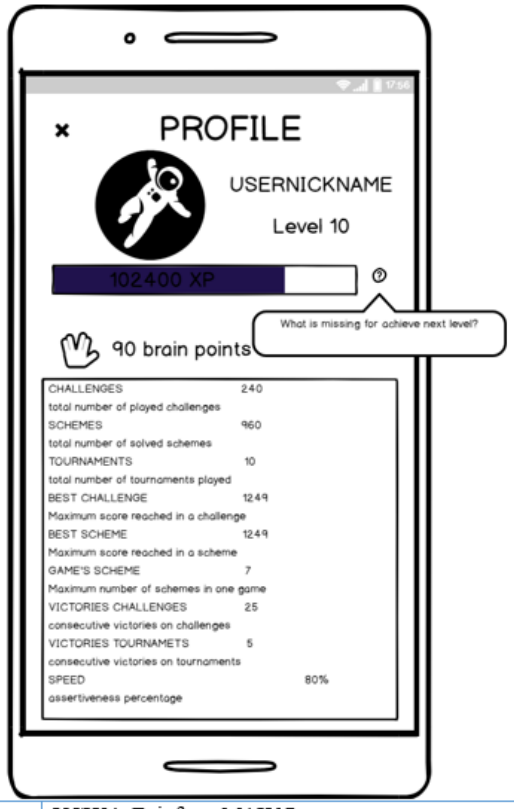
Figure 3.63: Use Case UCP05

UCP06	Show number of brains
Target of Use case	Show how many brains the user have collected on MAK07
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07
Outputs	The system shows the number of brains that a user has collected until this time

Basic flow

No	User	No	System
1	User consult his profile		
		2	The system shows the number of brains that a user has collected until this time

Interface view



Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UCH04, UCP (01-05,07-15)

Figure 3.64: Use Case UCP06

UCP07	Show number of played challenges		
Target of Use case	Show how many challenges have played until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of challenges that a user has played until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the number of challenges that a user has played until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-06,08-15)		

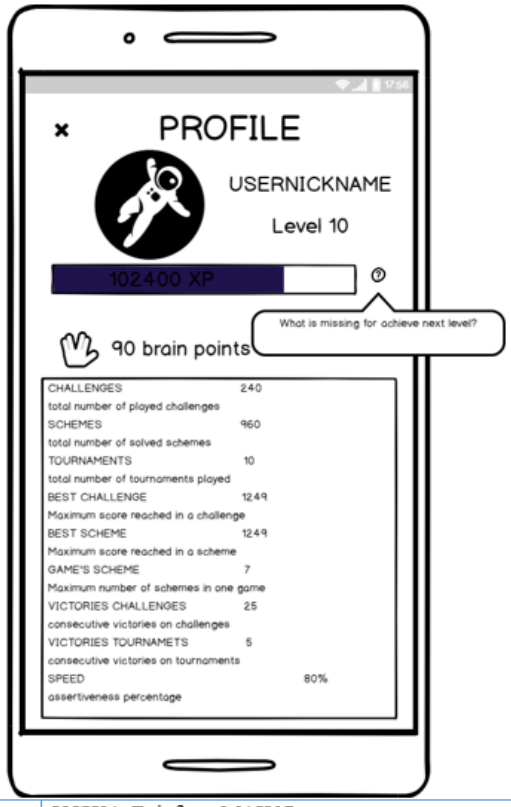


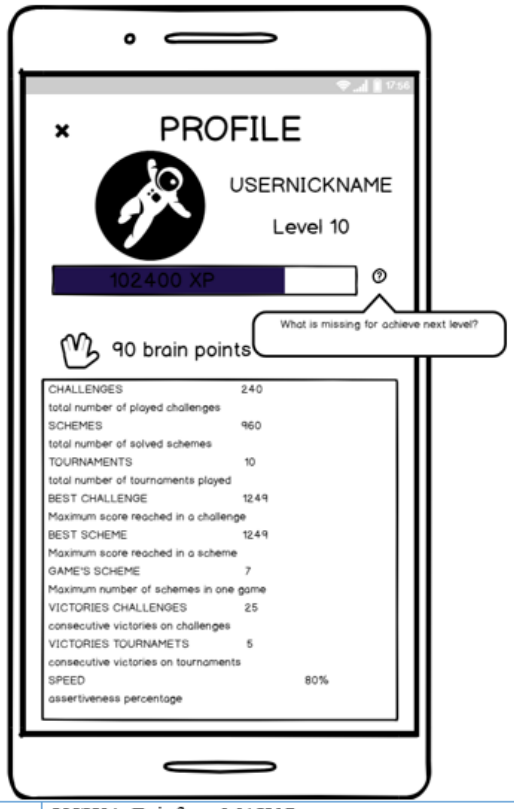
Figure 3.65: Use Case UCP07

UCP08	Show number of schemas solved
Target of Use case	Show how many schemas have solved until that time
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07
Outputs	The system shows the number of schemas that a user has solved until that time

Basic flow

No	User	No	System
1	User consult his profile		
		2	The system shows the number of schemas that a user has solved until that time

Interface view



Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UCH04, UCP (01-07,09-15)

Figure 3.66: Use Case UCP08

UCP09	Show number of tournament played		
Target of Use case	Show how many tournaments have played until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of tournament that a user has played until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the number of tournament that a user has played until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-08,10-15)		

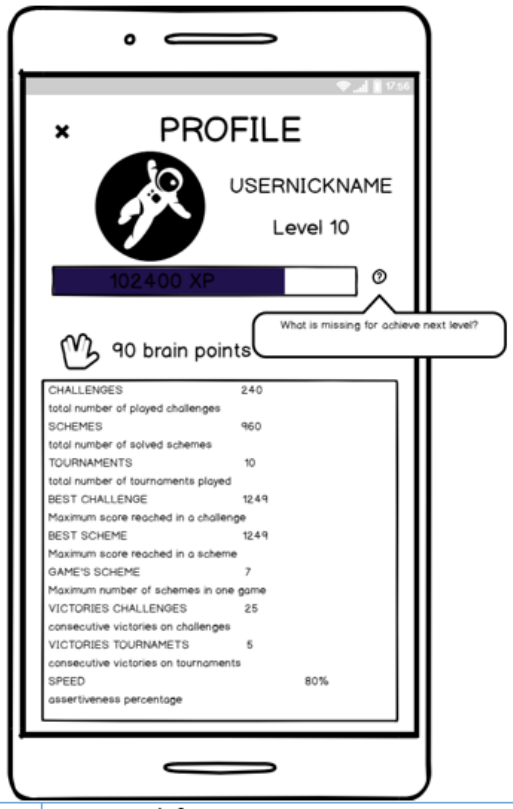


Figure 3.67: Use Case UCP09

UCP10	Show number of tournaments played		
Target of Use case	Show how many tournaments have played until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of tournaments that a user has played until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the number of tournaments that a user has played until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-09,11-15)		

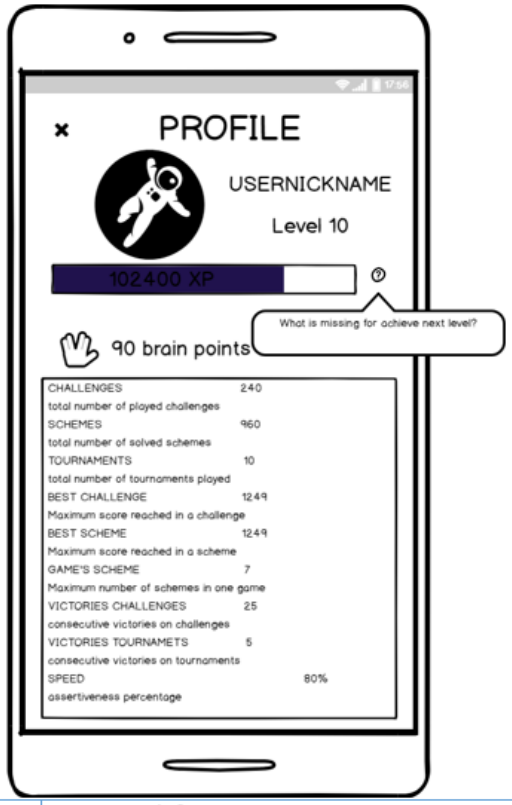


Figure 3.68: Use Case UCP10

UCP11	Show the maximum score reached		
Target of Use case	Show the maximum score reached in a scheme until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the maximum score reached in a scheme until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the maximum score reached in a scheme until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-10,12-15)		

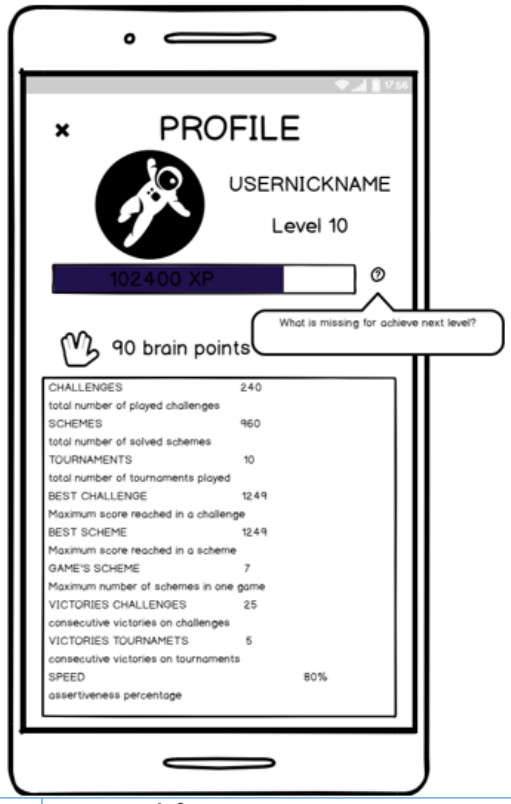


Figure 3.69: Use Case UCP11

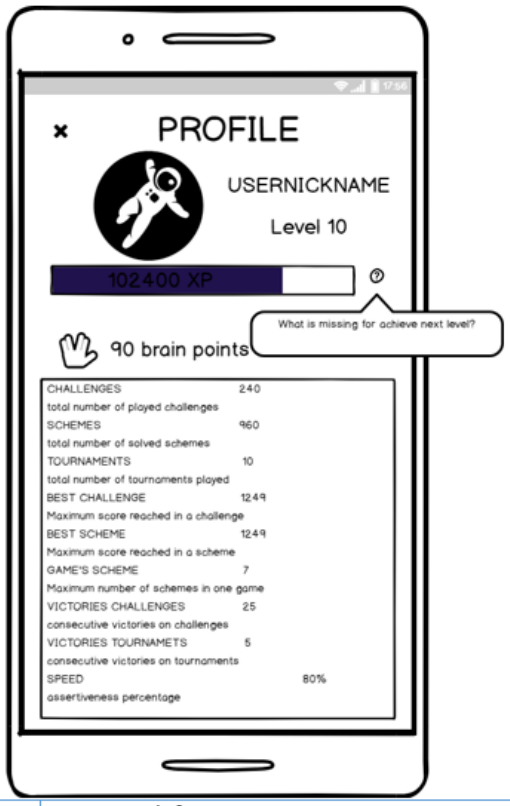
<table>
<tr><th colspan="2">UCP12</th><th colspan="2">Show the maximum number of schemas solved</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the maximum number of schemas solved in one game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the maximum number of schemas solved in one game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult his profile</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the maximum number of schemas solved in one game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH04, UCP (01-11,13-15)</td></tr>
</table>

Figure 3.70: Use Case UCP12

UCP13	Show the consecutive victories on a challenge		
Target of Use case	Show the consecutive victories on a challenge that have done until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the consecutive victories on a challenge that have done until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the consecutive victories on a challenge that have done until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-12,15)		

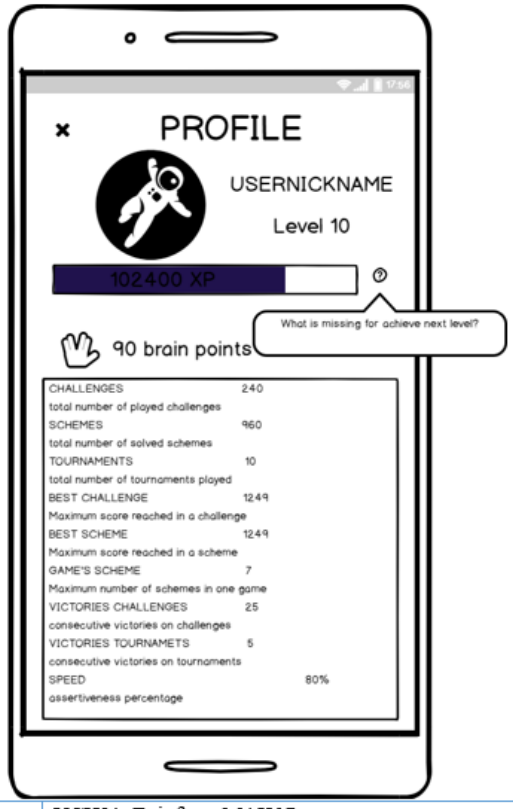


Figure 3.71: Use Case UCP13

UCP14	Show the consecutive victories on a tournament		
Target of Use case	Show the consecutive victories on a tournament that have done until that time		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the consecutive victories on a tournament that have done until that time		
Basic flow			
No	**User**	**No**	**System**
1	User consult his profile		
		2	The system shows the consecutive victories on a tournament that have done until that time
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH04, UCP (01-13,15)		

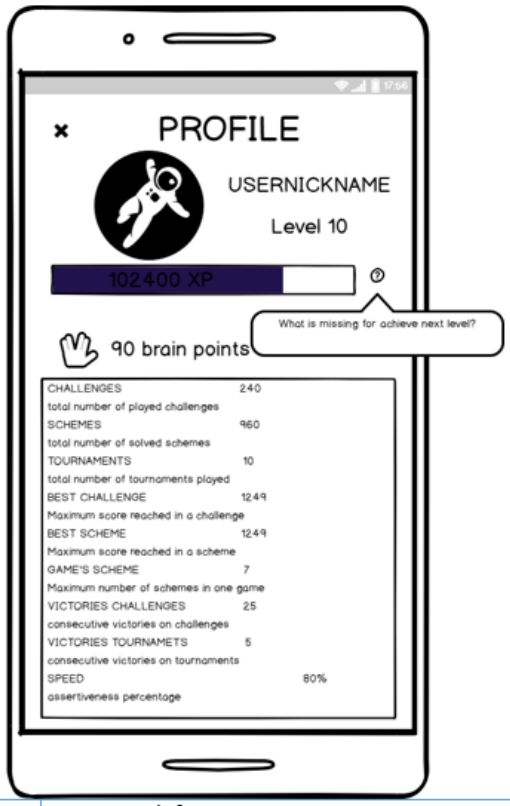


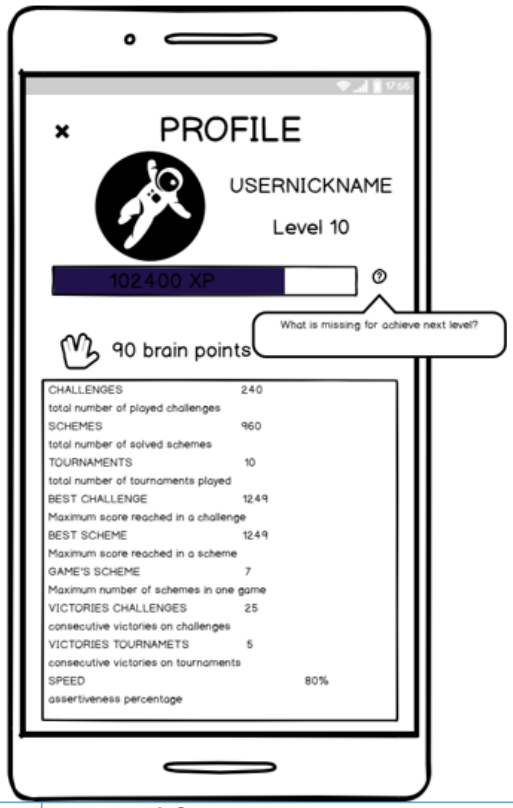
Figure 3.72: Use Case UCP14

UCP15	Show the percentage of assertiveness
Target of Use case	Show the percentage of assertiveness of user playing MAK07 until this time
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07
Outputs	The system shows the percentage of assertiveness of user playing MAK07 until this time

Basic flow

No	User	No	System
1	User consult his profile		
		2	The system shows the percentage of assertiveness of user playing MAK07 until this time

Interface view



Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UCH04, UCP (01-14)

Figure 3.73: Use Case UCP15

<table>
<tr><th colspan="2">UCTU01</th><th colspan="2">Show the goal of MAK07</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the goal of playing MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the goal of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the tutorial</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the goal of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH03, UCTU (02-07)</td></tr>
</table>

Figure 3.74: Use Case UCTU01

<table>
<tr><th colspan="2">UCTU02</th><th colspan="2">Show the explanation how to play</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the explanation of how to play MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the explanation of how to play MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the tutorial</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the explanation of how to play MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH03, UCTU (01,03-07)</td></tr>
</table>

Figure 3.75: Use Case UCTU02

<table>
<tr><th colspan="2">UCTU03</th><th colspan="2">Show how the results are shown</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the explanation of how the results are shown until arrived to 0</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the explanation of how the results are shown until arrived to 0</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the tutorial</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the explanation of the results are shown until arrived to 0</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH03, UCTU (01,02,04-07)</td></tr>
</table>

Figure 3.76: Use Case UCTU03

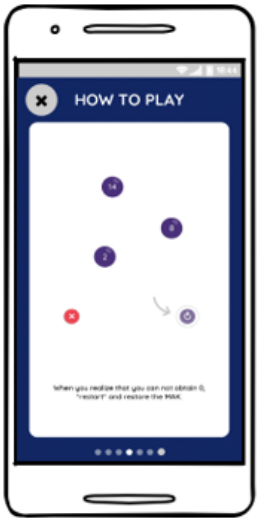
<table>
<tr><th colspan="2">UCTU04</th><th colspan="2">Show how to restart or cancel the game</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the explanation of how to restart or cancel the game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the explanation of how restart or cancel the game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the tutorial</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the explanation of how to restart or cancel a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH03, UCTU (01-03,05-07)</td></tr>
</table>

Figure 3.77: Use Case UCTU04

UCTU05	Show the rules		
Target of Use case	Show the rules of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the rules of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User consult the tutorial		
		2	The system shows the rules of MAK07
Interface view			

Alternative flow 1:	UCH21: Exit from MAK07.
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.
Extensions	UCH03, UCTU (01-04,06,07)

Figure 3.78: Use Case UCTU05

<table>
<tr><th colspan="2">UCTU06</th><th colspan="2">Show how the points are calculated</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the information of how the points are calculated according to each operation</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the information of how the points are calculated according to each operation</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the tutorial</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the information of how the points are calculated according to each operation</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH03, UCTU (01-05,07)</td></tr>
</table>

Figure 3.79: Use Case UCTU06

UCTU07	Show the strategy		
Target of Use case	Show the strategy of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the strategy of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	User consult the tutorial		
		2	The system shows the strategy of MAK07
Interface view  			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH03, UCTU (01-06)		

Figure 3.80: Use Case UCTU07

<table>
<tr><th>UC3-6P01</th><th colspan="3">Show a MAK schema composed of 3 numbers</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Show a MAK schema composed of 3 numbers</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system shows a schema of 3 numbers</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the schema composed by 3 numbers</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH02, UC3-6P02</td></tr>
</table>

Figure 3.81: Use Case UC3-6P01

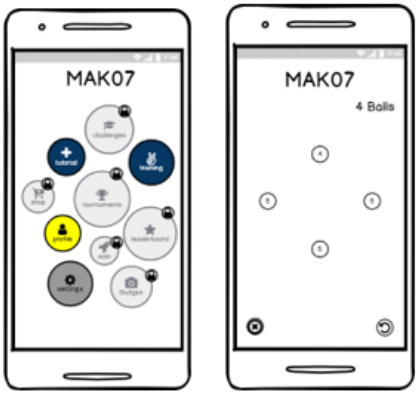
<table>
<tr><th colspan="2">UC3-6P02</th><th colspan="2">Show a MAK schema composed of 4 numbers</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a MAK schema composed of 4 numbers</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a schema of 4 numbers</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the schema composed by 4 numbers</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UC3-6P (01,03)</td></tr>
</table>

Figure 3.82: Use Case UC3-6P02

<table>
<tr><th colspan="2">UC3-6P03</th><th colspan="2">Show a MAK schema composed of 5 numbers</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a MAK schema composed of 5 numbers</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a schema of 5 numbers</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the schema composed by 5 numbers</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UC3-6P (01,04)</td></tr>
</table>

Figure 3.83: Use Case UC3-6P03

UC3-6P04	Show a MAK schema composed of 6 numbers		
Target of Use case	Show a MAK schema composed of 6 numbers		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a schema of 6 numbers		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows the schema composed by 6 numbers
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02, UC3-6P (01,05)		

Figure 3.84: Use Case UC3-6P04

UC3-6P05	Unblock functionalities of MAK07		
Target of Use case	Show the first trophy that unblock the rest of functionalities of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a trophy of unblock functionalities		
Basic flow			
No	**User**	**No**	**System**
1	User finish all progressive training schemas		
		2	The system shows a trophy won by the user
		3	The system unblocks the rest of functionalities
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02		

Figure 3.85: Use Case UC3-6P05

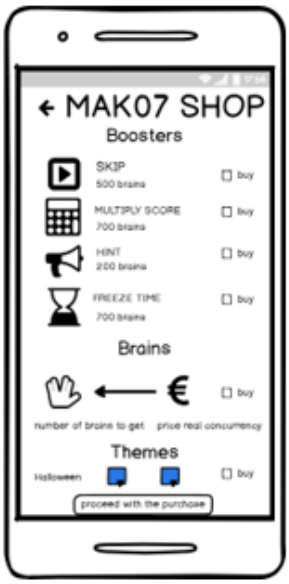
<table>
<tr><th colspan="2">UCSH01</th><th colspan="2">Show all items to buy</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show all the items to buy of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of items with the price related</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User consult the shop</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a list of items with the price related</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (02-08)</td></tr>
</table>

Figure 3.86: Use Case UCSH01

<table>
<tr><th colspan="2">UCSH02</th><th colspan="2">Selection of items to buy</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the check boxes to be selected representing the list of items to buy</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system allows the selection of items to buy from the list</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select the items to buy using the check box</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system saves the list of items selected to buy</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01,03-08)</td></tr>
</table>

Figure 3.87: Use Case UCSH02

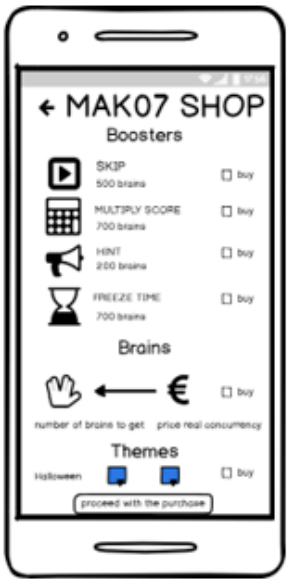
UCSH03	Show the button to proceed with the purchase		
Target of Use case	Show the button to proceed with the purchase		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the button to proceed with the purchase		
Basic flow			
No	**User**	**No**	**System**
1	User select the items to buy using the check box		
		2	The system saves the list of items selected to buy
		3	The system allows the button to proceed with purchase
Interface view  			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02, UCSH (01,02,04-08)		

Figure 3.88: Use Case UCSH03

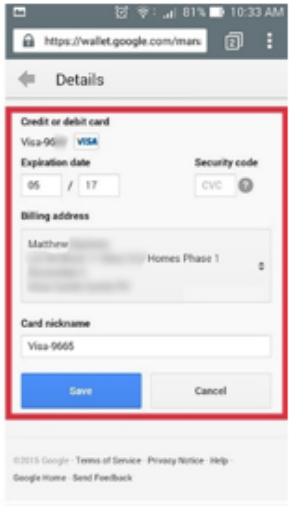
UCSH04	Select the method of payment		
Target of Use case	Show the button to proceed with the purchase		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07 User must already have associated a payment account		
Outputs	The system shows the button to proceed with the purchase		
Basic flow			
No	**User**	**No**	**System**
1	User select the items to buy using the check box		
		2	The system saves the list of items selected to buy
		3	The system allows the button to proceed with purchase
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH02, UCSH (01-03,05-08)		

Figure 3.89: Use Case UCSH04

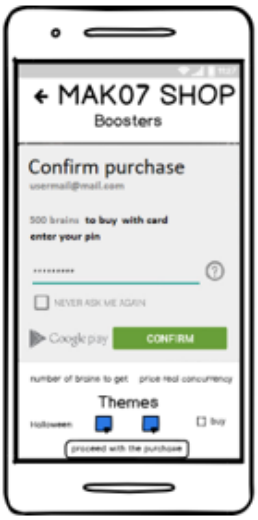
<table>
<tr><th colspan="2">UCSH05</th><th colspan="2">Allow the user to confirm the purchase before connexon to the bank</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the button to proceed with the purchase</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have associated a payment account</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the button to confirm the purchase</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User select the button proceed purchase</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a message of confirmation</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01-04,06-08)</td></tr>
</table>

Figure 3.90: Use Case UCSH05

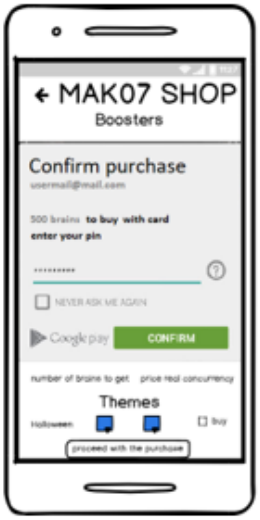
<table>
<tr><th colspan="2">UCSH06</th><th colspan="2">send the receipt</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Send the receipt of the purchase by email</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have associated a payment account
User must already have bought an item</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system sends the receipt of the purchase by email</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User bought an item</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system sends the receipt of the purchase by email</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01-05,07,08)</td></tr>
</table>

Figure 3.91: Use Case UCSH06

<table>
<tr><th colspan="2">UCSH07</th><th colspan="2">send the receipt</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Send the receipt of the purchase by email</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have associated a payment account
User must already have bought an item</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system sends the receipt of the purchase by email</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User bought an item</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system sends the receipt of the purchase by email</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01-05,07,08)</td></tr>
</table>

Figure 3.92: Use Case UCSH07

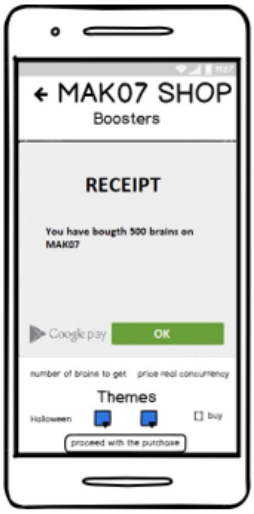
<table>
<tr><th colspan="2">UCSH08</th><th colspan="2">Show the receipt</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Send the receipt of the purchase</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have associated a payment account
User must already have bought an item</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the receipt of the purchase</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User bought an item</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the receipt of the purchase</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01-06,08)</td></tr>
</table>

Figure 3.93: Use Case UCSH08

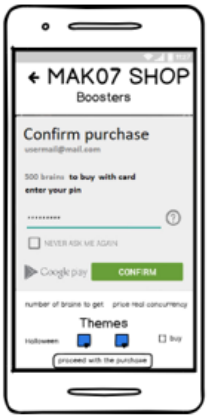
<table>
<tr><th colspan="2">UCSH09</th><th colspan="2">Transaction security</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to introduce bank account information</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07
User must already have associated a payment account
User must already have bought an item</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system allows the user to introduce bank account information</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User bought an item</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system allows the user to introduce bank account information</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH02, UCSH (01-07)</td></tr>
</table>

Figure 3.94: Use Case UCSH09

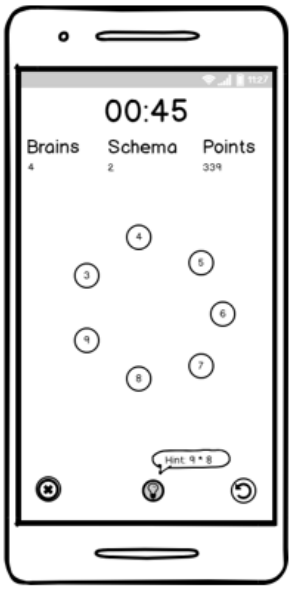
<table>
<tr><th colspan="2">UCTR01</th><th colspan="2">Show the time left</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the time left for a game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the time left</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the time left</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12</td></tr>
</table>

Figure 3.95: Use Case UCTR01

UCTR02	Show number of brains accumulated		
Target of Use case	Show the time left for a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the time left		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows the time left
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12		

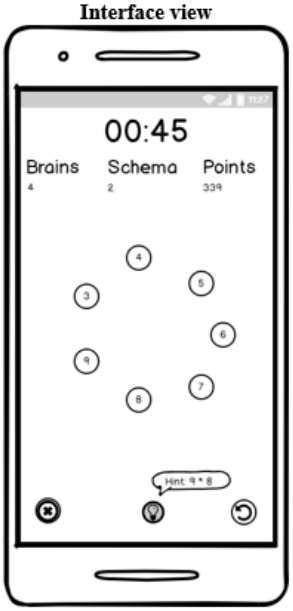


Figure 3.96: Use Case UCTR02

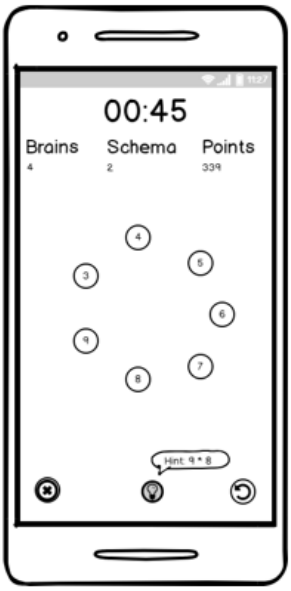
<table>
<tr><th colspan="2">UCTR03</th><th colspan="2">Show number of schemas solved</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the number of schemas solved until that time in the same game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the number of schemas solved until that time in the same game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the number of schemas solved until that time in the same game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12</td></tr>
</table>

Figure 3.97: Use Case UCTR03

UCTR04	Show number of points accumulated		
Target of Use case	Show the number of points accumulated until that time in a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of points accumulated until that time in a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows the number of points accumulated until that time in a game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12		

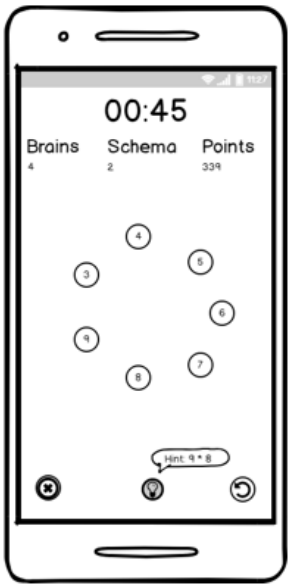


Figure 3.98: Use Case UCTR04

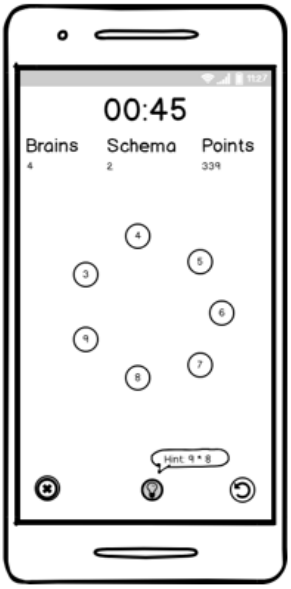
<table>
<tr><th colspan="2">UCTR05</th><th colspan="2">Show hint</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a hint for solving the schema presented</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a hint for solving the schema presented</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a hint for solving the schema presented</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12</td></tr>
</table>

Figure 3.99: Use Case UCTR05

<table>
<tr><th colspan="2">UCTR06</th><th colspan="2">Show results after times up</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Provide the resume and results of a game done after times up</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the resume and results of a game done after times up</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the resume and results of a game done after times up</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12</td></tr>
</table>

Figure 3.100: Use Case UCTR06

<table>
<tr><th colspan="2">UCTR07</th><th colspan="2">Show actual level of a player</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the actual level of a player on MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the actual level of a player</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the actual level of a player</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05,11-15)</td></tr>
</table>

Figure 3.101: Use Case UCTR07

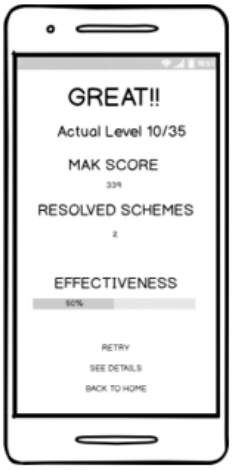
UCTR08	Show XP (MAK) points		
Target of Use case	Show the score of XP points gotten after a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the score of XP points gotten after a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows the score of XP points gotten after a game in the screen
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05,11-15)		

Figure 3.102: Use Case UCTR08

<table>
<tr><th colspan="2">UCTR09</th><th colspan="2">Show number schemas solved</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the number of schemas solved in a game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the number of schemas solved in a game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the number of schemas solved in a game on the screen</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05,11-15)</td></tr>
</table>

Figure 3.103: Use Case UCTR09

<table>
<tr><th colspan="2">UCTR10</th><th colspan="2">Show the effectiveness</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the effectiveness of a game represented in a progress bar</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the effectiveness of a game represented in a progress bar</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the effectiveness of a game represented in a progress bar on the screen</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05,11-15)</td></tr>
</table>

Figure 3.104: Use Case UCTR10

<table>
<tr><th>UCTR11</th><th colspan="3">Retry game</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Allow the user to retry the game one more time</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system allows the user to retry the same game one more time</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a button for retry the game saving the number of the seed played before</td></tr>
<tr><td></td><td></td><td>3</td><td>The system shows again the game with the same seed</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.105: Use Case UCTR11

UCTR12	Buy best solution		
Target of Use case	Allow the user to buy the best solution of a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the button to buy the best solution of a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows a button to see details
		3	The system shows the button to buy details of the best solution
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05)		

Figure 3.106: Use Case UCTR12

<table>
<tr><th colspan="2">UCTR13</th><th colspan="2">Display a message of motivation</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Display a message of motivation after finished a game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows on the screen a message of motivation</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows on the screen a message of motivation</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.107: Use Case UCTR13

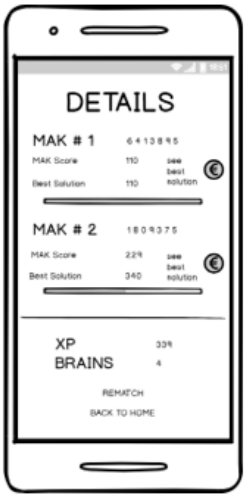
<table>
<tr><th colspan="2">UCTR14</th><th colspan="2">Display the details of each schema solved</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Display as a list all the details of each schema solved in a game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows on the screen a list of details of each schema solved in the game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows on the screen a list of details of each schema solved in the game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.108: Use Case UCTR14

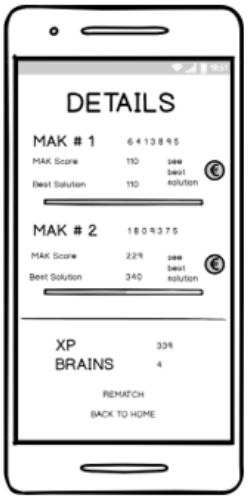
<table>
<tr><th colspan="2">UCTR15</th><th colspan="2">Display input numbers of each schema</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Display the combination of numbers of input of each schema in a game included in a list</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows on the screen the combination of numbers of input of each schema solved in the game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows on the screen the combination of numbers of input of each schema solved in the game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.109: Use Case UCTR15

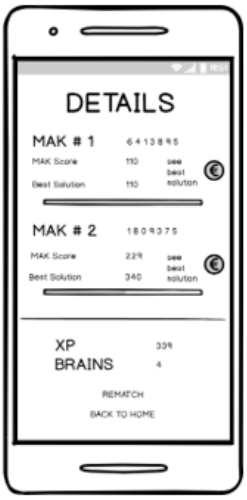
UCTR16	Display XP points gotten for each schema		
Target of Use case	Display the XP points gotten for each schema solved in a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows on the screen the XP points gotten for each schema solved in a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows on the screen the XP points gotten for each schema solved in a game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05)		

Figure 3.110: Use Case UCTR16

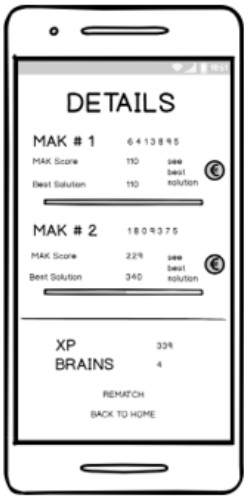
UCTR17	Display points of best solution		
Target of Use case	Display the points of the best solution for each schema solved in a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows on the screen numerically and with a progress bar the points of the best solution for each schema solved in a game,		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows on the screen the points of the best solution for each schema solved in a game
		3	The system shows a contrast between points gotten versus points of the best solution found for each schema solved in a game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05)		

Figure 3.111: Use Case UCTR17

<table>
<tr><th colspan="2">UCTR18</th><th colspan="2">Show details of operations done</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the details of the operations done</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows on the screen numerically and with a progress bar the points of the best solution for each schema solved in a game,</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows on the screen the points of the best solution for each schema solved in a game</td></tr>
<tr><td></td><td></td><td>3</td><td>The system shows a contrast between points gotten versus points of the best solution found for each schema solved in a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.112: Use Case UCTR18

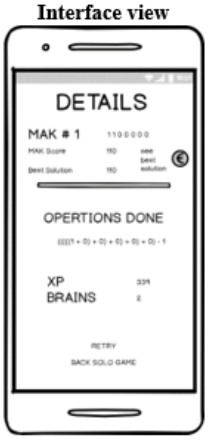
UCTR19	Progress bar contrast		
Target of Use case	Display a progress bar that represent the comparation between best solution and the solution done by the user for each schema solved in a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a progress bar that contrast the points of the best solution with the points gotten of a schema solved in a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows a contrast between points gotten versus points of the best solution found for each schema solved in a game represented with a progress bar
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05)		

Figure 3.113: Use Case UCTR19

UCTR20	Show total brains		
Target of Use case	Show the total brains that a user has won		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of brains gotten after played a game		
Basic flow			
No	**User**	**No**	**System**
1	User play training mode		
		2	The system shows the number of brains gotten after played a game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH12, UCH01, UCTR (01-05)		

Figure 3.114: Use Case UCTR20

<table>
<tr><th>UCTR21</th><th colspan="3">Show total points</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Show the total points that a user has won</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system shows the number of points gotten after played a game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play training mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the number of points gotten after played a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH12, UCH01, UCTR (01-05)</td></tr>
</table>

Figure 3.115: Use Case UCTR21

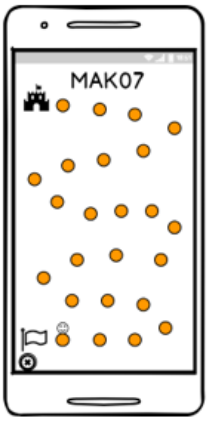
<table>
<tr><th colspan="2">UCSOLO01</th><th colspan="2">Show a path game</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a path game where is visualized the starting point, the finish, each stop where the player can be and each stop that represent levels of difficulties progressive</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a path game where is visualized the starting point, the finish, each stop where the player can be and each stop that represent levels of difficulties progressive</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a path game where is visualized the starting point, the finish, each stop where the player can be and each stop that represent levels of difficulties progressive</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08, UCSOLO (02-05)</td></tr>
</table>

Figure 3.116: Use Case UCSOLO01

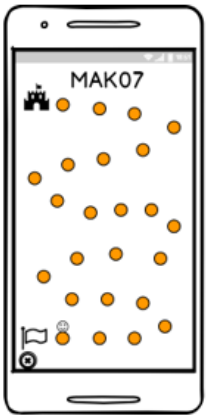
<table>
<tr><th colspan="2">UCSOLO02</th><th colspan="2">Show stop position on path</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show where the user is over the path game in solo game MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows where the user is over the path game in solo game MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a symbolic representation of the last stop where the user was, in the case of first game always be on 1st stop</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08, UCSOLO (01,03-05)</td></tr>
</table>

Figure 3.117: Use Case UCSOLO02

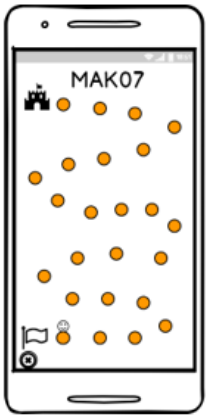
UCSOLO03	Repeat game stop		
Target of Use case	Allow the user play as many times the player want a level that he/she already has overcome		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system allows to play repeatedly an overcome game		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game mode		
		2	The system allows to play repeatedly an overcome game and save the results obtain after played
Interface view  			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH08, UCSOLO (01,02,04,05)		

Figure 3.118: Use Case UCSOLO03

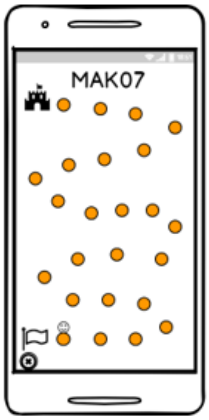
UCSOLO04	Change game stop		
Target of Use case	Allow the user to change the level when has overcome a level of a path game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system allows the use to change the level when has overcome a level of a path game		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game mode		
		2	The system allows the use to change the level when has overcome a level of a path game
Interface view  			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH08, UCSOLO (01 - 03,05)		

Figure 3.119: Use Case UCSOLO04

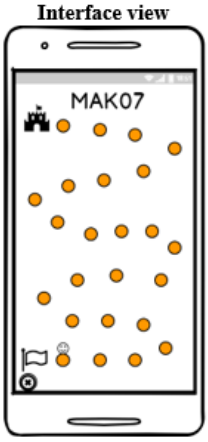
<table>
<tr><th colspan="2">UCSOLO05</th><th colspan="2">Visualized unblock stops on path</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Visualized unblock levels that user hasn't yet overcome in the game path</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows unblock levels that user hasn't yet overcome in the game path</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows unblock levels that user hasn't yet overcome in the game path</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08, UCSOLO (01 - 04)</td></tr>
</table>

Figure 3.120: Use Case UCSOLO05

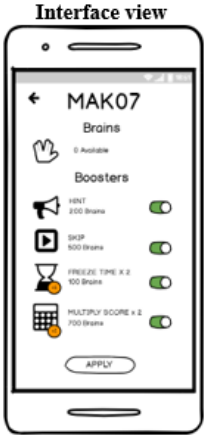
<table>
<tr><th>UCSOLO06</th><th colspan="3">Active booster</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Allow the user to active booster for a game</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system shows a list of boosts available for the game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td>2</td><td>User select one stop to play</td><td></td><td></td></tr>
<tr><td></td><td></td><td>3</td><td>The system shows a list of boosts available for the game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH08</td></tr>
</table>

Figure 3.121: Use Case UCSOLO06

UCSOLO07	Active booster		
Target of Use case	Allow the user to active booster for a game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a list of boosts available for the game		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game mode		
2	User select one stop to play		
3	User select the booster to apply in the game		
		4	The system shows all the boosters selected for a game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH08		

Figure 3.122: Use Case UCSOLO07

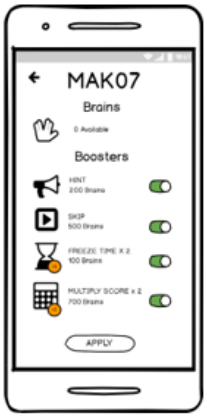
<table>
<tr><th colspan="2">UCSOLO08</th><th colspan="2">Show the cost of each booster</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Shows the cost of each booster for a game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of boosts available for the game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the cost of apply each booster for a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08</td></tr>
</table>

Figure 3.123: Use Case UCSOLO08

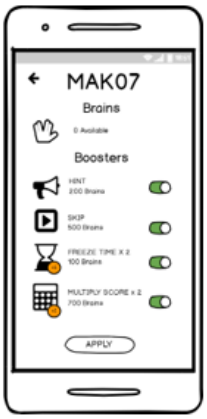
<table>
<tr><th colspan="2">UCSOLO09</th><th colspan="2">Show brains available</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Shows the number of brains available at that moment that a player has</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the number of brains available for apply a booster in a game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the number of brains available for apply a booster in a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08</td></tr>
</table>

Figure 3.124: Use Case UCSOLO09

<table>
<tr><th colspan="2">UCSOLO10</th><th colspan="2">Return to path game of solo game</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Return to path game of solo game of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the screen of the path game of solo game of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User returns to path game of solo game</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the solo game scenario for the solo game of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08</td></tr>
</table>

Figure 3.125: Use Case UCSOLO10

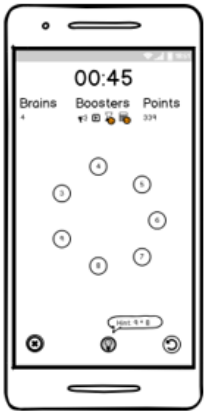
UCSOLO11	Active booster available		
Target of Use case	Show the active booster available in the game		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the active booster available in a game		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game mode		
2	User select one stop to play		
3	User select the booster to apply in the game		
		4	The system shows all the boosters selected for a game
Interface view 			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH08		

Figure 3.126: Use Case UCSOLO11

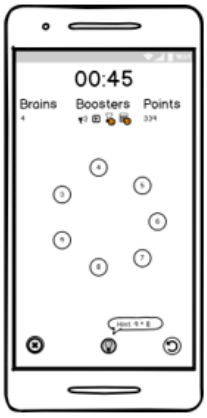
<table>
<tr><th colspan="2">UCSOLO12</th><th colspan="2">MAK schema 7 numbers</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a MAK schema composed of 7 numbers</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a solvable combination of 7 numbers represented with balls</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play solo game mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a solvable combination of 7 numbers represented with balls</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08</td></tr>
</table>

Figure 3.127: Use Case UCSOLO12

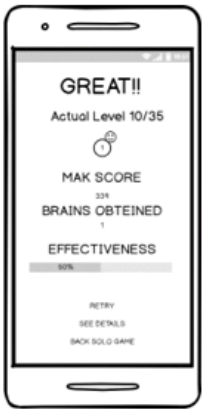
UCSOLO13	Show position of player		
Target of Use case	Show the number of stop where the player actually is		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the number of the stop where the player actually is		
Basic flow			
No	**User**	**No**	**System**
1	User play solo game mode		
		2	The system shows the number of the stop where the player actually is
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH08		

Figure 3.128: Use Case UCSOLO13

<table>
<tr><th colspan="2">UCC01</th><th colspan="2">Create a new challenge</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Create a new challenge by random search of opponent</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system creates a new challenge by random search of opponent</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play challenge mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the interface of a challenge game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH08</td></tr>
</table>

Figure 3.129: Use Case UCC01

<table>
<tr><th colspan="2">UCC02</th><th colspan="2">Show notification of a challenge invitation</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the notification of a challenge invitation</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the notification of a challenge invitation</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>User play challenge mode</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the notification of a challenge invitation</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH10</td></tr>
</table>

Figure 3.130: Use Case UCC02

<table>
<tr><th>UCC03</th><th colspan="3">Accept / Decline challenge</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Allow the user to accept or decline a challenge invitation</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system shows a message of new challenge invitation and can be accepted or decline by the user</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system shows a message of new challenge invitation and can be accepted or decline by the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH10</td></tr>
</table>

Figure 3.131: Use Case UCC03

UCC04	Search a player		
Target of Use case	Create a new challenge by searching a player with nickname		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system searches a player by typing a nickname creating a new challenge with it		
Basic flow			
No	**User**	**No**	**System**
1	The user clicks the button of find by nickname		
		2	The system shows the keyboard for typing the nickname of the player that the user wants to challenge
		3	The system searches on the nickname and sends an invitation to play a challenge by a notification
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH10		

Figure 3.132: Use Case UCC04

<table>
<tr><th>UCC05</th><th colspan="3">Show list of challenges ready to play</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Shows a list of challenges ready to play on MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays a list of challenges that are ready for playing</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on the tab play</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the list of challenges ready to play</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH10</td></tr>
</table>

Figure 3.133: Use Case UCC05

<table>
<tr><th colspan="2">UCC06</th><th colspan="2">Show list of challenges waiting</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Shows a list of challenges waiting to play on MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays a list of challenges that are waiting for playing</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on the tab waiting</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the list of challenges waiting to play</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH10</td></tr>
</table>

Figure 3.134: Use Case UCC06

UCC07	Show list of challenges recently played		
Target of Use case	Shows a list of challenges recently played on MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays a list of challenges that are recently played		
Basic flow			
No	**User**	**No**	**System**
1	The user clicks on the tab finished		
		2	The system shows the list of challenges recently played
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH10		

Figure 3.135: Use Case UCC07

UCC08	Start challenge with active selected booster		
Target of Use case	Start a challenge activating the booster selected previously		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays a list of challenges that are recently played		
Basic flow			
No	**User**	**No**	**System**
		1	The system shows the list of boosters available for the game
2	The user selects the boosters to activate during the game		
3	The user clicks on button play		
		4	The system shows the schema and all the boosters selected available for the game
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH10		

Figure 3.136: Use Case UCC08

UCC09	Return to challenge menu		
Target of Use case	Return to challenge menu		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays the challenge menu		
Basic flow			
No	**User**	**No**	**System**
1	The user clicks on X button, exit button or decline button		
		2	The system shows the screen of challenge menu
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH10		

Figure 3.137: Use Case UCC09

<table>
<tr><th colspan="2">UCC10</th><th colspan="2">Chat with opponent</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Chat with the opponent</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the keyboard for chatting with the opponent</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on chat button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the screen of chatting with the opponent</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH10</td></tr>
</table>

Figure 3.138: Use Case UCC10

UCC11	Type and send message		
Target of Use case	Allow the user to type and send a message		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the keyboard and send a message to the opponent		
Basic flow			
No	**User**	**No**	**System**
1	The user clicks on chat button		
		2	The system shows the screen of chatting with the opponent
3	The user types the message		
4	The user clicks the button send		
		5	The system sends the message to the opponent, generating a notification on opponent
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH10		

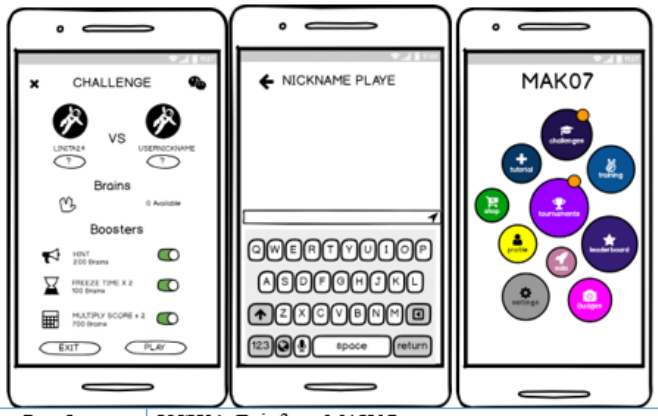


Figure 3.139: Use Case UCC11

<table>
<tr><th colspan="2">UCC12</th><th colspan="2">Return to selection of booster activation for a challenge</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow the user to type and send a message</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the keyboard and send a message to the opponent</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on arrow button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the screen of selection of boosters</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH10</td></tr>
</table>

Figure 3.140: Use Case UCC12

<table>
<tr><th colspan="2">UCTOUR01</th><th colspan="2">Show a list of tournaments</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the list of tournaments available to play</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of tournaments that are available to play</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects to play a tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the screen of tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.141: Use Case UCTOUR01

UCTOUR02	Show a list of tournaments finished		
Target of Use case	Show the list of tournaments recently finished		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a list of tournaments recently played		
Basic flow			
No	**User**	**No**	**System**
1	The user selects the tab of finished		
		2	The system shows the screen of tournament recently finished
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

Figure 3.142: Use Case UCTOUR02

<table>
<tr><th colspan="2">UCTOUR03</th><th colspan="2">Create a new tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Create a new tournament</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of tournaments recently played</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the button new tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the screen of create new tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (04,05,06)</td></tr>
</table>

Figure 3.143: Use Case UCTOUR03

UCTOUR04	Give a name of a tournament		
Target of Use case	Give a name of a tournament to be created		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a field for type the name of a tournament		
Basic flow			
No	**User**	**No**	**System**
1	The user selects the button new tournament		
		2	The system shows the screen of create new tournament
3	The user gives a name of the tournament		
		4	The system saves the tournament name
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09, UCTOUR (03,05,06)		

Figure 3.144: Use Case UCTOUR04

<table>
<tr><th colspan="2">UCTOUR05</th><th colspan="2">Check uniqueness of the name of a tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Check the uniqueness of the name of a tournament to be created associated to a user</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system allows to save the name in the system</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the button new tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the screen of create new tournament</td></tr>
<tr><td>3</td><td>The user gives a name of the tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>4</td><td>The system check uniqueness of the name associated with the user</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (03,04,06)</td></tr>
</table>

Figure 3.145: Use Case UCTOUR05

UCTOUR06	Select number of players of a tournament		
Target of Use case	Select the number of players for a tournament		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system allows to save the number of players in the system		
Basic flow			
No	**User**	**No**	**System**
1	The user selects the number of players for the tournament		
		2	The system saves the number of players selected to start the tournament
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09, UCTOUR (03,04,05)		

Figure 3.146: Use Case UCTOUR06

<table>
<tr><th colspan="2">UCTOUR07</th><th colspan="2">Check minimum number of players to start tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Check after having pass 20 minutes if the minimum number of real players are ready to play</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system starts a tournament after 20 minutes with a minimum number of real players</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the number of players for the tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system waits until 20 minutes checking if at least are the minimum number of real players ready to play a tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (08)</td></tr>
</table>

Figure 3.147: Use Case UCTOUR07

<table>
<tr><th colspan="2">UCTOUR08</th><th colspan="2">Complete tournament players with bots</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Complete the missing number of players of a tournament with bots of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system starts a tournament after 20 minutes with a minimum number of real players and the rest with bots</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the number of players for the tournament</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system waits until 20 minutes checking if at least are the minimum number of real players ready to play a tournament and the rest with bots</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (07)</td></tr>
</table>

Figure 3.148: Use Case UCTOUR08

<table>
<tr><th colspan="2">UCTOUR09</th><th colspan="2">Invite a friend</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Invite friends to join a tournament</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system sends an invitation to the user with the nickname given</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the button invite friends</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system searches a player by nickname to send an invitation of join to new tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (10)</td></tr>
</table>

Figure 3.149: Use Case UCTOUR09

<table>
<tr><th>UCTOUR10</th><th colspan="3">Search friends</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Search friends to join a tournament by nickname</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system sends an invitation to the user with the nickname given</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the button invite friends</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system searches a player by nickname to send an invitation of join to new tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09, UCTOUR (10)</td></tr>
</table>

Figure 3.150: Use Case UCTOUR10

UCTOUR11	Type nickname		
Target of Use case	Allow the user to type nickname to search player		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the keyboard in order to type the nickname of the user of searching		
Basic flow			
No	**User**	**No**	**System**
1	The user selects the button invite friends		
		2	The system shows the keyboard in order to type the nickname of the user of searching
3	The user types the nickname of searching		
		4	The system searches a player by nickname to send an invitation of join to new tournament
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09, UCTOUR (10,11)		

Figure 3.151: Use Case UCTOUR11

UCTOUR12	Send invitation to join the tournament		
Target of Use case	Send the invitation to join the tournament a friend previously searched by nickname		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system sends the invitation to join the tournament to the user searched previously by nickname		
Basic flow			
No	**User**	**No**	**System**
1	The user selects the button invite friends		
		2	The system shows the keyboard in order to type the nickname of the user of searching
3	The user types the nickname of searching		
		4	The system searches a player by nickname to send an invitation of join to new tournament
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09, UCTOUR (10,11)		

Figure 3.152: Use Case UCTOUR12

<table>
<tr><th colspan="2">UCTOUR13</th><th colspan="2">Accept / dismiss invitation tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Accept / dismiss the invitation to join a tournament of MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system receives the answer of the petition sent</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system searches a player by nickname to send an invitation of join to new tournament</td></tr>
<tr><td>2</td><td>The user accepts or reject the invitation</td><td></td><td></td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09, UCTOUR (12)</td></tr>
</table>

Figure 3.153: Use Case UCTOUR13

UCTOUR14	Return to search a player for tournament		
Target of Use case	Return to search a player for tournament		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays the screen of search a player for tournament		
Basic flow			
No	**User**	**No**	**System**
		1	The system searches a player by nickname to send an invitation of join to new tournament
2	The user accepts or reject the invitation		
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09, UCTOUR (12)		

Figure 3.154: Use Case UCTOUR14

UCTOUR15	Return to search a player for tournament		
Target of Use case	Return to search a player for tournament		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays the screen of search a player for tournament		
Basic flow			
No	**User**	**No**	**System**
		1	The system searches a player by nickname to send an invitation of join to new tournament
2	The user accepts or reject the invitation		
Interface view			
			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

Figure 3.155: Use Case UCTOUR15

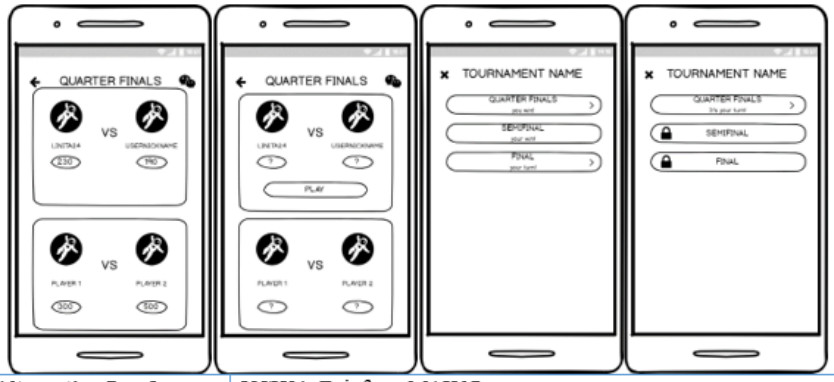
<table>
<tr><th>UCTOUR16</th><th colspan="3">Unblock semifinal of tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Unblock semifinal of tournament MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system unblocks the semifinal and shows the button without the lock</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user wins the quarter finals</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system unblocks the semifinal</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.156: Use Case UCTOUR16

UCTOUR17	Unblock final of tournament		
Target of Use case	Unblock final of tournament MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system unblocks the final and shows the button without the lock		
Basic flow			
No	**User**	**No**	**System**
1	The user wins the semifinal finals		
		2	The system unblocks the final
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

Figure 3.157: Use Case UCTOUR17

UCTOUR18	Unblock quarter of tournament		
Target of Use case	Unblock quarter of tournament MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system unblocks the quarter and shows the button without the lock		
Basic flow			
No	**User**	**No**	**System**
1	The user starts the tournament		
		2	The system unblocks the quarter
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

Figure 3.158: Use Case UCTOUR18

<table>
<tr><th>UCTOUR19</th><th colspan="3">Notify quarter finals of tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Notify to all users that the quarter finals of tournament have started on MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system sends a notification of the started quarter finals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system has created the tournament</td></tr>
<tr><td></td><td></td><td>2</td><td>The system sends a notification to all users playing the tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.159: Use Case UCTOUR19

<table>
<tr><th colspan="2">UCTOUR20</th><th colspan="2">Notify semifinals of tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Notify to all users that the semifinals of tournament have started on MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system sends a notification of the started semifinals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system checks that all users have played quarter finals</td></tr>
<tr><td></td><td></td><td>2</td><td>The system sends a notification to winner users playing semifinals of the tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.160: Use Case UCTOUR20

<table>
<tr><th>UCTOUR21</th><th colspan="3">Notify final of tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Notify to all users that the finals of tournament have started on MAK07</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system sends a notification of the started final</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td></td><td></td><td>1</td><td>The system checks that all users have played semifinals</td></tr>
<tr><td></td><td></td><td>2</td><td>The system sends a notification to winner users playing final of the tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.161: Use Case UCTOUR21

<table>
<tr><th colspan="2">UCTOUR22</th><th colspan="2">Visualize the draw</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow to visualize the draw of tournament players in the quarter finals</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface where is shown the draw of tournament players in the quarter finals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on quarter finals button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the interface where is shown the draw of tournament players in the quarter finals</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.162: Use Case UCTOUR22

<table>
<tr><th colspan="2">UCTOUR23</th><th colspan="2">Visualize the score quarter finals</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow to visualize the score of each player in quarter finals of a tournament</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface where is shown the score of each player in quarter finals of a tournament</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on quarter finals button</td><td></td><td></td></tr>
<tr><td>2</td><td>Users have finished their games on quarter finals</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the interface where is shown the score of each player in quarter finals of a tournament</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.163: Use Case UCTOUR23

<table>
<tr><th colspan="2">UCTOUR24</th><th colspan="2">Chat players tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow to chat with players of a tournament</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the interface of chat</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user clicks on chat button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the keyboard to type a message</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.164: Use Case UCTOUR24

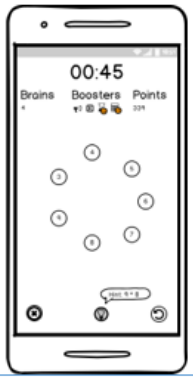
<table>
<tr><th colspan="2">UCTOUR25</th><th colspan="2">Activate booster tournament</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Allow to activate and select the boosters for the tournament game</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the active booster available in a game</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user starts a game of the tournament with the active boosters selected</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows all the boosters selected for a game</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.165: Use Case UCTOUR25

UCTOUR26	Return to tournament waiting room for semifinals		
Target of Use case	Return to tournament waiting room for semifinals		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays the screen of tournament waiting room for semifinals		
Basic flow			
No	**User**	**No**	**System**
1	The user finished a game of semifinals		
		2	The system displays the screen of tournament waiting room for semifinals
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

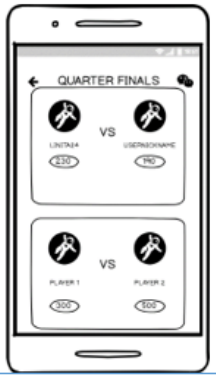


Figure 3.166: Use Case UCTOUR26

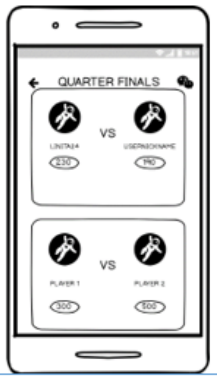
<table>
<tr><th colspan="2">UCTOUR27</th><th colspan="2">Return to tournament waiting room for quarter finals</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Return to tournament waiting room for quarter finals</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the screen of tournament waiting room for quarter finals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user finished a game of quarter finals</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen of tournament waiting room for quarter finals</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.167: Use Case UCTOUR27

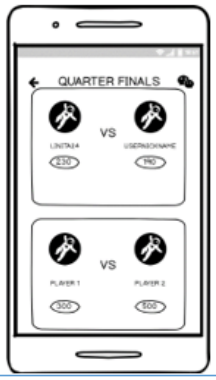
<table>
<tr><th colspan="2">UCTOUR28</th><th colspan="2">Return to tournament waiting room for final</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Return to tournament waiting room for final</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the screen of tournament waiting room for final</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user finished a game of final</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen of tournament waiting room for final</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH09</td></tr>
</table>

Figure 3.168: Use Case UCTOUR28

UCTOUR29	Return to tournament waiting room		
Target of Use case	Return to tournament waiting room		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system displays the screen of tournament waiting room		
Basic flow			
No	**User**	**No**	**System**
1	The user finished a game or just start the tournament		
		2	The system displays the screen of tournament waiting room
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH09		

Figure 3.169: Use Case UCTOUR29

<table>
<tr><th>UCTOUR30</th><th colspan="3">Play semifinals challenge on a tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Play semifinals challenge on a tournament</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the screen of tournament for semifinals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user plays a game of semifinals</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen of tournament for semifinals</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.170: Use Case UCTOUR30

<table>
<tr><th>UCTOUR31</th><th colspan="3">Play quarter finals challenge on a tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Play quarter finals challenge on a tournament</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the screen of tournament for quarter finals</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user plays a game of quarter finals</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen of tournament waiting for quarter finals</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.171: Use Case UCTOUR31

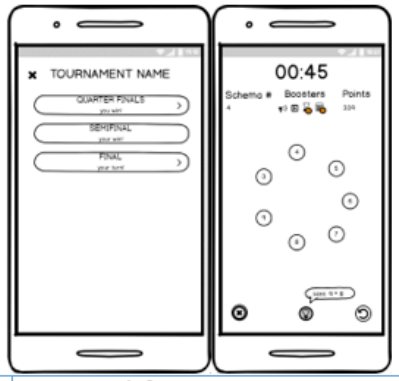
<table>
<tr><th>UCTOUR32</th><th colspan="3">Play final challenge on a tournament</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Play final challenge on a tournament</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the screen of tournament for final</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user plays a game of final</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen of tournament waiting for final</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH09</td></tr>
</table>

Figure 3.172: Use Case UCTOUR32

<table>
<tr><th colspan="2">UCLEAD01</th><th colspan="2">Global ranking</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a list of the best players in a global ranking with nickname and XP</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system displays the screen the global ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user select leaderboard</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen the global ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH11, UCLEAD (02,03)</td></tr>
</table>

Figure 3.173: Use Case UCLEAD01

<table>
<tr><th>UCLEAD02</th><th colspan="3">Friends ranking</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Show a list of the best players in a friend ranking with nickname and XP</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the screen the friends ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user select leaderboard</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen the friends ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH11, UCLEAD (01,03)</td></tr>
</table>

Figure 3.174: Use Case UCLEAD02

<table>
<tr><th>UCLEAD03</th><th colspan="3">Country ranking</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Show a list of the best players in a country ranking with nickname and XP</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system displays the screen the country ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user select leaderboard</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system displays the screen the country ranking between the best players of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH11, UCLEAD (01,02)</td></tr>
</table>

Figure 3.175: Use Case UCLEAD03

UCB01	Show budgets		
Target of Use case	Show a list of budgets available of MAK007		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows a list of budgets available of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	The user selects budgets		
		2	The system shows a list of budgets available of MAK07
Interface view			
			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH07, UCB03		

Figure 3.176: Use Case UCB01

<table>
<tr><th colspan="2">UCB02</th><th colspan="2">Show unblock budgets</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a list of unblock budgets that a player already has collected on MAK007</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of unlock budgets available of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects budgets</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a list of unlock budgets available of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH07, UCB01</td></tr>
</table>

Figure 3.177: Use Case UCB02

<table>
<tr><td colspan="2">UCB03</td><td colspan="2">Show block budgets</td></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show a list of block budgets that a player already has collected on MAK007</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows a list of block budgets available of MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects budgets</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows a list of block budgets available of MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH07, UCB01</td></tr>
</table>

Figure 3.178: Use Case UCB03

<table>
<tr><th colspan="2">UCB04</th><th colspan="2">Show most recent budget</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the most recent budget collected on MAK07</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the most recent budget collected on MAK07</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects budgets</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the most recent budget collected on MAK07</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH07, UCB01</td></tr>
</table>

Figure 3.179: Use Case UCB04

UCB05	Show details of budget		
Target of Use case	Show the details of budget already won with date when was won, name description, description and logo		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the details of budget already won with date when was won, name description, description and logo		
Basic flow			
No	**User**	**No**	**System**
1	The user selects a budged to see details		
		2	The system shows the details of budget already won with date when was won, name description, description and logo
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH07, UCB (06,08)		

Figure 3.180: Use Case UCB05

<table>
<tr><th colspan="2">UCB06</th><th colspan="2">Show details of budget blocked</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Show the details of budget blocked with name description, description and logo</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the details of budget blocked with name description, description and logo</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects a budged blocked to see details</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the details of budget blocked with name description, description and logo</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH07, UCB (07,08)</td></tr>
</table>

Figure 3.181: Use Case UCB06

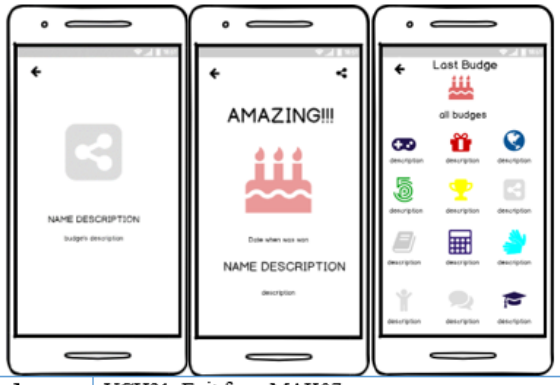
UCB07	Return to budgets collection interface		
Target of Use case	Return to budgets collection interface of MAK07		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the collection of budgets of MAK07		
Basic flow			
No	**User**	**No**	**System**
1	The user selects an arrow button to comeback		
		2	The system shows the collection of budgets of MAK07
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH07, UCB (05,06,08)		

Figure 3.182: Use Case UCB07

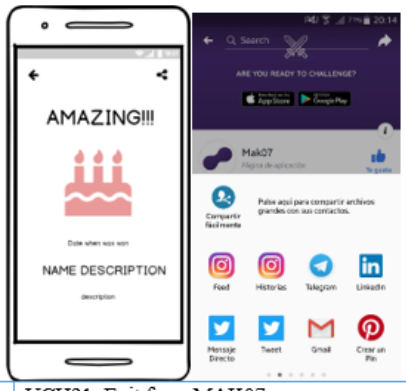
<table>
<tr><th>UCB08</th><th colspan="3">Share budge</th></tr>
<tr><td>Target of Use case</td><td colspan="3">Allow the user to share a budge in a chat of MAK07 or with another application installed in the phone</td></tr>
<tr><td>Inputs</td><td colspan="3">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td>Outputs</td><td colspan="3">The system shows a list of application to share the budge</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user selects the share button</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system shows the list of application to share the badge</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td>Alternative flow 1:</td><td colspan="3">UCH21: Exit from MAK07.</td></tr>
<tr><td>Alternative flow 2:</td><td colspan="3">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td>Extensions</td><td colspan="3">UCH07, UCB05</td></tr>
</table>

Figure 3.183: Use Case UCB08

UCB09	Save data budge won		
Target of Use case	Save the data when the user has won the medal		
Inputs	User must already have an account associated to MAK07 User must already have login to MAK07		
Outputs	The system shows the collection of budges		
Basic flow			
No	**User**	**No**	**System**
1	The user won a budge		
		2	The system saves the new achievement
		3	The system shows the collection of budges
Interface view			
Alternative flow 1:	UCH21: Exit from MAK07.		
Alternative flow 2:	UCH22: Switch application on device in which MAK07 will continue run in background.		
Extensions	UCH07, UCB (01,02,04)		

Figure 3.184: Use Case UCB09

<table>
<tr><th colspan="2">UCB10</th><th colspan="2">Check requirement of each budge</th></tr>
<tr><td colspan="2">Target of Use case</td><td colspan="2">Check requirement of each medal after having played a challenge, tournament or solo game in order to unblock a medal</td></tr>
<tr><td colspan="2">Inputs</td><td colspan="2">User must already have an account associated to MAK07
User must already have login to MAK07</td></tr>
<tr><td colspan="2">Outputs</td><td colspan="2">The system shows the collection of budges</td></tr>
<tr><td colspan="4">Basic flow</td></tr>
<tr><td>No</td><td>User</td><td>No</td><td>System</td></tr>
<tr><td>1</td><td>The user won a budge after having played a challenge / tournament or solo game</td><td></td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>The system saves the new achievement</td></tr>
<tr><td></td><td></td><td>3</td><td>The system shows the collection of budges</td></tr>
<tr><td colspan="4">Interface view
 
</td></tr>
<tr><td colspan="2">Alternative flow 1:</td><td colspan="2">UCH21: Exit from MAK07.</td></tr>
<tr><td colspan="2">Alternative flow 2:</td><td colspan="2">UCH22: Switch application on device in which MAK07 will continue run in background.</td></tr>
<tr><td colspan="2">Extensions</td><td colspan="2">UCH07, UCB (01,02,04,09)</td></tr>
</table>

Figure 3.185: Use Case UCB10

3.2.2 Description of players of MAK07

Given that different types of players are found in the system, it is necessary to segment them so that the system is appropriate for more than one subgroup of players and to be able to offer them various game options according to the Bartles Classification [figure 3.186]:

Figure 3.186: Bartles players classification [5]

1. Killer: they like to impose themselves against others typically to beat them. MAK07 count the number of times a user win consecutively (challenge, solo, tournament) and award them with a medal.
2. Achiever: They like the thrill of leveling up or winning a medal. MAK07 give a different types of medals for actions that can be differentiated by the others.
3. Socializer: They like to socialize with friends. MAK07 count with a chat in which can be shared a great game. Also motivate other users to join MAK07 sending Facebook invitations and ranking MAK07 on shop.

4. Explorer: They want to find new content. Unlocking some functionalities of MAK07 progressively help to users to keep interested on MAK07. When they discover the medals unlocked that are available only if they completed some task also that generates attention and attraction to do it.

MAK07 has 3416 users, 599 female, 1779 male, 922 unknown. Since many years ago when the first game was developed, female gender hasn't been represented in characters, that causes less interest from woman point of view. Even throw new games that personificate beautiful woman in a video game, the culture and the tradition about playing is more for man than woman [13] [14] [15] [16].

3.2.3 Requirements of MAK07

The following are the non functional requirements [figure 3.187].

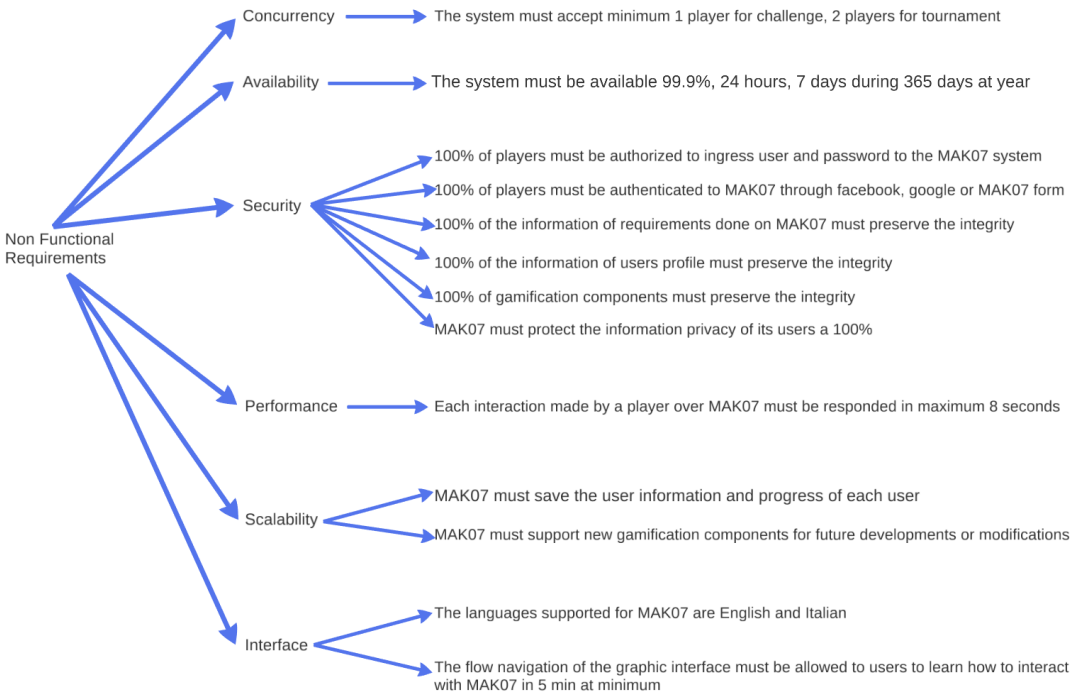


Figure 3.187: Non functional requirements

3.3 Architectural Analysis

3.3.1 Logic view of architecture of MAK07

MongoDB is a non relational database offering a flexible schema and designed in such a way that changes or updates could be handled easily. The following graphs are showing the AsIs database model and ToBe data base model, thinking that non relational data structures are difficult to represent.

AsIs MAK07 without gamification

This was the database for version 1 of MAK07 [figure 3.188].

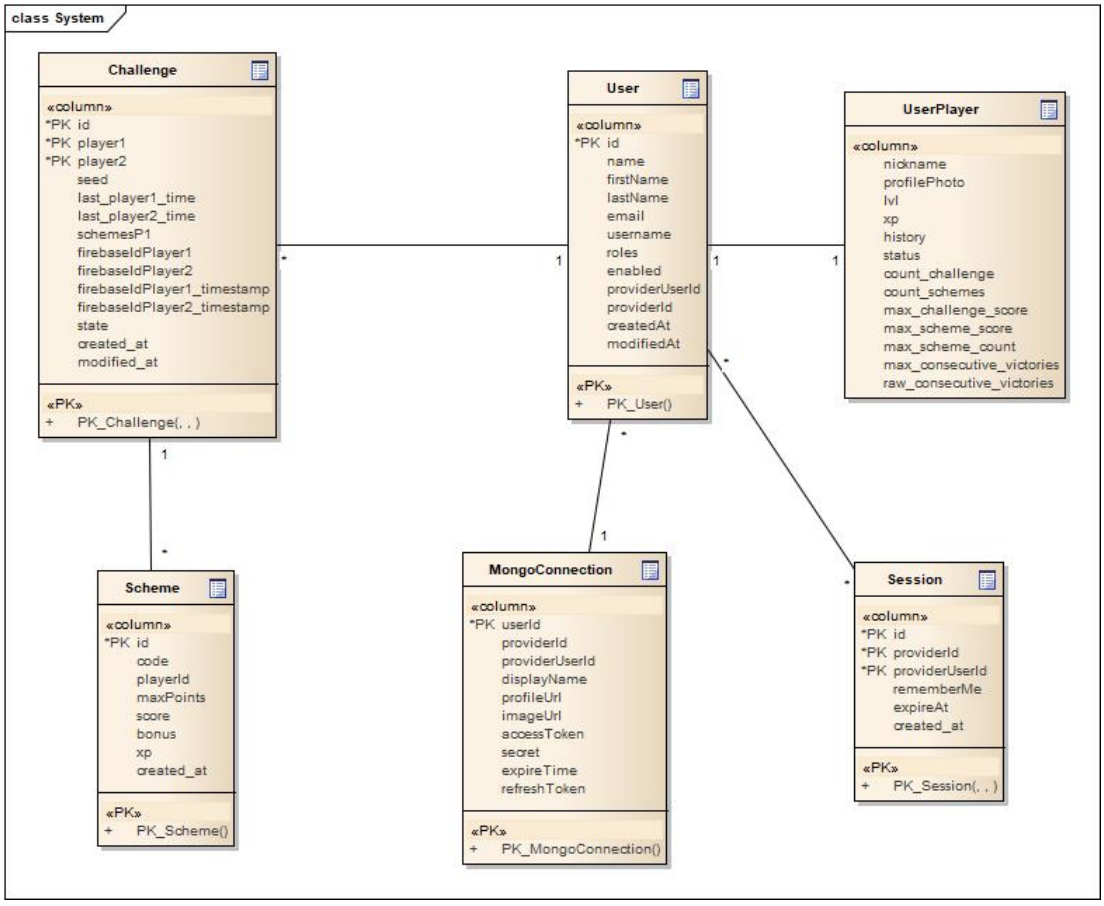


Figure 3.188: AS IS Database Model

ToBe MAK07 with gamification

The following graph shows the modifications and additions to do in order to implement gamifications, the purpure classes are new implementations and blue classes are ones needed to support gamification components [figure 3.189].

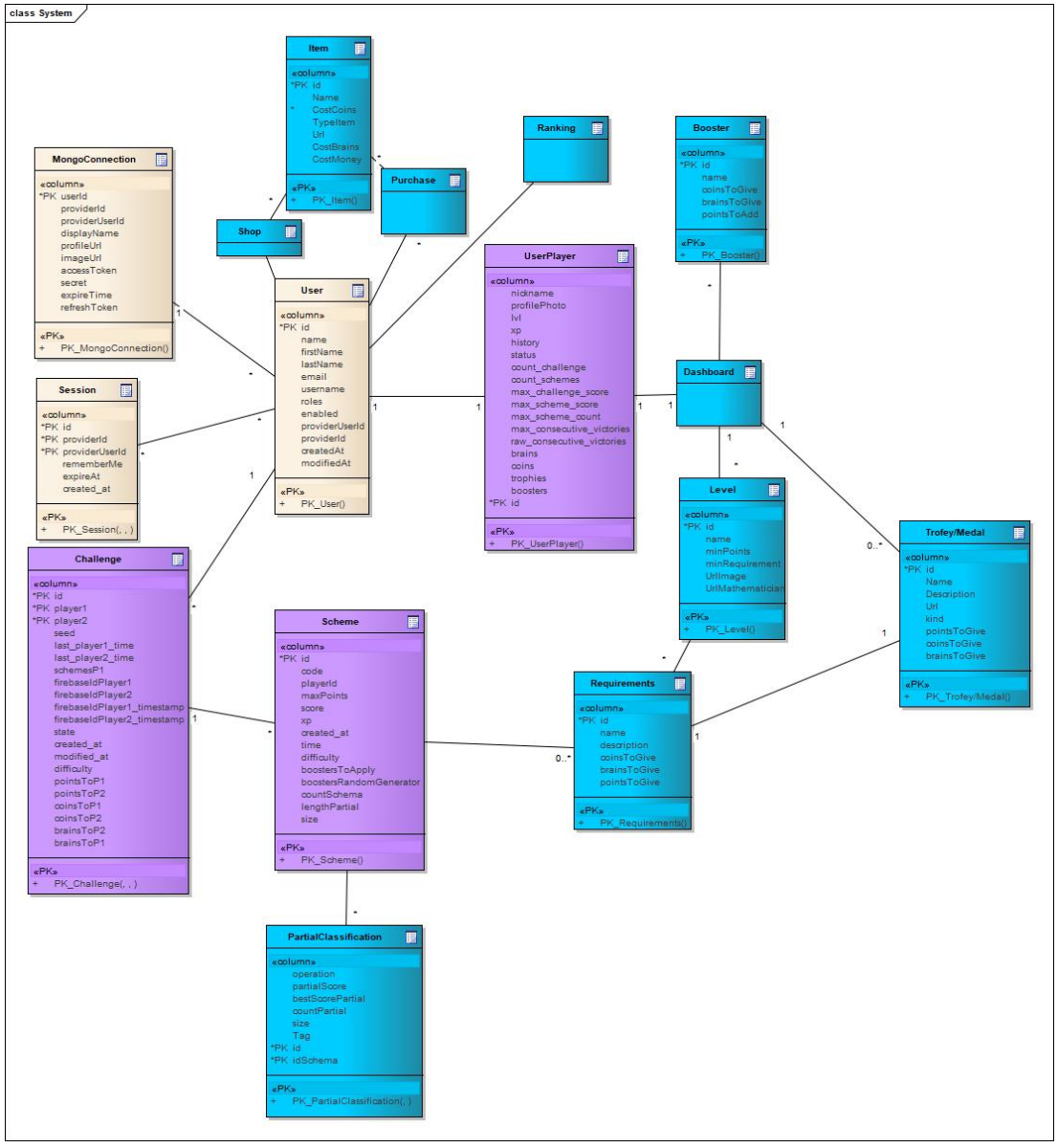


Figure 3.189: AS IS Database Model

3.3.2 Logic view MAK07 gamified

Levels

After an extensive study of timing and reaction of player for each movement of MAK07, that consist on tabulate the timing on seconds and milliseconds and results (points and actual bonus point) for each

movement, I could define the boundaries of each level. Each level can have a list of requirements that must be complete in order to move to the next level. Following there is define the list of requirements associate with the quantity of points that must be done and achieve as minimum for each level.

Level definitions: 0 Level

- 0 points Exp, user that have download the game without play any game or start a game but never finishes
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

1 Level:

- From 17 Points Exp
- 1 Solo Game Played or 1 challenge Game Played
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

2 Level:

- From 102 Points Exp
- 6 Solo Games Played or 6 challenge Games played
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

3 Level:

- From 323 Points Exp
- 19 Solo Games Played or 19 Battle Games played
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

4 Level:

- From 782 Points Exp
- 46 Solo Games Played or 46 Battle Games
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

5 Level:

- From 1547 Points Exp
- From 91 Solo Games Played or 91 Battle Games Played
- Input game difficulty 1
- Time 72000 milliseconds or 1,2 min or 72 seconds

6 Level:

- From 21888 Points Exp
- From 171 Solo Games Played and 5 battle games played or from 171 Battle Games played and 5 Solo Games played
- Input game difficulty 2
- Time 78000 milliseconds or 1,3 min or 78 seconds

7 Level:

- From 39808 Points Exp
- From 311 solo Games Played and 70 Battle Game played or from 311 Battle Games played and 70 Solo Game played
- Input game difficulty 2
- Time 78000 milliseconds or 1,3 min or 78 seconds

8 Level:

- From 62720 Points Exp
- From 490 Solo Games Played and 120 Battle Game played or from 490 Battle Games played and 120 Solo Game played
- Input game difficulty 2

- Time 78000 milliseconds or 1,3 min or 78 seconds

9 Level:

- From 88320 Points Exp
- From 690 Solo Games Played and 180 Battle Game played or from 690 Battle Games played and 180 Solo Game played
- Input game difficulty 2
- Time 78000 milliseconds or 1,3 min or 78 seconds

10 Level:

- From 102400 Points Exp
- From 800 Solo Games Played and 240 Battle Game played or from 800 Battle Games played and 240 Solo Game played
- Input game difficulty 2
- Time 78000 milliseconds or 1,3 min or 78 seconds

11 Level:

- From 41000 Points Exp
- From 1000 Battle Games played and 350 Solo Game Played and 1 tournament played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

12 Level:

- From 57400 Points Exp
- From 1400 Battle Game played and 360 solo Games Played and 6 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

13 Level:

- From 82000 Points Exp

- From 2000 Battle Game played and 400 solo Games Played and 20 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

14 Level:

- From 106600 Points Exp
- From 2600 Battle Game played and 450 solo Games Played and 40 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

15 Level:

- From 127100 Points Exp
- From 3100 Battle Game played and 500 solo Games Played and 70 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

16 Level:

- From 159900 Points Exp
- From 3900 Battle Game played and 550 solo Games Played and 120 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

17 Level:

- From 192700 Points Exp
- From 4700 Battle Game played and 600 solo Games Played and 190 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

18 Level:

- From 246000 Points Exp
- From 6000 Battle Game played and 650 solo Games Played and 270 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

19 Level:

- From 282900 Points Exp
- From 6900 Battle Game played and 700 solo Games Played and 360 tournaments played
- Input game difficulty 3
- Time 84000 milliseconds or 1,4 min or 84 seconds

20 Level:

- From 494100 Points Exp
- From 8100 Battle Game played and 800 solo Games Played and 500 tournaments played
- Input game difficulty 4
- Time 90000 milliseconds or 1,5 min or 90 seconds

21 Level:

- From 549000 Points Exp
- From 9000 Battle Game played and 850 solo Games Played and 700 tournaments played
- Input game difficulty 4
- Time 90000 milliseconds or 1,5 min or 90 seconds

22 Level:

- From 732000 Points Exp
- From 12000 Battle Game played and 900 solo Games Played and 800 tournaments played

- Input game difficulty 4
- Time 90000 milliseconds or 1,5 min or 90 seconds

23 Level:

- From 854000 Points Exp
- From 14000 Battle Game played and 950 solo Games Played and 900 tournaments played
- Input game difficulty 4
- Time 90000 milliseconds or 1,5 min or 90 seconds

24 Level:

- From 1220000 Points Exp
- From 20 000 Battle Game played and 1000 solo Games Played and 1000 tournaments played
- Input game difficulty 4
- Time 90000 milliseconds or 1,5 min or 90 seconds

25 Level:

- From 1550000 Points Exp
- From 30 000 Battle Game played and 2000 solo Games Played and 2000 tournaments played
- Input game difficulty 5
- Time 96000 milliseconds or 1,6 min or 96 seconds

26 Level:

- From 1600000 Points Exp
- From 50 000 Battle Game played and 3000 solo Games Played and 3000 tournaments played
- Input game difficulty 5
- Time 96000 milliseconds or 1,6 min or 96 seconds

27 Level:

- From 1700000 Points Exp
- From 60 000 Battle Game played and 4000 solo Games Played and 4000 tournaments played
- Input game difficulty 5
- Time 96000 milliseconds or 1,6 min or 96 seconds

28 Level:

- From 1900000 Points Exp
- From 80 000 Battle Game played and 6000 solo Games Played and 6000 tournaments played
- Input game difficulty 5
- Time 96000 milliseconds or 1,6 min or 96 seconds

29 Level:

- From 2200 000 Points Exp
- From 90 000 Battle Game played and 7000 solo Games Played and 7000 tournaments played
- Input game difficulty 5
- Time 96000 milliseconds or 1,6 min or 96 seconds

30 Level:

- From 3300 000 Points Exp
- From 100 000 Battle Game played and 9 000 solo Games Played and 9000 tournaments played
- Input game difficulty 6
- Time 102000 milliseconds or 1,7 min or 102 seconds

31 Level:

- From 4400 000 Points Exp
- From 300 000 Battle Game played and 120 000 solo Games Played and 120 000 tournaments played
- Input game difficulty 6

- Time 102000 milliseconds or 1,7 min or 102 seconds

32 Level:

- From 5500 000 Points Exp
- From 600 000 Battle Game played and 170 000 solo Games Played and 170 000 tournaments played
- Input game difficulty 6
- Time 102000 milliseconds or 1,7 min or 102 seconds

33 Level:

- From 9800 000 Points Exp
- From 800 000 Battle Game played and 300 000 solo Games Played and 300 000 tournaments played
- Input game difficulty 6
- Time 102000 milliseconds or 1,7 min or 102 seconds

34 Level:

- From 1600 000 Points Exp
- From 1200 000 Battle Game played and 700 000 solo Games Played and 700 000 tournaments played
- Input game difficulty 6
- Time 102000 milliseconds or 1,7 min or 102 seconds

35 Level:

- From 7 000 000 Points Exp
- From 5 000 000 Battle Game played and 1 000 000 solo Games Played and 1 000 000 tournaments played
- Input game difficulty 7
- Time 120 000 milliseconds or 2 min or 120 seconds

For each Mathematician there is an association with a level [tables 3.1, 3.2].

Web reference	**Thetoptens.com [17]**	**Fabpedigree.com [24]**
1st	Leonarhard Euler	Isaac Newton
2nd	Isaac Newton	Archimedes
3er	Srinivasa Ramanujan	Carl F. Gauss
4th	Aryabhatta	Leonard Euler
5th	Archimedes	Bernhard Riemann
6th	Euclid of Alexandria	Henri Poincare
7th	Gottfried W. Leibniz	Joseph-Louis Lagrange
8th	John Von Neumann	Euclid of Alexandria
9th	Rene Descartes	David Hilbert
10th	Bernhard Riemann	Gottfried W. Leibniz

Table 3.1: Matematicians

Web reference	**Thetoptens.com [17]**	**Fabpedigree.com [24]**
11th	Augustin Cauchy	Alexandre Grothendieck
12th	Pierre Simone laplace	Pierre de Fermat
13th	Pythagoras	Evariste Galois
14th	Bhascar Acharya	John von Neumann
15th	Henri Poincare	Niels Abel
16th	Muhammad Al-Khowarizmi	Karl W. T Weierstrass
17th	Georg Cantor	Rene Descartes
18th	Chris Winterburn	Peter G. L. Dirichlet
19th	Alan Turing	Srinivasa Ramanujan
20th	Carl Friedrich Gauss	Carl G. J. Jacobi
21th	Blaise Pascal	Brahmagupta
22th	Pierre De Fermat	Georg Cantor
23er	Joshep Louis Lagrange	Augustin Cauchy
24th	Bertrand Russell	Hermann K. H. Weyl
25th	Alexandre Grothendieck	Arthur Cayley
26th	Niles Abel	Emmy Noether
27th	Evariste Galois	Pythagoras of Samos
28th	Kurt Godel	Aryabhata
29th	David Hilbert	Leonardo ‘Fibonacci’
30th	Liu Hui	William R. Hamilton
31th	Maryam Mirzakhani	Apollonius of Perga
32th	Sir Andrew Wiles	Charles Hermite
33th	Brahmagupta	Diophantus of Alexandria
34th	Peter G. L. Dirichlet	Pierre-Simon Laplace
35th	Nicolai Lobachevsky	Carl Ludwig Siegel

Table 3.2: Matematicians cont. 2

Points

Mak07 will have 2 systems of points, Experience points that are the ones that the user gets for each interaction with the game, the other kind is the brain points which are the ones that are hard to get and Will be the concurrency of the game. If the user wants to buy brains, they can do it by paying with real money (euros, pounds, dollars). After many test, the following formula is the best one to calculate the experience points.

$$\text{Experience Points} = \left\{ \begin{array}{c} \sum\left(\frac{NoSchemeCompleted}{(1+(lefttimeonmilliseconds)*weight)))} + PointsOp \right) + 1 \\ or 0 if no left time and 0 scenario Completed \end{array} \right\}$$

Awards

MAK07 will have a list of medals, the following table will show the details of each [tables 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10].

Type	Trophy	Description
speed	4 x 90	Solve 4 scheme in 90000 milliseconds on a challenge
	5 x 90	Solve 5 scheme in 90000 milliseconds on a challenge
	6 x 90	Solve 6 scheme in 90000 milliseconds on a challenge
	7 x 90	Solve 7 scheme in 90000 milliseconds on a challenge

Table 3.3: Medals/Trophy

Type	Trophy	Description
Perseverance	Challenge of the day x 3	Play at least 1 challenge each day for 3 days consecutive
	Challenge of the day x 5	Play at least 1 challenge each day for 5 days consecutive
	Challenge of the day x 10	Play at least 1 challenge each day for 10 days consecutive
	Challenge of the day x 25	Play at least 1 challenge each day for 25 days consecutive
	Challenge of the day x 50	Play at least 1 challenge each day for 50 days consecutive
Athletic	Training of the day x 3	Play at least 1 training game each day for 3 days consecutive
	Training of the day x 5	Play at least 1 training game each day for 5 days consecutive
	Training of the day x 10	Play at least 1 training game each day for 10 days consecutive
	Training of the day x 25	Play at least 1 training game each day for 25 days consecutive
	Training of the day x 50	Play at least 1 training game each day for 50 days consecutive
Warrior	Tournament player x 3	Play at least 1 tournament each day for 3 days consecutive
	Tournament player x 5	Play at least 1 tournament each day for 5 days consecutive
	Tournament player x 10	Play at least 1 tournament each day for 10 days consecutive
	Tournament player x 25	Play at least 1 tournament each day for 25 days consecutive
	Tournament player x 50	Play at least 1 tournament each day for 50 days consecutive

Table 3.4: Medals/Trophy cont. 2

Type	Trophy	Description
Invincible	Winner challenge x 3	Play 3 consecutive challenge without being defeated
	Winner challenge x 5	Play 5 consecutive challenge without being defeated
	Winner challenge x 10	Play 10 consecutive challenge without being defeated
	Winner challenge x 25	Play 25 consecutive challenge without being defeated
	Winner challenge x 50	Play 50 consecutive challenge without being defeated
	Winner tournament x 3	Play 3 consecutive tournament without being defeated
	Winner tournament x 5	Play 5 consecutive tournament without being defeated
	Winner tournament x 10	Play 10 consecutive tournament without being defeated
	Winner tournament x 25	Play 25 consecutive tournament without being defeated
	Winner tournament x 50	Play 50 consecutive tournament without being defeated
Challenges	Hard player x 100	Play 100 challenge overall
	Hard player x 500	Play 500 challenge overall
	Hard player x 1000	Play 1000 challenge overall
	Hard player x 5000	Play 5000 challenge overall
	Hard player x 1000 000	Play 1000 000 challenge overall
	Hard player x 7 000 000	Play 7000 000 challenge overall
Tournaments	Invincible x 100	Play 100 tournament overall
	Invincible x 500	Play 500 tournament overall
	Invincible x 1000	Play 1000 tournament overall
	Invincible x 5000	Play 5000 tournament overall
	Invincible x 1000 000	Play 1000 000 tournament overall
Level	1 to 35	When an user reach new level, unblock a trophy associated to that level

Table 3.5: Medals/Trophy cont. 3

Type	Trophy	Description
Chronometry	Less than 10119 milliseconds	Solve a schema of difficulty 1 (level from 1- 5) in less than 10119 milliseconds or 0,16856 seconds
	Less than 11135 milliseconds	Solve a schema of difficulty 2 (level from 6 - 10) in less than 11135 milliseconds or 0,1855833 seconds
	Less than 10489 milliseconds	Solve a schema of difficulty 3 (level from 11 â 19) in less than 10489 milliseconds or 0,17481667 seconds
	Less than 8570 milliseconds	Solve a schema of difficulty 4 (level from 20 â 24) in less than 8570 milliseconds or 0,1428333 seconds
	Less than 11591 milliseconds	Solve a schema of difficulty 5 (level from 25 â 29) in less than 11591 milliseconds or 0,19318333 seconds
	Less than 9881 milliseconds	Solve a schema of difficulty 6 (Level from 30 - 34) in less than 9881 milliseconds or 0,1646833 seconds
	Less than 10211 milliseconds	Solve a schema of difficulty 7 (Level 35) in less than 10211 milliseconds or 0,17018333 seconds
High quality	1 Scheme In a challenge	Solve 1 scheme with the maximum points in a challenge
	2 Scheme in a challenge	Solve 2 scheme with the maximum points in the same challenge
	3 Scheme in a challenge	Solve 3 scheme with the maximum points in the same challenge
	4 Scheme in a challenge	Solve 4 scheme with the maximum points in the same challenge
	5 Scheme in a challenge	Solve 5 scheme with the maximum points in the same challenge
draw	draw	First draw in a challenge
Social	Share	Share the app to friends
	rank	Rank the app

Table 3.6: Medals/Trophy cont. 4

Type	Trophy	Description
Solo game	Champion x 100	Play 100 solo game overall
	Champion x 500	Play 500 solo game overall
	Champion x 1000	Play 1000 solo game overall
	Champion x 5000	Play 5000 solo game overall
	Champion x 1000 000	Play 1000 000 solo game overall
Daring	Daring challenge x 5	Win 5 challenge against a higher-level player
	Daring challenge x 10	Win 10 challenge against a higher-level player
	Daring challenge x 25	Win 25 challenge against a higher-level player
	Daring challenge x 50	Win 50 challenge against a higher-level player
Boosters	Freeze	First time using freeze booster
	skip	First time using skip booster
	Multiply score	First time using multiply score booster
	hint	First time using hint booster
	poison	First time using poison booster

Table 3.7: Medals/Trophy cont. 5

Type	Trophy	Description
speed	3 x 72	Solve 3 scheme in 72000 milliseconds on a challenge
	4 x 72	Solve 4 scheme in 72000 milliseconds on a challenge
	5 x 72	Solve 5 scheme in 72000 milliseconds on a challenge
	6 x 72	Solve 6 scheme in 72000 milliseconds on a challenge
	3 x 78	Solve 3 scheme in 78000 milliseconds on a challenge
	4 x 78	Solve 4 scheme in 78000 milliseconds on a challenge
	5 x 78	Solve 5 scheme in 78000 milliseconds on a challenge
	6 x 78	Solve 6 scheme in 78000 milliseconds on a challenge
	4 x 84	Solve 4 scheme in 84000 milliseconds on a challenge
	5 x 84	Solve 5 scheme in 84000 milliseconds on a challenge
	6 x 84	Solve 6 scheme in 84000 milliseconds on a challenge
	7 x 84	Solve 7 scheme in 84000 milliseconds on a challenge

Table 3.8: Medals/Trophy cont. 6

Type	Trophy	Description
Time	Morning 3 days in a row	Play Mak07 in the morning, between 8am and 10 am for 3 days consecutive
	Morning 5 days in a row	Play Mak07 in the morning, between 8am and 10 am for 5 days consecutive
	Morning 10 days in a row	Play Mak07 in the morning, between 8am and 10 am for 10 days consecutive
	Morning 25 days in a row	Play Mak07 in the morning, between 8am and 10 am for 25 days consecutive
	Morning 50 days in a row	Play Mak07 in the morning, between 8am and 10 am for 50 days consecutive
	Afternoon 3 days in a row	Play Mak07 in the afternoon, between 3pm and 5pm for 3 days consecutive
	Afternoon 5 days in a row	Play Mak07 in the afternoon, between 3pm and 5pm for 5 days consecutive
	Afternoon 10 days in a row	Play Mak07 in the afternoon, between 3pm and 5pm for 10 days consecutive
	Afternoon 25 days in a row	Play Mak07 in the afternoon, between 3pm and 5pm for 25 days consecutive
	Afternoon 50 days in a row	Play Mak07 in the afternoon, between 3pm and 5pm for 50 days consecutive
	Evening 3 days in a row	Play Mak07 in the evening, between 7pm to 9pm for 3 days consecutive
	Evening 5 days in a row	Play Mak07 in the evening, between 7pm to 9pm for 5 days consecutive
	Evening 10 days in a row	Play Mak07 in the evening, between 7pm to 9pm for 10 days consecutive

Table 3.9: Medals/Trophy cont. 7

Type	Trophy	Description
Time	Evening 25 days in a row	Play Mak07 in the evening, between 7pm to 9pm for 25 days consecutive
	Evening 50 days in a row	Play Mak07 in the evening, between 7pm to 9pm for 50 days consecutive
	Night 3 days in a row	Play Mak07 in the night, between 11pm to 1am for 3 days consecutive
	Night 5 days in a row	Play Mak07 in the night, between 11pm to 1am for 5 days consecutive
	Night 10 days in a row	Play Mak07 in the night, between 11pm to 1am for 10 days consecutive
	Night 25 days in a row	Play Mak07 in the night, between 11pm to 1am for 25 days consecutive
	Night 50 days in a row	Play Mak07 in the night, between 11pm to 1am for 50 days consecutive

Table 3.10: Medals/Trophy cont. 8

Boosters

MAK07 will have a list of boosters, the following table will show the details of each [Tables 3.11, 3.12].

Name	**Type**	**Description**	**Price on shop**	**Level in which is given to users**
Skip		Skip the schema shown and replace it for another one of the same level	500 Brains	5, 10, 15, 20, 25, 30
Hint		Give a suggestion to finish the game with great score	200 Brains	1, 10, 20, 29, 34

Table 3.11: Boosters

Name	Type	Description	Price on shop	Level in which is given to users
Freeze	X 2 Seconds	Addition of 2 seconds more	100 Brains	3
	X 3 Seconds	Addition of 3 seconds more	500 Brains	6
	X 4 Seconds	Addition of 4 seconds more	600 Brains	9
	X 5 Seconds	Addition of 5 seconds more	700 brains	12
Multiply	X 2	Multiply the score gotten by 2	700 Brains	7,11,17
	X 3	Multiply the score gotten by 3	800 Brains	8, 16, 24, 32
	X 4	Multiply the score gotten by 4	900 Brains	13, 26, 33
Poison	1 / 4	Take 1/4 of opponent points	700 Brains	7, 14,21
	1 / 3	Take 1/3 of opponent points	800 Brains	17,27
	1 / 2	Take 1/3 of opponent points	900 Brains	31,32,33,34,35

Table 3.12: Boosters cont. 2

Dynamics, mechanics, components of gamification

The following table will describe the different dynamics related to MAK07 [Tables 3.13, 3.14, 3.15].

Dynamic	Description	Dynamics in system
Narration	Tutorial	A short tutorial is available for the user where the mechanic of the game explanation is and how to achieve the points.
Popup Awards	Popup when a user has achieved a new reward	New medal/trophy.
		New level.
		New booster.

Table 3.13: Dynamics, mechanics, components of gamification

Dynamic	Description	Dynamics in system
Relationships	Social interactions	A player can share the app using different apps installed on the device.
		A player can ranking the app.
		A player can give a review or feedback of the app.
		A player can install other apps suggested by recommendations.
		A player can follow the official web page of the app.
		User can share a battle/results of a battle to other friends.
Progression	Evolution of players	The progress bar will tell the player its own status on the game, how far is the player to achieve the next level. It is shown in the profile of the player.
		On each game results will also see a progress bar that shows the relationship between its answer and the best solution so far.
		Level of experience will be differentiate by colours and names.
		Ranking will position the player in comparison with world player or his own friends.
		Dashboard will resume all the medal/trophy that a player has achieved so far.
Notification	Notification appear on the screen after some actions done	Having a new challenge.
		Challenge completed from opponent.
		After do not have playing for a while (1 day, a week)
		Having a new message in chat.
		Having a new challenge to do.
		Having an invitation of tournament to participate.

Table 3.14: Dynamics, mechanics, components of gamification cont. 2

Dynamic	Description	Dynamics in system
Limitations	System restrictions	Users only can play installing the app on the device.
		User maximum will play with 7 digits because of the size of the screen and business logic
		Multiplayer battle only can be played with an internet connection
Emotions	Suggested emotions to players	Motivation of a player in order of improve, learn, or review math techniques.
		Competitiveness of a player in order to obtain and achieve points, medals/trophy, levels, brains or be in a better position in the ranking.
		Customization of the app.

Table 3.15: Dynamics, mechanics, components of gamification cont. 3

Mechanics: process to generate engagement

The Mechanics of MAK07 will be shown on the table Mechanics: the process to generate engagement [Table 3.16].

Mechanics	Description	Game mechanics
Challenge	Task that requires some effort to solve	Challenge of the battle game.
		Challenge of be part of the top 3 ranking (global and friends)
		Constant challenge of respond correctly to operations
feedback	Information about what the player is doing	Each operation will show at the end and can buy a booster in order to know one of the best solution operation .
		Is possible to write to developers in order to suggest/complain about the game.
Competition	A player win or lose	With the ranking can show the position in the world or with friends
Rewards	Rewards achieve with an action or purchase	Depends on the boosters.

Table 3.16: Mechanics: process to generate engagement

Components: Specific instance of dynamics and mechanics

The Components of MAK07 will be shown on the table Components: Specific instance of dynamics and mechanics [Table 3.17].

Component	Description	Component of the game
Points	Numeric representation of game progress	Show points
Medal/trophy	Graphic representation of achievements	Show all medal/trophy that the user have won
Levels	Levels defined for the progress of the player	Show the level of the experience
Ranking	Position between player (global or friends)	Show the position on the ranking
Dashboard	Medal/trophy achieved	Gallery of medal/trophy achieved
Leader board	Graphical representation of progress and performance	Progress bar

Table 3.17: Mechanics: process to generate engagement

3.3.3 Deployment view

Mak07 has been developed with a mobile environment architecture, focused as the majority of mobile applications on Android and iOS operating systems [figure 3.190]. Typically mobile applications need to connect to internet to exchange information about user progress, authentication and synchronization [25]. The [figure 3.191] shows the MAK07 client server architecture in which the server back end works with REST functionalities and it exposed outside their services throw an API connected by clients with HTTP methods. The API invocation is the principal method achieved for the client server communications, but also the Websocket mechanism in which users has been track into the system in a way that players have the game application in execution even if they are not playing any challenge. For notifications was used Google firebase.

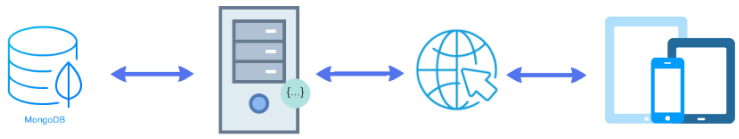


Figure 3.190: Architecture

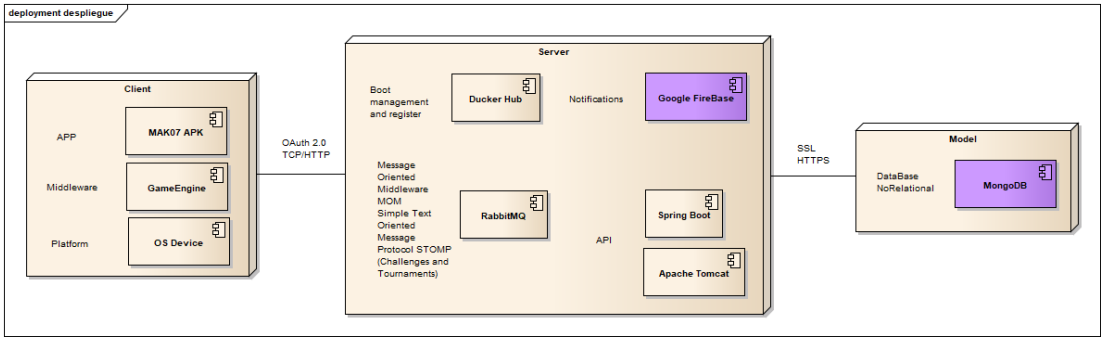


Figure 3.191: Deployment diagram

Technological dependencies

MAK07 count with few limitations to develop:

- Online multiplayer gaming
- Screen limitation of smart phones are until 7 balls for screen space
- Android version upper than 4.4

- iOS version upper than 9.0
- Users need wifi connection to play
- Users need to create a profile or use a Facebook or Google account to play
- Operative system of server: Linux kernel 3.13.0 and Ubuntu 14.04.5
- Database motor: MongoDB 2.6.11 port 27017
- GameServer: Spring Boot 1.5.7 and Apache Tomcat 8.5.20
- Google Firebase used for notifications
- RabbitMQ message broker in charge of sending the output messages to the correct message queue and forwarding the input messages to the correct messages endpoints
- Docker Hub Engine: Docker 0.9 libvirt, LXC o systemd-nspawn. port 443 to 8443
- Mak07 works with 4 containers but can be grow depending on future functionalities
- Server Domain: game.mak07.com
- Server CPU: Intel(R) Xeon(R) CPU E5-2620 v2 @2.10GHz
- Server memory: 40GB
- Server IP: 91.250.83.69

Chapter 4

Results

4.1 Designing solo game, starting from 3 ball until 7 ball

Gamification look forward to generate engagement loops and progression stairs to users in a way that MAK07 give motivations to user throw activities then user give a feedback response.

The main idea of solo game is to teach and training users to understand strategies of solving math operations while the difficult increase adding a new ball every time starting from 3 balls until 7 balls.

The following tables are the analysis of the user behaviour when they face a progression game starting with 3 balls until 7 balls using and testing the different formulas for pointing system.

4.1.1 3 balls

	scenarios done													
	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5
Formula 1	14188.5	11692.25	22063.5	27319	30585.1	22100.7	25738.1	25546.7	41860	42706	31290.75	36072	36681	45925	33511.8
Formula 2	14199.5	11705.25	22107.5	27333	30617.1	22100.7	25780.1	25590.7	41909	42789	31319.75	36121	36767	46074	33688.8
Formula 3	18.0004511	22.0005025	42.001356	30.0007792	42.0006865	14.0012294	50.000815	50.0008111	52.0009627	64.0009322	38.0016225	37.0014158	50.0013146	68.0019083	70.0024423
Formula 4	0.00323569	0.00406774	0.00973744	0.00373852	0.0049373	0.0028629	0.00697295	0.00706217	0.00584079	0.00763321	0.00672073	0.00667801	0.00781622	0.0101253	0.01236187
Formula 5	203550	258906.5	520522	508047.2	759489.6	170719.1	775956.8	767203.2	1127282	1442220	614645	791722.5	1090804	1863371	1838180.9
Formula 6	11544.6429	15370.75	17928.3889	67240.1667	20428.5893	69091.0833	15257.2778	12956.7083	39155.5179	37296.3214	122605.233	60246.5833	30956.8333	47145.5222	269998.046
Formula 7	0.00041021	0.00036047	0.00057341	0.00038635	0.00056802	0.00026446	0.00063738	0.00074451	0.00065587	0.00077292	0.00049097	0.00033577	0.00059207	0.00063202	0.00064395
Formula 8	9796.85714	13555.2917	10236.1667	26942.625	9948.10119	30134.6806	8216.51042	7087.56944	16377.5238	18534.3214	57446.8444	31468.7778	19633.1806	26148.8806	117317.862
Formula 9	0.00069606	0.00063566	0.00107756	0.00060632	0.00091114	0.00035742	0.00113153	0.00134203	0.00121939	0.00167501	0.00078214	0.0007857	0.00162505	0.00201982	0.00231014
Formula 10	445110.405	575608.735	1024437.65	1153748.04	1397783.9	637488.998	1436569.57	1315034.27	1762380.81	1906743.76	1408574.83	1364556.66	1347830.25	1935198.73	1775253.39
Formula 11	445110.405	575608.735	1024437.65	1153748.04	1397783.9	637488.998	1436569.57	1315034.27	1762380.81	1906743.76	1408574.83	1364556.66	1347830.25	1935198.73	1775253.39
Formula 12	445111.405	575609.485	1024438.9	1153749.34	1397785.3	637490.398	1436570.87	1315035.67	1762382.81	1906745.76	1408576.33	1364558.31	1347832.25	1935201.13	1775255.34
Formula 13	445110.405	575608.735	1024437.65	1153748.04	1397783.9	637488.998	1436569.57	1315034.27	1762380.81	1906743.76	1408574.83	1364556.66	1347830.25	1935198.73	1775253.39
Formula 14	237719.905	269624.985	418874.404	526763.643	542296.597	400150.398	497404.369	458541.872	701363.312	715379.257	675534.575	708479.159	614504.247	813786.929	760597.285
Formula 15	-28185.997	-31957.9408	-49582.6596	-62544.1283	-64292.2596	-47585.3532	-58875.1472	-54238.1472	-83158.7691	-84715.1004	-80210.2159	-84134.4549	-72799.5472	-96373.9442	-90003.4161
Formula 16	0.01155595	0.01184033	0.02325216	0.01091949	0.01623828	0.00620835	0.02181374	0.02422343	0.02077791	0.02909643	0.01562979	0.01639884	0.02905567	0.03768704	0.04437976
Formula 17	614.259418	492.402922	545.600038	1315.83595	556.480915	1649.30448	431.229235	400.253452	955.950971	1105.21089	1994.86662	1595.18952	1204.07809	1385.20366	3541.25744

Figure 4.1: 3 balls

The 4.1 shows the progression that a player can have solving in 20 seconds 2 schemes as minimum and 5 schemes as maximum. Notice that there is a drop down in the graph in which the behavior expected is different from the real one 4.2.

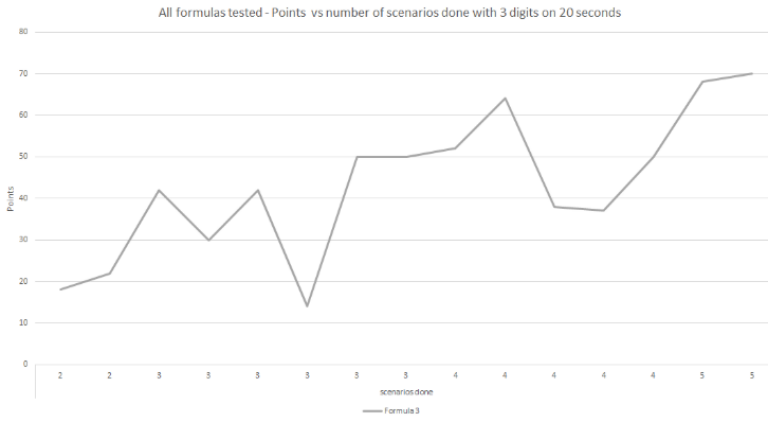


Figure 4.2: 3 balls graph

4.1.2 4 balls

	scenarios done														
	6	6	7	7	7	7	7	7	8	8	8	8	8	9	9
Formula 1	25288.69	22792.44	33204.89	33167.69	38423.19	36842.29	36650.89	41689.29	47789.19	52969.19	53815.19	36073	42399.94	57037.19	44623.99
Formula 2	26302.69	22848.44	34438.89	41132.69	39671.19	38118.29	37928.89	42955.29	49340.19	54486.19	55390.19	48703.19	43900.94	58882.19	46496.99
Formula 3	253.03707	257.03713	249.04441	277.04454	265.04396	285.044	285.04399	277.04387	285.05105	287.05083	299.0508	272.05144	273.05164	303.05821	305.05874
Formula 4	0.8994701	0.9003022	0.905655	0.9125295	0.9065306	0.9097651	0.9098543	0.9077294	0.917166	0.9153203	0.9171081	0.9163118	0.9163531	0.9260327	0.9282693
Formula 5	1477500.7	1532857.2	1758890.6	2108693.5	2096218.7	2364128.3	2355374.7	2347661.1	2993196.2	3060506.2	3568416.2	2725799.2	2545347.2	4079984	4054793.9
Formula 6	75237.493	79063.6	148687.15	97524.451	146836.23	94853.34	92552.771	100024.65	126456.11	142362.79	133937.45	162004.52	225182.01	158548.01	381400.53
Formula 7	0.0021432	0.0020935	0.0017345	0.0020435	0.0018564	0.0021074	0.0022146	0.0020381	0.00187	0.001923	0.0019779	0.0016004	0.0017572	0.0017629	0.0017749
Formula 8	25704.361	29462.796	46043.222	26144.708	42851.167	24125.052	22996.111	25856.643	35542.76	32287.603	34443.972	47378.802	73356.924	42059.498	133228.48
Formula 9	0.0105994	0.010539	0.0102558	0.0109759	0.0105047	0.0110299	0.0112404	0.0108095	0.0115184	0.0111128	0.0115683	0.0106791	0.0106755	0.0119082	0.0121986
Formula 10	2504914.9	2635413.3	2697294.2	3084242.8	3213553.2	3496374.8	3374839.5	3457589.1	3407636.1	3822187.2	3966550.1	3424362.8	3468380.9	3995005.3	3835059.9
Formula 11	4157187.9	4287686.3	4349567.2	4736515.8	4865826.2	5148647.8	5027112.5	5109862.1	5059909.1	5474460.2	5618823.1	5076635.8	5120653.9	5647278.3	5487332.9
Formula 12	2504917.3	2635415.4	2697296.9	3084245.4	3213555.9	3496377.4	3374842.2	3457591.8	3407639.5	3822190.5	3966553.5	3424365.8	3468383.8	3995009	3835063.2
Formula 13	2504917.8	2635416.2	2697297.8	3084246.4	3213556.8	3496378.3	3374843.1	3457592.7	3407640.4	3822191.4	3966554.4	3424367	3468385.2	3995010.2	3835064.9
Formula 14	700720.88	732625.96	863214.91	881938.91	989828.15	960468.88	921606.38	1005361.1	1077632.3	1164493.4	1178521.3	1171609.5	1138664.6	1259641.5	1206451.9
Formula 15	-81283.21	-85055.15	-100619	-102616.3	-115577.8	-111908.8	-107271.8	-117325.9	-125769.7	-136126.9	-137671.2	-137102.3	-133178.3	-149280.5	-142910
Formula 16	0.8013498	0.8016342	0.8158686	0.8329124	0.8205797	0.831474	0.8338836	0.8258985	0.8585822	0.8504342	0.8594987	0.8460852	0.8452976	0.8870799	0.8937727
Formula 17	856.64195	734.78545	1882.3773	778.67285	1548.9088	664.30205	633.32627	789.55373	1453.5618	1182.3457	1351.2742	1838.9443	2237.8719	1612.8185	3768.8723

Figure 4.3: 4 balls

The behaviour of players with 4 balls are more progressive 4.3. Increment of points are directly proportional to increment of schemes done in a 26 seconds 4.4.

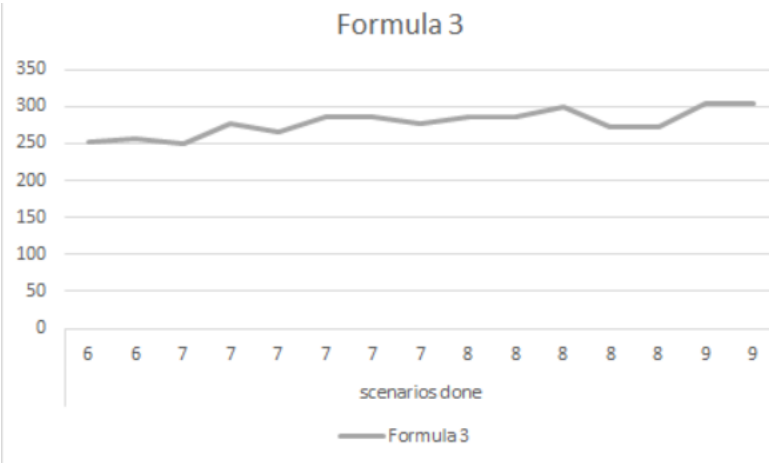


Figure 4.4: 4 balls graph

4.1.3 5 balls

	scenarios done														
	12	12	13	13	13	13	13	13	14	14	14	14	14	15	15
Formula 1	33876.825	30366.575	42040.425	41849.025	40978.825	46234.325	41016.025	49500.425	55837.325	61017.325	61863.325	50448.075	55229.325	65322.325	52909.125
Formula 2	33876.825	30422.575	45929.425	45740.025	48943.825	47482.325	42250.025	50766.425	57388.325	62534.325	63438.325	51949.075	56751.325	67167.325	54782.125
Formula 3	1048.08946	1052.08951	1126.6021	1126.6021	1118.60264	1106.60207	1090.60252	1118.60197	1173.11488	1175.11466	1187.11463	1161.11547	1160.11527	1237.62776	1239.62829
Formula 4	8231.53755	8231.53838	8278.05357	8278.05366	8278.05634	8278.05034	8278.04946	8278.05154	8324.5667	8324.56485	8324.56664	8324.56588	8324.56584	8371.08129	8371.08352
Formula 5	2076772.91	2132129.41	3025620.3	3016866.7	2770185.5	2757710.7	2420382.6	3009153.1	3716908.09	3784218.09	4292128.09	3269059.09	3449511.09	4865915.67	4840725.57
Formula 6	26894268.8	26898094.9	30501082	30498781.4	30503753.1	30553064.9	30554915.8	30506253.3	34119882.1	34135788.8	34127363.5	34218608	34155430.5	37739171.4	37962023.9
Formula 7	0.29784693	0.29779719	0.27506463	0.27517175	0.27500065	0.27481359	0.27469171	0.27499526	0.25533023	0.25538321	0.25543809	0.25521735	0.25506061	0.23832573	0.23833767
Formula 8	3613394.96	3617153.39	3611879.73	3613415.73	3613899.39	3630605.85	3633797.9	3613611.32	3623361.52	3620106.36	3622262.73	3661175.69	3635197.56	3629942.34	3721111.32
Formula 9	0.2835994	0.283539	0.26453327	0.26474377	0.2644793	0.26400806	0.26375916	0.26431288	0.24812475	0.24771907	0.24817465	0.24728182	0.24728538	0.2337296	0.23401992
Formula 10	6873064.54	7003562.87	7864524.52	7742989.22	7452392.6	7581702.99	7065443.95	7825738.85	7775786.01	8190337.07	8334700.02	7836530.84	7792512.67	8363155.3	8203209.96
Formula 11	13983671.5	14114169.9	14975131.5	14853596.2	14562999.6	14692310	14176050.9	14936345.8	14886393	15300944.1	15445307	14947137.8	14903119.7	15473762.3	15313817
Formula 12	6873067.3	7003565.38	7864527.58	7742992.38	7452395.61	7581706.05	7065447.11	7825742	7775789.76	12558491.1	8334703.78	7836534.09	7792516.08	8363159.46	8203213.66
Formula 13	6873070.07	7003568.4	7864530.99	7742995.69	7452399.07	7581709.46	7065450.42	7825745.32	7775793.42	12558497.5	8334707.43	7836538.25	7792520.09	8363163.66	8203218.32
Formula 14	2561563.63	2593468.71	2821455.07	2782454.19	2742786.72	2850675.96	2724062.72	2866208.91	2938485.16	4886199.09	3039374.17	2999517.49	3032462.32	3120499.44	3067309.8
Formula 15	-301166.822	-304938.766	-331776.73	-327154.43	-322484.243	-335445.712	-320486.936	-337193.843	-345621.889	-575831.32	-357523.442	-353030.557	-356954.546	-369117.044	-362746.516
Formula 16	1347.75349	1347.75378	1358.42892	1358.43133	1358.43036	1358.41802	1358.41331	1358.42334	1369.10133	2737.33593	1369.10225	1369.08804	1369.08883	1379.77513	1379.78182
Formula 17	9027.17186	8905.31537	8769.36322	8738.38744	8883.73403	9653.96994	9987.43847	8894.6149	9494.359	17263.9401	9392.07142	10278.6691	9879.74148	9590.52016	11746.5739

Figure 4.5: 5 balls

The behaviour of players with 5 balls are more progressive 4.5. increment of points are directly proportional to increment of schemes done in a 26 seconds 4.6.

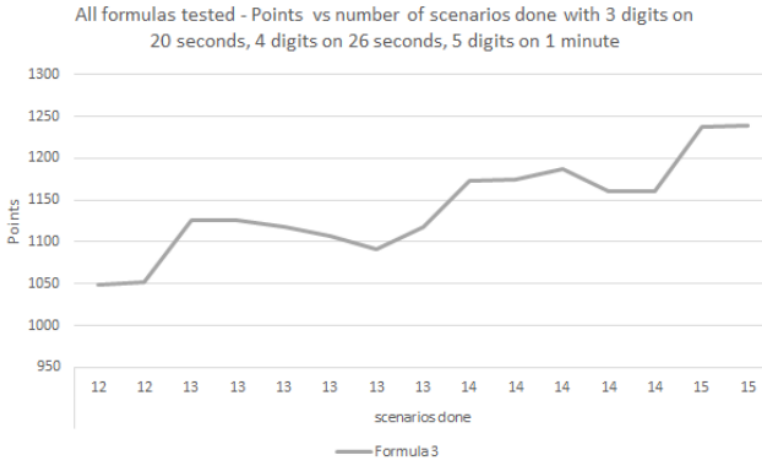


Figure 4.6: 5 balls graph

This is the pseudo code of how the input data of MAK07 was found.

Algorithm 1: Algorithm to find input values of MAK07

```
while Combinatorial Of Number Of Digits do
    if hasSolution then
        saveIt;
    else
        descarted it;
    end
end
while all solutions found do
    Find Best Solution And Save it;
end
```

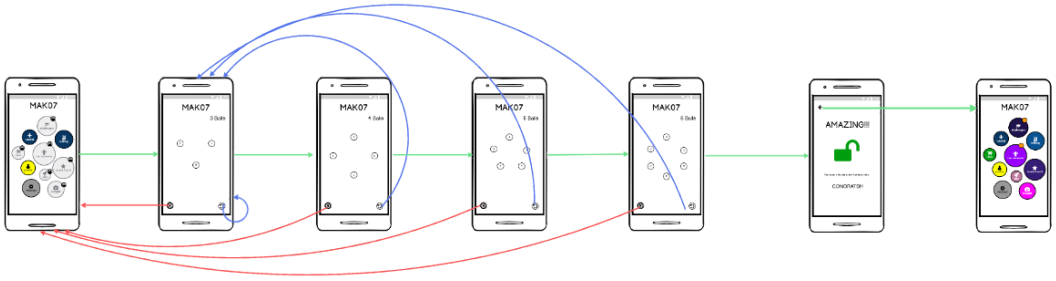


Figure 4.7: 3-7 balls

4.2 Classification of input game

The figure 4.8 will illustrate the 3 criteria of classification, each has different weight to assign that will increase the difficulty of each schema combination.

4.2.1 Aspects to take in count

If the initial number (7 digits) is composed of a sextuplet, example 2222229 then the weight will be increase by 4.

If the initial number (7 digits) is composed of a quintuple and a pair, example 2222233 then the weight will be increase by 4.

If the initial number (7 digits) is composed of a quintuple, example 2222213 then the weight will be increase by 4.

If the initial number (7 digits) is composed of a quadruple, example 2222345 then the weight will be increase by 4.

If the initial number (7 digits) is composed of a pair and a triplet, example 2233345 then the weight will be increase by 4.

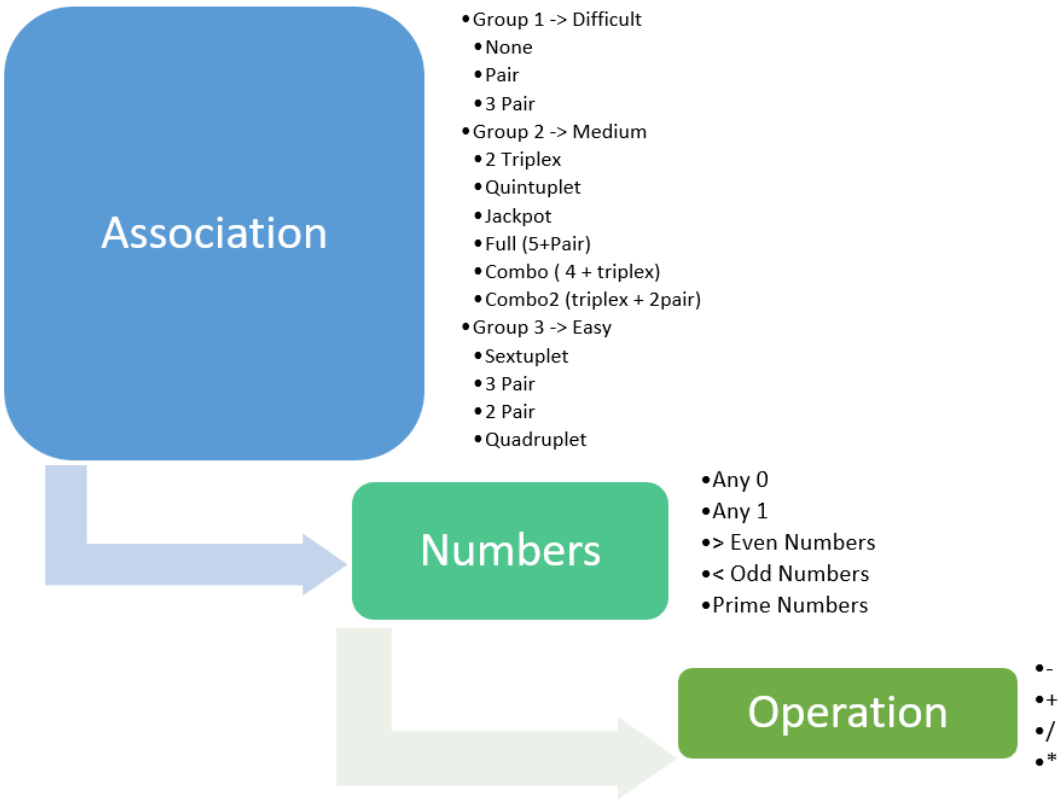


Figure 4.8: Classification criteria

If the initial number (7 digits) is composed of 2 pair only that has same number, example 11223456 then the weight will be increase by 8 OR If the initial number (7 digits) is composed by 4 digits of the same number, example 2222456 then the weight will be increase by 8.

If the initial number (7digits) is composed of 3 pair that has the same number only, example 1122334 then the weight will be increase by 14.

If the initial number (7 digits) is composed of 1 pair only of same number, example 2234578, the weight will be increase by 14.

4.2.2 Subcategory of 1 level to take in count

If the initial number (7 digits) is composed of any 0 then weight will be + 1.

If the initial number (7 digits) is composed of any 1 then weight will be + 1.

4.2.3 Subcategory of 2 level to take in count

For each number from op check if it is composed by a number bigger than 9 and between 100 then the weight will be multiplied by 10.

For each number from op check if it is composed by a number bigger than 99 and between 1000 then the weight will be multiplied by 100.

4.2.4 Subcategory of 2 level to take in count

If the op is a - then increment +1.

If the op is a + increment +4.

If the op is a / increment +8.

If the op is * increment +12.

4.2.5 Process description

The 4.9 shows the data process done for doing the clusterization.

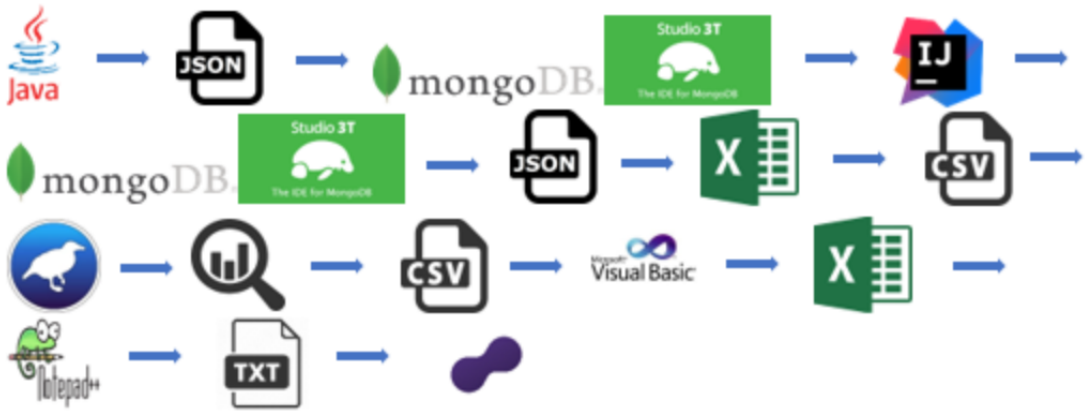


Figure 4.9: Process Description

1. The initial input data was done in java and was visualized as a Json objects in which has the following structure:

2. Migration of this data to mongoDB In order to generate 2 new objects to consider

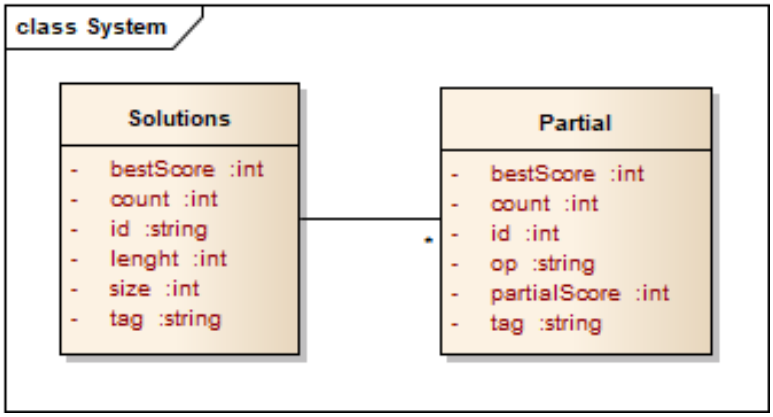


Figure 4.10: Json Objects

for the classification.

Algorithm 2: Algorithm clusterization

```
1  for each solutions of 7 digits sol do
2      initialize flags anyZero, Prime, Odd, Even, anyOne;
3      initialize array ops;
4      for each PartialSolution do
5          add on ops each operation symbol;
6      end
7      declare and initialized the flag ToVerify = true;
8      String rev="";
9      Integer review=-1;
10     for each PartialSolution par do
11         rev = par.operation + par.BestScore;
12         review=par.Count;
13         for each PartialSolution aux do
14             if rev == (aux.Operation + aux.BestScore) then
15                 if review!=aux.Count then
16                     ToVerify=false;
17                 end
18             end
19         end
20         if review then
21             add on parcialcounting hashmap <par.operation, par.count>;
22             add on bestScorePartials hashmap <par.Operation, par.BestScore>;
23         end
24         review=-1;
25         rev="";
26         ToVerify=true;
27         ... MediaCalculation;
28         standardDeviation;
29         weightAssign;
30         ...
31     end
32 end
```

Algorithm 3: Algorithm for calculate the media and the standard deviation

```
1  declare and give memory to HashMap distance;
2  declare an Iterator iteradistance;
3  while iteradistance has next do
4  |   declare string save operator read;
5  |   if operator is equal to - then
6  |   |   sum= abs(1-media) and val = Math.pow(2,sum) and save in distance HashMap the key and
   |   |     val;
7  |   end
8  |   if operator is equal to + then
9  |   |   sum= abs(1-media) and val = Math.pow(2,sum) and save in distance HashMap the key and
   |   |     val;
10 |   end
11 |   if operator is equal to * then
12 |   |   sum= abs(1-media) and val = Math.pow(2,sum) and save in distance HashMap the key and
   |   |     val;
13 |   end
14 |   if operator is equal to / then
15 |   |   sum= abs(1-media) and val = Math.pow(2,sum) and save in distance HashMap the key and
   |   |     val;
16 |   end
17 end
```

Algorithm 4: Algorithm media calculation and weightAssign

```
1  int weight=0;
2  float media =0.0;
3  for each partialSolutions, count the repetitions of the same operation and give weight for each
     operation do
4  |  if - then
5  |  |  current weight + 1;
6  |  end
7  |  if + then
8  |  |  current weight + 10;
9  |  end
10 |  if * then
11 |  |  current weight + 30;
12 |  end
13 |  if / then
14 |  |  current weight + 20;
15 |  end
16 |  add the weight to sol.
17 end
18 media = weight / internalOperations.Size;
19 calculate the media and the standard deviation;
20 if Associate numbers classifying 3 groups by searching single pairs, double pairs, triple pairs, single
     triplex, double triplex, jackpot, quadruplet, quintuplet, sextuplet, full, combo1 or combo 2 then
21 |  if group 1 then
22 |  |  current weight + 40;
23 |  end
24 |  if group 2 then
25 |  |  current wight + 100;
26 |  end
27 |  if group 3 then
28 |  |  current weight + 200;
29 |  end
30 |  and analyze the number composition;
31 |  if any prime then
32 |  |  current weight + 40;
33 |  end
34 |  if any 0 and odd then
35 |  |  current weight + 10 else + 30;
36 |  end
37 |  if any 1 and even then
38 |  |  current weight + 1 else + 20;
39 |  end
40 end
41 clear variables;
```

Algorithm 5: Algorithm of Combo 2

```
1  int countPair = 0, countTriple = 0, fisrtPair=-1, truple =-1;
2  boolean countSndPair=false, foundTripOnJack=false;
3  Create a list of integers positionReferenced;
4  for i=0; i<data.length;i++ do
5      for j=0; j<data.length;j++ do
6          if data[i]==data[j]  i != j then
7              countTriple++ and save position referenced j ;
8              if countTriple == 2 then
9                  foundTripOnJack=true and i is saved on positionReferenced and triple=data[j] and
                     break;
10             end
11         end
12         if j==data.length-1 then
13             clear positionReferenced and make countTriple =0;
14         end
15     end
16     if foundTripOnJack then
17         break;
18     end
19 end
20 for i=0; i<data.length;i++ do
21     if positionReferenced not contains i then
22         for j=0; j<data.length;j++ do
23             if data[i]==data[j]  i != j  positionReferenced not contains j  triple!= data[j] then
24                 countPair++ and j is saved on positionReferenced;
25                 if countPair==1 then
26                     i is saved on positionReferenced and countSndPair = true and firstpair = data[j];
27                 end
28             end
29         end
30     end
31     if countSndPair then
32         break;
33     end
34 end
35 countPair=0;
36 declare terzo = false;
37 for i=0; i<data.length;i++ do
38     if positionReferenced not contains i then
39         for j=0; j<data.length;j++ do
40             if data[i]==data[j]  i != j  positionReferenced not contains j  firstpair!=j  triple!= data[j]
                 firstpair!=triple then
41                 countPair++ and j is saved on positionReferenced;
42                 if countPair==1 then
43                     i is saved on positionReferenced;
44                     if countSndPair  foundTripOnJack then
45                         return true;
46                     end
47                 end
48             end
49         end
50     end
51 end
52 return false;
```

Algorithm 6: Algorithm of Combo

```
1  int count4= 0, countTriple = 0;
2  boolean foundTripOnJack=false;
3  Create a list of integers positionReferenced;
4  for i=0; i<data.length;i++ do
5  |  for j=0; j<data.length;j++ do
6  |  |  if data[i]==data[j]  i != j then
7  |  |  |  countTriple++ and save position referenced j ;
8  |  |  |  if countTriple == 3 then
9  |  |  |  |  foundTripOnJack=true and i is saved on positionReferenced and triple=data[j] and
   |  |  |  |    break;
10 |  |  |  end
11 |  |  end
12 |  |  if j==data.length-1 then
13 |  |  |  clear positionReferenced and make countTriple =0;
14 |  |  end
15 |  end
16 |  if foundTripOnJack then
17 |  |  break;
18 |  end
19 end
20 for i=0; i<data.length;i++ do
21 |  if positionReferenced not contains i then
22 |  |  for j=0; j<data.length;j++ do
23 |  |  |  if data[i]==data[j]  i != j  positionReferenced not contains j then
24 |  |  |  |  count4++ and j is saved on positionReferenced;
25 |  |  |  |  if count4==2 then
26 |  |  |  |  |  i is saved on positionReferenced and return foundTripOnJack;
27 |  |  |  |  end
28 |  |  |  end
29 |  |  end
30 |  end
31 end
32 return false;
```

Algorithm 7: Algorithm of full

```
1  int countPair= 0, count5 = 0;
2  boolean foundTripOnJack=false;
3  Create a list of integers positionReferenced;
4  for i=0; i<data.length;i++ do
5  |  for j=0; j<data.length;j++ do
6  |  |  if data[i]==data[j]  i != j then
7  |  |  |  count5++ and save position referenced j ;
8  |  |  |  if count4 == 4 then
9  |  |  |  |  foundTripOnJack=true and i is saved on positionReferenced and triple=data[j] and
   |  |  |  |    break;
10 |  |  |  end
11 |  |  end
12 |  |  if j==data.length-1 then
13 |  |  |  clear positionReferenced and make count5 =0;
14 |  |  end
15 |  end
16 |  if foundTripOnJack then
17 |  |  break;
18 |  end
19 end
20 for i=0; i<data.length;i++ do
21 |  if positionReferenced not contains i then
22 |  |  for j=0; j<data.length;j++ do
23 |  |  |  if data[i]==data[j]  i != j  positionReferenced not contains j then
24 |  |  |  |  countPair++ and j is saved on positionReferenced;
25 |  |  |  |  if countPair==1 then
26 |  |  |  |  |  i is saved on positionReferenced and return foundTripOnJack;
27 |  |  |  |  end
28 |  |  |  end
29 |  |  end
30 |  end
31 end
32 return false;
```

Algorithm 8: Algorithm of sextuplet

```
1  int count= 0;
2  for i=0; i<data.length;i++ do
3  |  for j=0; j<data.length;j++ do
4  |  |  if data[i]==data[j]  i != j then
5  |  |  |  count++;
6  |  |  |  if count==5 then
7  |  |  |  |  return true;
8  |  |  |  end
9  |  |  end
10 |  |  if j==data.length-1 then
11 |  |  |  make count = 0;
12 |  |  end
13 |  end
14 end
15 return false;
```

Algorithm 9: Algorithm of quintuplet

```
1  int count= 0;
2  for i=0; i<data.length;i++ do
3  |   for j=0; j<data.length;j++ do
4  |   |   if data[i]==data[j]  i != j then
5  |   |   |   count++;
6  |   |   |   if count==4 then
7  |   |   |   |   return true;
8  |   |   |   end
9  |   |   end
10 |   |   if j==data.length-1 then
11 |   |   |   make count = 0;
12 |   |   end
13 |   end
14 end
15 return false;
```

Algorithm 10: Algorithm of quadruplet

```
1  int count= 0;
2  for i=0; i<data.length;i++ do
3  |   for j=0; j<data.length;j++ do
4  |   |   if data[i]==data[j]  i != j then
5  |   |   |   count++;
6  |   |   |   if count==3 then
7  |   |   |   |   return true;
8  |   |   |   end
9  |   |   end
10 |   |   if j==data.length-1 then
11 |   |   |   make count = 0;
12 |   |   end
13 |   end
14 end
15 return false;
```

Algorithm 11: Algorithm of jackpot

```
1  int countPair = 0, countTriple = 0, numRefPair=-1, numRefTrip =-1;
2  boolean foundTripOnJack=false;
3  Create a list of integers positionReferenced;
4  for i=0; i < data.length;i++ do
5  |  for j=0; j < data.length;j++ do
6  |  |  if data[i]==data[j]  i != j then
7  |  |  |  countTriple++ and save position referenced j ;
8  |  |  |  if countTriple == 2 then
9  |  |  |  |  foundTripOnJack=true and i is saved on positionReferenced and break;
10 |  |  |  end
11 |  |  end
12 |  |  if j==data.length-1 then
13 |  |  |  clear positionReferenced and make countTriple =0;
14 |  |  end
15 |  end
16 |  if foundTripOnJack then
17 |  |  break;
18 |  end
19 end
20 for i=0; i<data.length;i++ do
21 |  if positionReferenced not contains i then
22 |  |  for j=0; j<data.length;j++ do
23 |  |  |  if data[i]==data[j]  i != j  positionReferenced not contains j then
24 |  |  |  |  countPair++ and j is saved on positionReferenced;
25 |  |  |  |  if countPair==1 then
26 |  |  |  |  |  i is saved on positionReferenced and return foundTripOnJack;
27 |  |  |  |  end
28 |  |  |  end
29 |  |  end
30 |  end
31 end
32 return false;
```

Algorithm 12: Algorithm of DoubleTriplex

```
1  int positionRef = -1, numRef1=-1, numRef2 =-1, cointFirstTriplex=0,countSecondTriplex=0;
2  boolean foundfirstTriplex=false;
3  Create a list of integers positionReferenced;
4  for i=0; i < data.length;i++ do
5      for j=0; j < data.length;j++ do
6          if data[i]==data[j] then
7              countFirstTriplex++ and save position referenced j ;
8              if countFirstTriplex == 3 then
9                  numRef1 = data[i] and foundFirstTriplex = true and positionRef = j and i is saved
                     on positionReferenced;
10                 if j==data.length-1 then
11                     make countFirstTriplex = 0;
12                 end
13                 break;
14             end
15         end
16         if j==data.length-1 then
17             make countFirstTriplex = 0;
18         end
19     end
20     if foundTripOnJack then
21         break;
22     end
23 end
24 for i=0; i<data.length;i++ do
25     if positionReferenced not contains i then
26         for j=0; j<data.length;j++ do
27             if data[i]==data[j]  positionReferenced not contains j  positionReferenced not contains i
                 then
28                 if numRef2!=data[i] then
29                     countSecondTriplex++;
30                     if countSecondTriplex == 3 then
31                         numRef2=data[i] and return foundFirstTriplex;
32                     end
33                 end
34             end
35         end
36         if j==data.length-1 then
37             countSeconddTriplex=0;
38         end
39     end
40 end
41 return false;
```

Algorithm 13: Algorithm of SingleTriplex

```
1  int count3=0;
2  for i=0; i < data.length;i++ do
3  |   for j=0; j < data.length;j++ do
4  |   |   if data[i]==data[j]  i!=j then
5  |   |   |   count3++;
6  |   |   |   if count3 == 2 then
7  |   |   |   |   return true;
8  |   |   |   end
9  |   |   end
10 |   |   if j==data.length-1 then
11 |   |   |   make count3 = 0;
12 |   |   end
13 |   end
14 end
15 return false;
```

Algorithm 14: Algorithm of TriplePair

```
1  int countFirstPair=0,countSecondPair=0, countThirdPair=0, refFirstPair = -1, refSecondPair=-1;
2  boolean foundFirstPair = false, foundSecondPair=false; whole=false;
3  Create a list of integers positionReferenced;
4  for i=0; i < data.length;i++ do
5      for j=0; j < data.length;j++ do
6          if data[i]==data[j]  i!=j then
7              countFirstPair++ and j is saved on positionReferenced;
8              if countFirstPair == 1 then
9                  refFirstPair=data[i] and i is saved on positionReferenced and foundFirstPair = true
                     and break;
10             end
11         end
12     end
13     if foundFirstPair then
14         break;
15     end
16 end
17 for i=0; i < data.length;i++ do
18     if i is not on positionReferenced then
19         for j=0; j < data.length;j++ do
20             if data[i]==data[j]  i!=j  j is not on positionReferenced then
21                 countSecondPair++ and j is saved on positionReferenced;
22                 if countSecondPair == 1 then
23                     refSecondPair=data[i] and i is saved on positionReferenced and foundSecondPair
                         = true and break;
24                 end
25             end
26         end
27     end
28     if foundSecondPair then
29         break;
30     end
31 end
32 for i=0; i < data.length;i++ do
33     if i is not on positionReferenced then
34         for j=0; j < data.length;j++ do
35             if j!=i  j is not on positionReferenced then
36                 if data[i]==data[j]  j!=i then
37                     countThirdPair++ and j is saved on positionReferenced;
38                     if countThirdPair == 1 then
39                         whole = (foundFirstPair  foundSecondPair) and i is saved on
                             positionReferenced;
40                     end
41                 end
42             end
43         end
44     end
45 end
46 return whole;
```

Algorithm 15: Algorithm of DoublePair

```
1  int countFirstPair=0,countSecondPair=0, refFirstPair = -1;
2  boolean foundFirstPair = false;
3  Create a list of integers positionReferenced;
4  for i=0; i < data.length;i++ do
5  |  for j=0; j < data.length;j++ do
6  |  |  if data[i]==data[j]  i!=j then
7  |  |  |  countFirstPair++ and j is saved on positionReferenced;
8  |  |  |  if countFirstPair == 1 then
9  |  |  |  |  refFirstPair=data[i] and i is saved on positionReferenced and foundFirstPair = true
   |  |  |  |    and break;
10 |  |  |  end
11 |  |  end
12 |  end
13 |  if foundFirstPair then
14 |  |  break;
15 |  end
16 end
17 for i=0; i < data.length;i++ do
18 |  if i is not on positionReferenced then
19 |  |  for j=0; j < data.length;j++ do
20 |  |  |  if data[i]==data[j]  i!=j  j is not on positionReferenced then
21 |  |  |  |  countSecondPair++ and j is saved on positionReferenced;
22 |  |  |  |  if countSecondPair == 2 then
23 |  |  |  |  |  return foundFirstPair;
24 |  |  |  |  end
25 |  |  |  end
26 |  |  end
27 |  end
28 end
29 return false;
```

Algorithm 16: Algorithm of SinglePair

```
1  int count=0;
2  for i=0; i < data.length;i++ do
3  |  for j=0; j < data.length;j++ do
4  |  |  if data[i]==data[j]  i!=j then
5  |  |  |  count++;
6  |  |  |  if count == 2 then
7  |  |  |  |  return true;
8  |  |  |  end
9  |  |  end
10 |  end
11 end
12 return false;
```

Algorithm 17: Algorithm of AnyZero

```
1  boolean foundAny=false;
2  for i=0; i < data.length;i++ do
3  |  if i==0 then
4  |  |  foundAny=true;
5  |  end
6  end
7  return foundAny;
```

Algorithm 18: Algorithm of AnyOne

```
1  boolean foundAny=false;
2  for i=0; i < data.length;i++ do
3  |  if i==1 then
4  |  |  foundAny=true;
5  |  end
6  end
7  return foundAny;
```

Algorithm 19: Algorithm of EvenNumbers

```
1  boolean foundAny=false;
2  int count=0;
3  for each number do
4  |  if i % 2 == 0 then
5  |  |  count++;
6  |  end
7  end
8  if count >= 4 then
9  |  foundAny=true;
10 end
11 return foundAny;
```

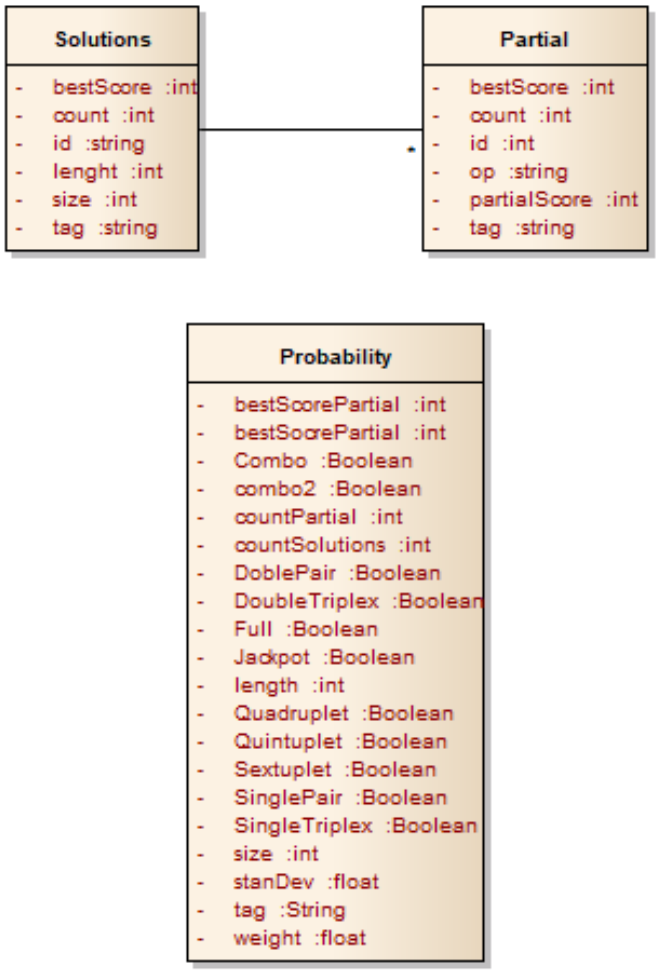
Algorithm 20: Algorithm of OddNumbers

```
1  boolean foundAny=false;
2  int count=0;
3  for each number do
4  |  if i % 2 != 0 then
5  |  |  count++;
6  |  end
7  end
8  if count >= 4 then
9  |  foundAny=true;
10 end
11 return foundAny;
```

Algorithm 21: Algorithm of OddNumbers

```
1  boolean foundAny=false, filter1=true, filter2=true;
2  int count=0;
3  for each number num do
4  |   if num > 2  num % 2 == 0  num!=0  num!= 1 then
5  |   |   filter1=false;
6  |   end
7  |   int top = Math.sqrt(num)+1;
8  |   for i=3; i < top; i+=2 do
9  |   |   if num % 1 == 0  num!=0  num!= 1 then
10 |   |   |   filter2=false;
11 |   |   end
12 |   end
13 |   if filter2  filter1 then
14 |   |   count++ and filter1=true and filter2=true;
15 |   end
16 |   filter1=true and filter2=true;
17 end
18 if count >= 4 then
19 |   foundAny=true;
20 end
21 return foundAny;
```

3. Mapping data from mongoDB to java on IntelliJ IDA [Figure 4.11].



Data MongoDB.png

Figure 4.11: Mapping data MongoDb

4. Generate new object on mongo that represents Probability object. 5. Export probability object to json file. 6. From excel read the json file and make a csv file. In order to do not lose floating digits each number of probability was multiplied by 10.000.000 7. On weka take as input the csv file. On weka was applied the algorithm no supervised of clustering k-means, simpleKmeans, distance function of Euclidean-Distance. In order to see the results, first weka let you analyze each of values that represent the criteria for found the best classification clusters.

The configuration on weka was the following:

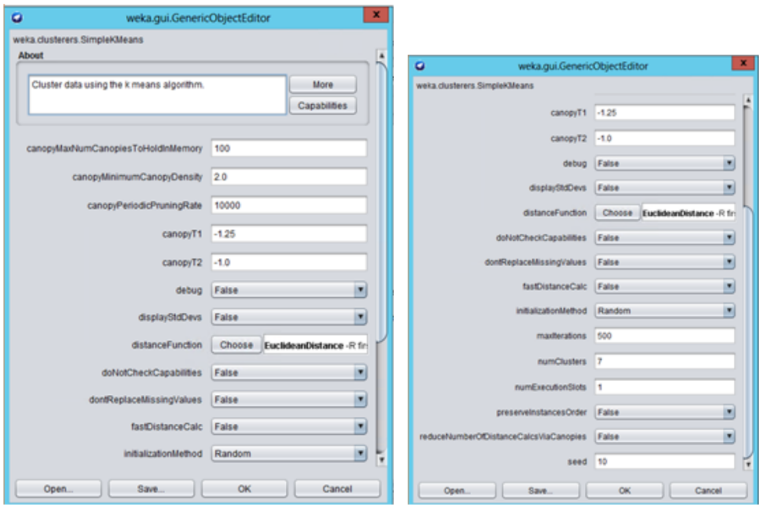


Figure 4.12: Weka Configuration

=== Run information ===

Scheme:weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 7 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation:NoDuplicatesBestScoreWeight

Instances: 10850

Attributes: 20: tag, bestScore, countSolutions, length, countPartial, bestScorePartial, SinglePair, DoublePair, SingleTriplex, DoubleTriplex, Jackpot, Quadruplet, Quintuplet, Sextuplet, Full, Combo, Combo2, size, weight, stanDev.

Test mode: evaluate on training data

=== Clustering model (full training set) ===

kMeans ======

Number of iterations: 15

Within cluster sum of squared errors: 15775.41157711805

Initial starting points (random):

Cluster 0: '0,1,5,5,9,9,9', 940, 160880, 7, 8556, 940, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 32, 487, 42.148838.

Cluster 1: '0,1,2,3,5,6,9', 436, 1347404, 7, 8256, 436, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 95, 1421, 53.23016.

Cluster 2: '4,6,6,7,7,9,9', 1596, 208870, 7, 3626, 1596, TRUE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 41, 699,98.911835.

Cluster 3: '0,2,2,2,2,6,9', 224, 82408, 7, 3724, 224, TRUE, TRUE, TRUE, FALSE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, 24, 347,32.62138.

Cluster 4: '3,3,3,5,5,6,7', 1094, 252291, 7, 8826, 1094, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 39, 678, 94.31635.

Cluster 5: '0,3,3,5,5,7,7', 1330, 541164, 7, 19136, 1330, TRUE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 34, 490, 38.76335.

Cluster 6: '1,2,4,5,5,6,8', 1246, 1642540, 7, 15600, 1246, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 88, 1516, 104.57286.

Missing values globally replaced with mean/mode Final cluster centroids:

Attribute	Full Data (10850.0)	Cluster 0 (1438.0)	Cluster 1 (120.0)	Cluster 2 (1979.0)	Cluster 3 (1477.0)	Cluster 4 (2070.0)	Cluster 5 (1294.0)	Cluster 6 (2472.0)
tag	0,0,0,0,0,1,1	0,0,0,0,0,2,2	0,1,2,3,4,5,6	0,0,1,1,2,3,6	0,0,0,0,0,1,1	0,1,1,6,6,6,7	0,0,0,1,2,5,8	0,0,0,1,2,3,4
bestScore	1003.644	364.662	906.3083	1284.4068	1057.0169	1579.4232	457.534	927.1383
count Solutions	402336.5409	99585.2768	1771114.95	597236.7196	100607.2221	233813.2903	306530.9946	727524.7144
length	7	7	7	7	7	7	7	7
countPartial	10808.6914	6861.758	16734.7	13657.2577	6398.9045	9374.5246	11128.5595	14204.8596
bestScore Partial	1003.644	364.662	906.3083	1284.4068	1057.0169	1579.4232	457.534	927.1383
SinglePair	T	T	F	T	T	T	T	T
DoublePair	T	T	F	T	T	T	T	F
Single Triplex	T	T	F	F	T	T	F	F
Double Triplex	F	F	F	F	F	F	F	F
Jackpot	F	T	F	F	F	T	F	F
Quadruplet	F	F	F	F	T	F	F	F
Quintuplet	F	F	F	F	F	F	F	F
Sextuplet		F	F	F	F	F	F	F
Full	F	F	F	F	F	F	F	F
Combo	F	F	F	F	F	F	F	F
Combo2	F	F	F	F	F	F	F	F
size	41.6718	19.9645	98.9417	55.7665	25.2322	35.3903	33.7736	59.4523
weight	579.5288	290.9159	1535.775	929.8454	421.1266	612.2227	441.7303	559.9474
stanDev	69.9799	35.9138	67.0109	92.8821	82.0734	94.5385	28.0141	65.7829

Table 4.1: Weka results

Time taken to build model (full training data) : 1.64 seconds.
=== Model and evaluation on training set ===
Clustered Instances

Difficulty	Cluster	Instances	Percentage
2	0	1438	(13%)
7	1	120	(1%)
5	2	1979	(18%)
1	3	1477	(14%)
6	4	2070	(19%)
4	5	1294	(12%)
3	6	2472	(23%)

Table 4.2: Weka results 2

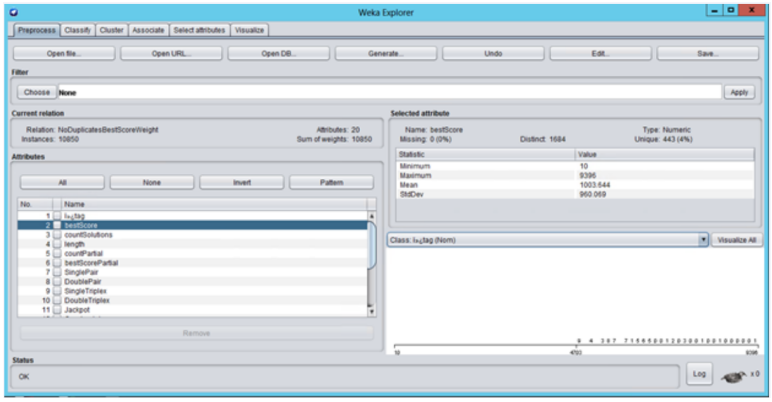


Figure 4.13: Tag Weka Configuration

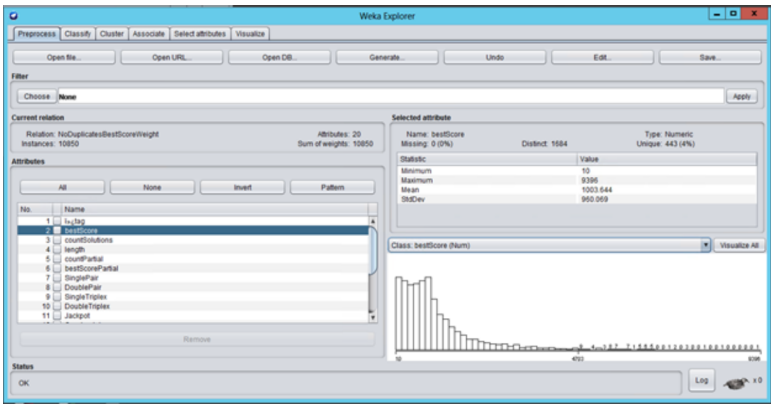


Figure 4.14: bestScore Weka Configuration

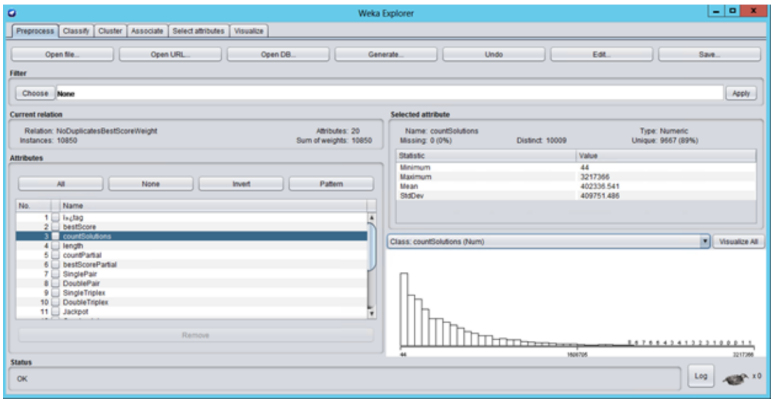


Figure 4.15: countSolutions Weka Configuration

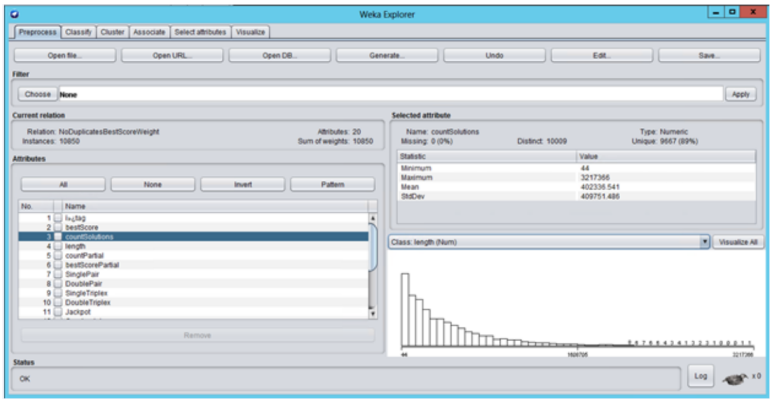


Figure 4.16: Length Weka Configuration

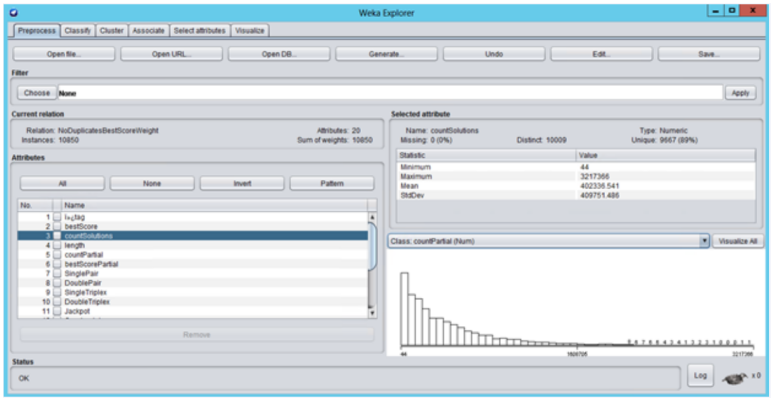


Figure 4.17: CountPartial Weka Configuration

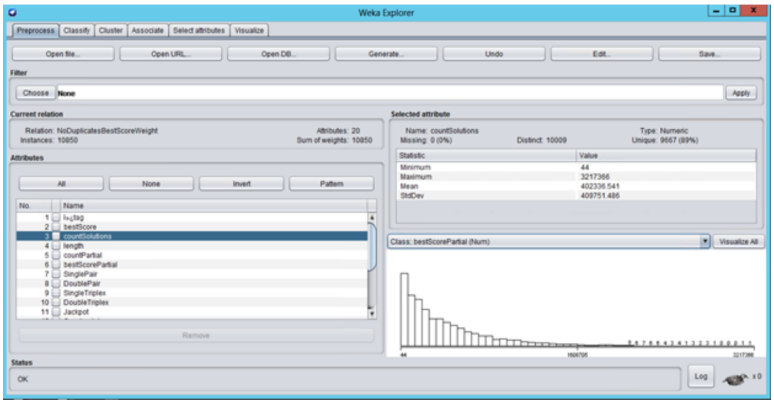


Figure 4.18: Best Score Partial Weka Configuration

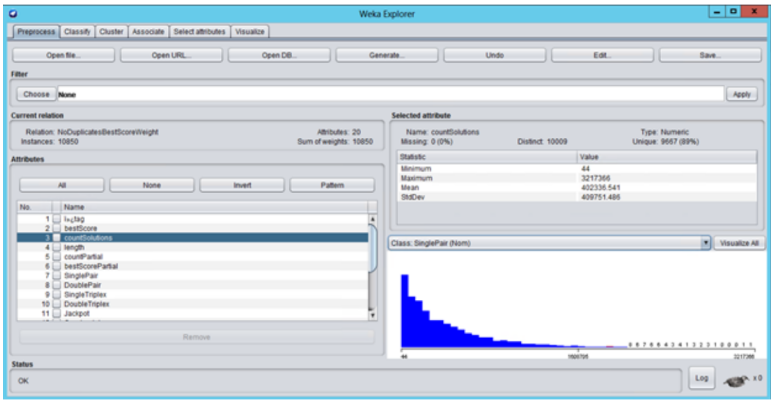


Figure 4.19: Single Pair Weka Configuration

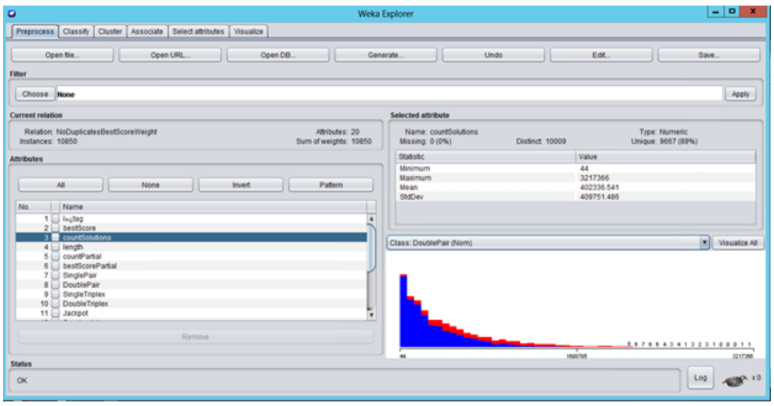


Figure 4.20: Double Pair Weka Configuration

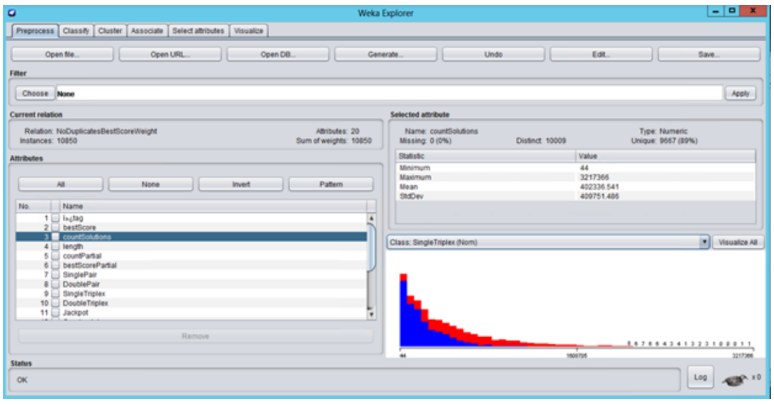


Figure 4.21: Single Triplex Weka Configuration

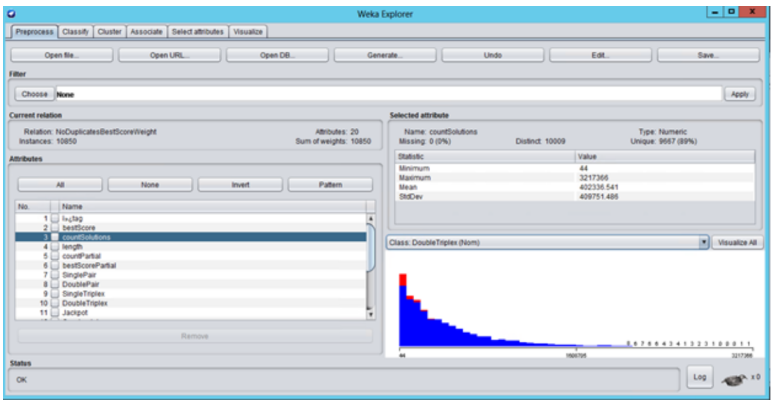


Figure 4.22: Double Triplex Weka Configuration

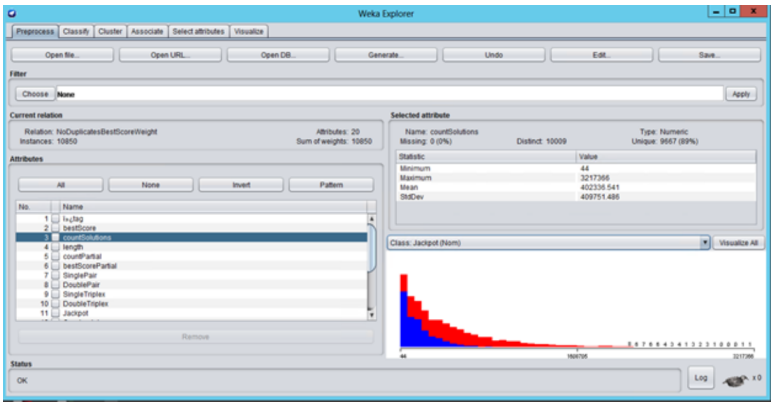


Figure 4.23: Jackpot Weka Configuration

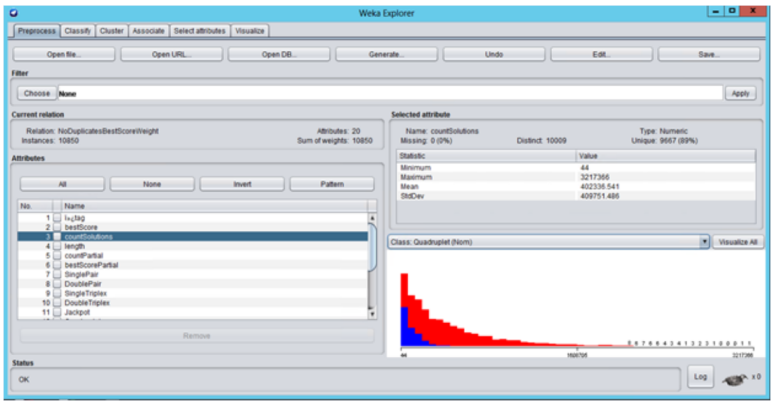


Figure 4.24: Quadruplet Weka Configuration

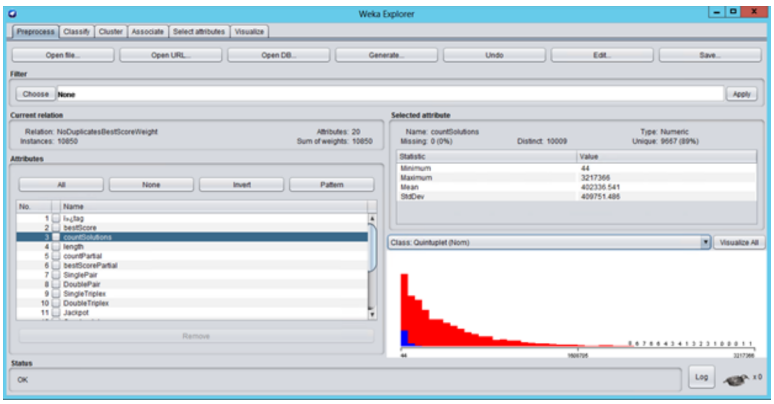


Figure 4.25: Quintuplet Weka Configuration

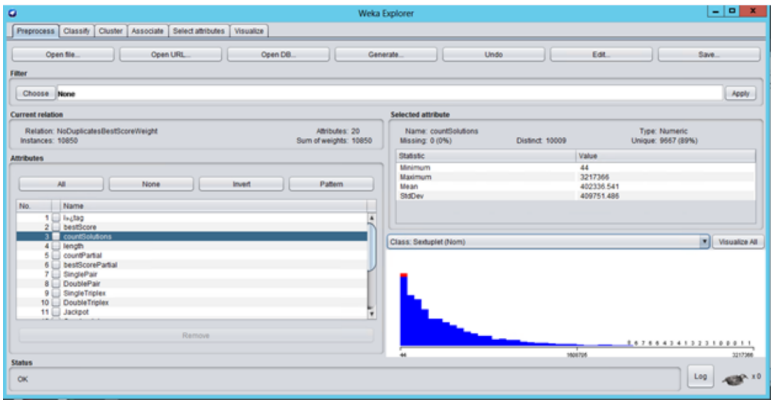


Figure 4.26: Sextuplet Weka Configuration

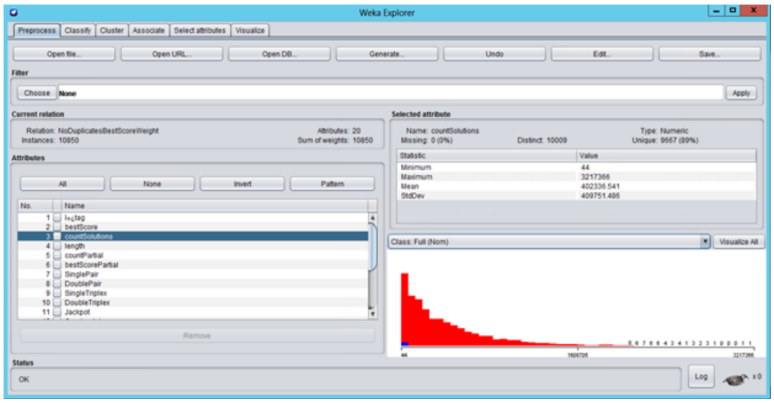


Figure 4.27: Full Weka Configuration

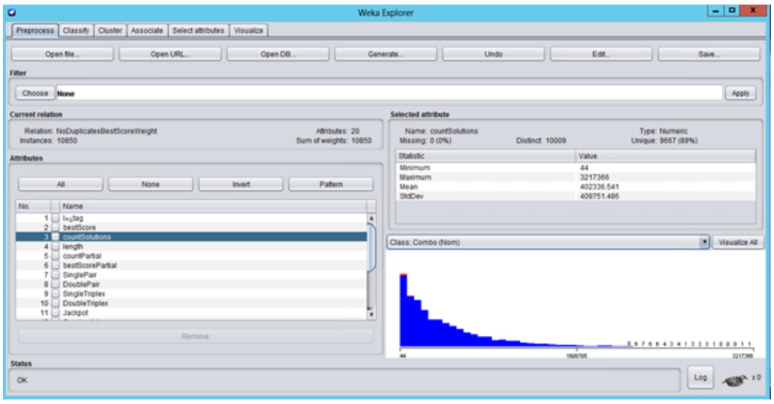


Figure 4.28: Combo Weka Configuration

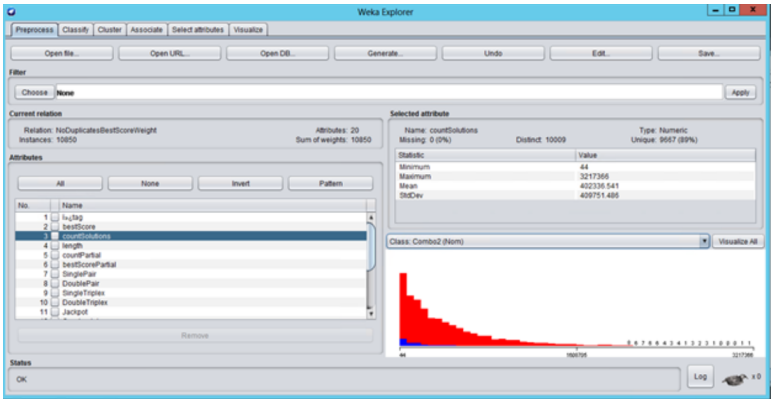


Figure 4.29: Combo2 Weka Configuration

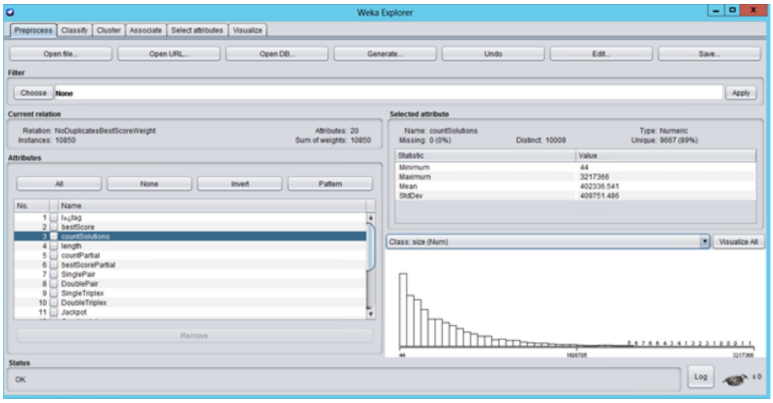


Figure 4.30: Size Weka Configuration

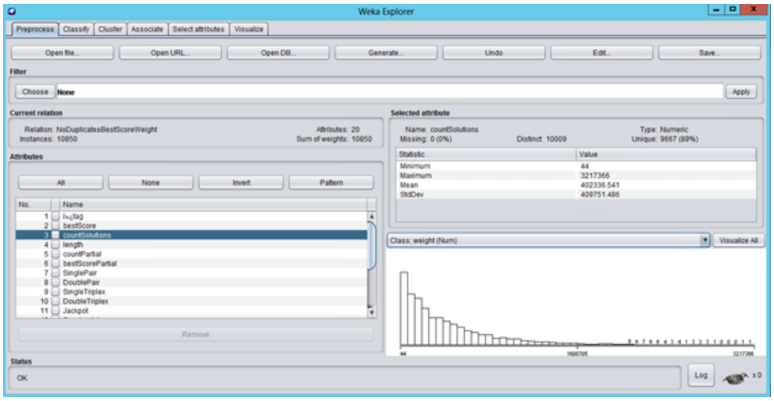


Figure 4.31: Weight Weka Configuration

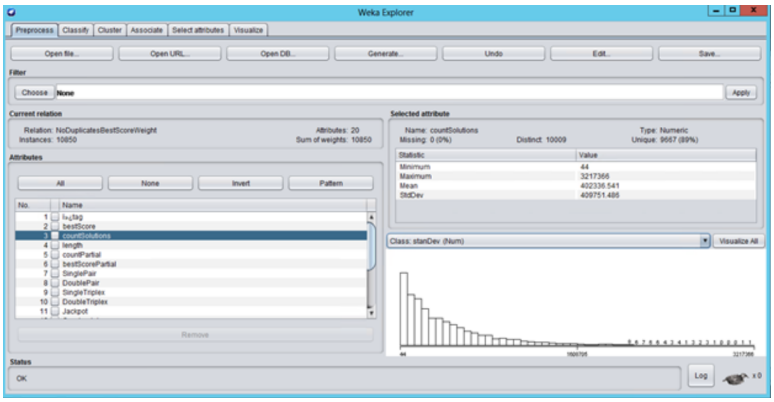


Figure 4.32: Standard Deviation Weka Configuration

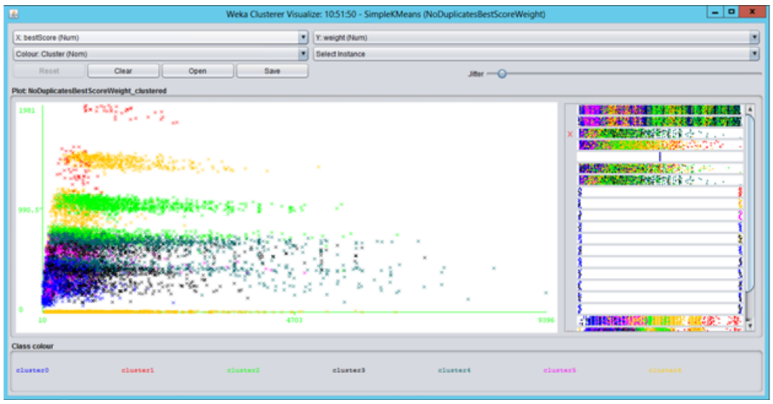


Figure 4.33: Results after apply algorithm

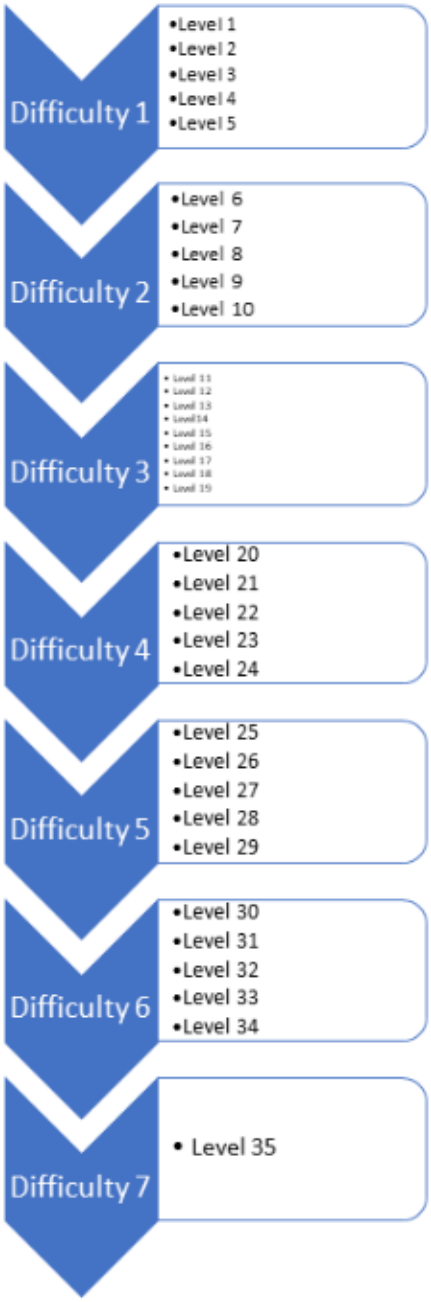


Figure 4.34: Subdivision

Figure 4.35: Relationship between Difficulty and Clusters

4.3 Design of point system and levels

For each difficulty was created an .apk in order to search the timing and speed of users on solving a schema related to the difficulty. The process consist on tabulate the results of different games, the data tabulated was related to number of games done, points get on each schema, experience points given with the previous point system, tag given random from the input separated by difficulty, operation done by the user, points gotten, bonus given, time in milliseconds left, time in seconds left, time in milliseconds spend, time in seconds spend.

Then for each schema solved, I had test 17 different formulas in order to find the best one. Those are the 17 formulas tested:

1. Points=$\sum((leftTimeonmillisenconds*\%weight) + \#ScenarioCompleted + PointsOp)$

2. $Points = \sum((leftTimeonmillisenconds * \%weight) + (ScenarioCompleted * PointsOp))$

3. Points=$\sum(\frac{\#schenarioCompleted}{1+(leftTimeonmilliseconds)*\%Weight)} + PointsOp) + 1or0idnoleftTimeand0ScenarioCompleted$

4. Points=$\sum(\frac{\#schenarioCompleted+PointsOp}{1+(leftTimeonmilliseconds)*\%Weight)})$

5. Points=$\sum((lefttime * \#scenario) * (PointsOp * \%Weight)) + 1or0ifnoleftTimeand0scenarioCompleted$

6. Points=$\sum(\frac{leftTimeonmilliseconds*\#scenarioCompleted}{1+(PointsOp*\%Weight)})$

7. Points=$\sum(\frac{PointsOp*\%Weight}{1+(leftTimeonmilliseconds*\#scenarioCompleted)})$

8. Points=$\sum(\frac{leftTimeonmilliseconds+\#scenarioCompleted}{1+(PointsOp*\%Weight)})$

9. Points=$\sum(\frac{PointsOp*\%Weight}{1+(leftTimeonmilliseconds+\#scenarioCompleted)})$

10. Points=$\sum(leftTimeonmilliseconds^2 + PointsOp * leftTimeonmilliseconds + \#scenarioCompleted)$

11. Points=$\sum(leftTtimeonmilliseconds^2 + PointsOp * leftTtimeonmilliseconds * difficulty + \#scenarioCompleted * \%Weight)$

12. Points=$\sum(leftTimeonmilliseconds^2 + PointsOp * leftTimeonmilliseconds + ((\#scenarioCompleted + difficulty)) * \%Weight)$

13. Points=$\sum(PointsOp^2 + (PointsOp * leftTimeonmilliseconds) + (\#scenarioCompleted * difficulty * \%Weight))$

14. Points=$\sum(PointsOp^2 + (PointsOp * \#scenarioCompleted * difficulty * \%Weight) + leftTimeonmilliseconds)$
15. Points=$\sum(PointsOp^2 + (PointsOp * \#scenarioCompleted * difficulty * \%Weight) - leftTimeonmilliseconds)$
16. Points=$\sum(\frac{PointsOp^2+(PointsOp*\#scenarioCompleted*difficulty*\%Weight}{1+leftTimeonmilliseconds})$
17. Points=$\sum(\frac{leftTimeonmilliseconds}{1+(PointsOp^2+(PointsOp*\#scenarioCompleted*difficulty*\%Weight)})$

The red formula was discarded immediately because generate negative values. the formula number 3 was the chosen one.

Also for Brains points were proposed 6 different ways to obtain them on each game.

1. Brains = PointsOp (more understandable for players)
2. Brains = possiblePointsOp
3. Brains = $\sum(leftime)Brains = (\#scenariosolved)$
4. Brains = bonus calculated on previous version
5. Brains = #scenario solved * difficulty of the input

Mak07 will have a database that will keep the pre calculated values of wight and standard deviation for each tag.

4.3.1 Difficulty 1

The following table is the data obtained by playing on the difficulty 1 found by clustering.

Each color represent the number of schemas done in 1 game [figure 4.36]. In this case the users played 11 games, but they had solve different number of schemas each time.

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results[figure 4.37].

Data Graphically shows in this case that the number or schemas solved in one game of 2 seconds are 3 [figure 4.38].

This is the behaviour of players playing a game of difficulty 1 [figure 4.39].

The chosen formula have a incremental behaviour [figure 4.40] [figure 4.41].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.42].

The following image represents the relationship between games vs time average: 261526 Total games: 11 [figure 4.43].

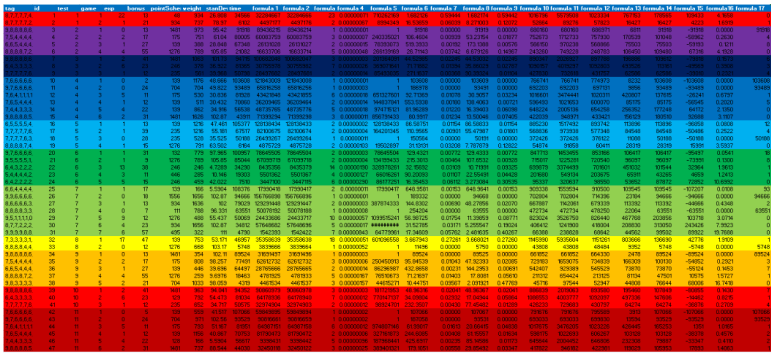


Figure 4.36: Data obtained by playing difficult 1 found by clustering

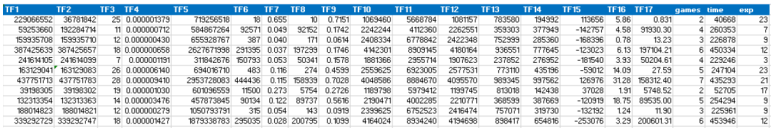


Figure 4.37: Data summarized by playing difficult 1 found by clustering

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.44].

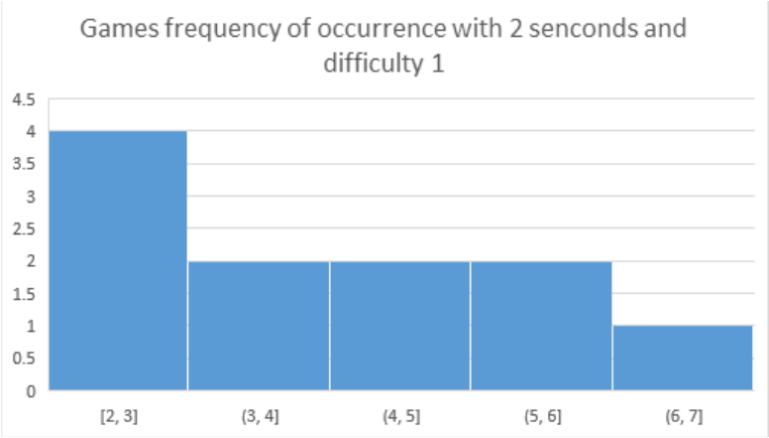


Figure 4.38: Games frequency of occurrence with 2 seconds and difficulty 1

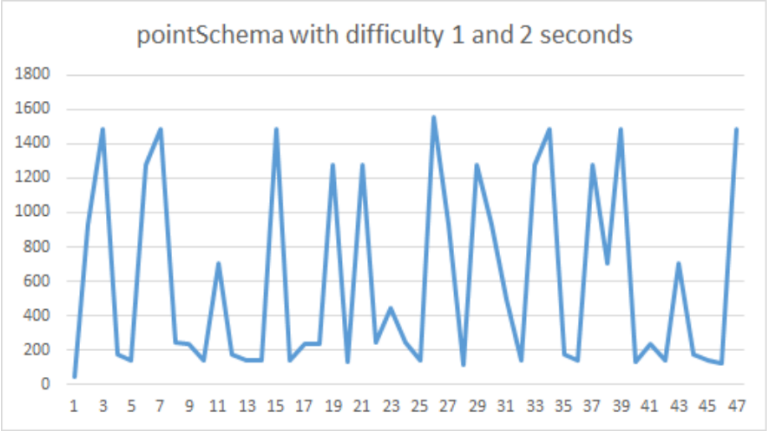


Figure 4.39: pointSchema with difficulty 1 and 2 seconds

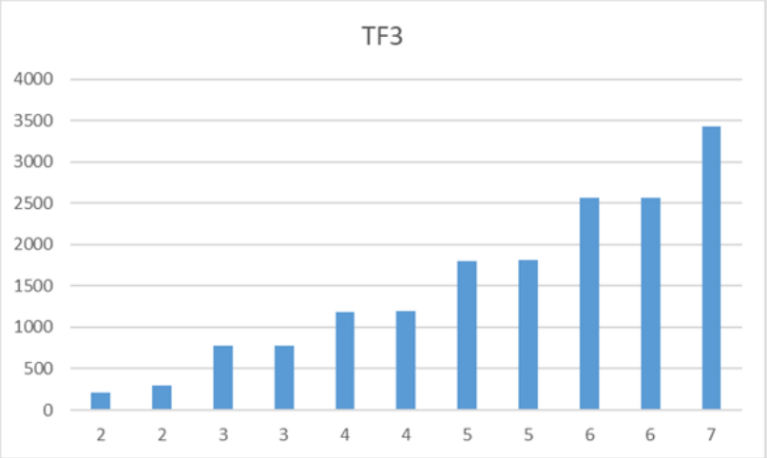


Figure 4.40: Graph of formula 3

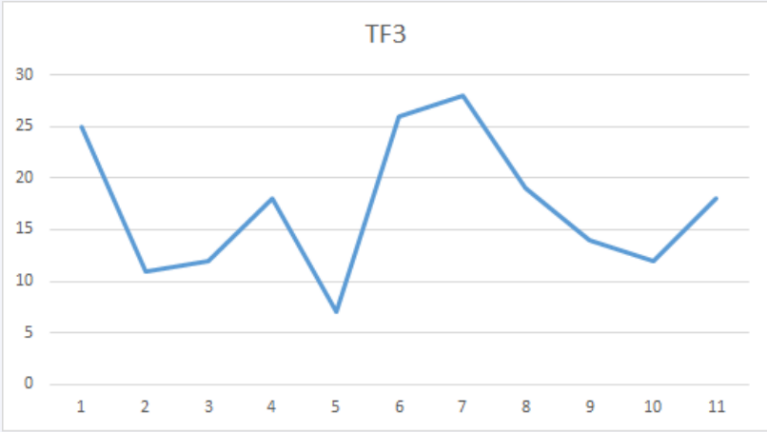


Figure 4.41: Graph of formula 3 line

games	TF3
2	210
2	301
3	771
3	771
4	1188
4	1196
5	1801
5	1807
6	2567
6	2567
7	3428

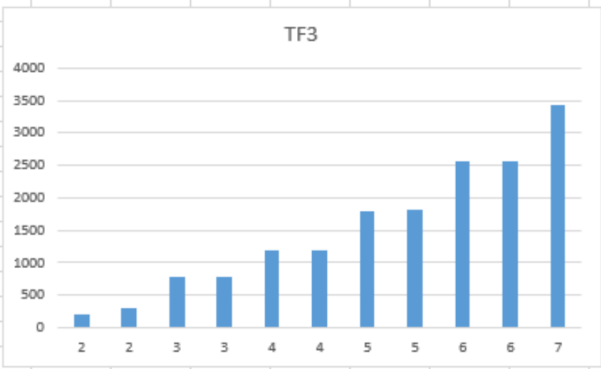


Figure 4.42: Relationship between games and points of formula 3

games	time
2	40668
2	52705
3	225961
3	226878
4	229246
4	260353
5	247104
5	254294
6	450334
6	453946
7	435293

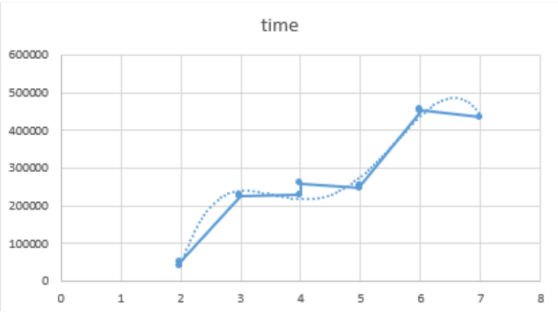


Figure 4.43: Relationship between games and time of formula 3

points	Sum of total
0	93535
1	236749
2	49619
3	194413
4	41371
6	84393
8	32052
12	35999
14	5082
16	20058
28	10309
32	23915
34	2456
36	20014
48	5537
84	8167
108	2374
196	2013
224	19154
256	1158
?	184355

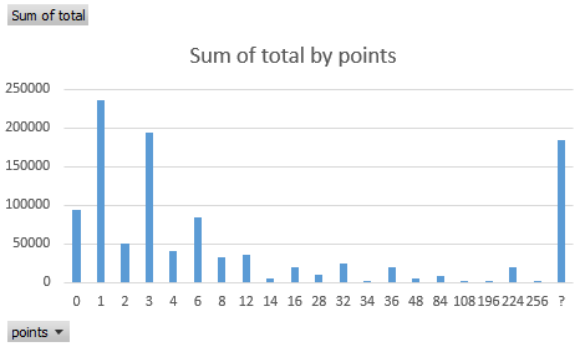


Figure 4.44: Sum of total by points

4.3.2 Difficulty 2

The following table is the data obtained by playing on the difficulty 2 found by clustering [figure 4.45]. Each color represent the number of schemas done in 1 game. In this case the users played 15 games, but they had solve different number of schemas each time.

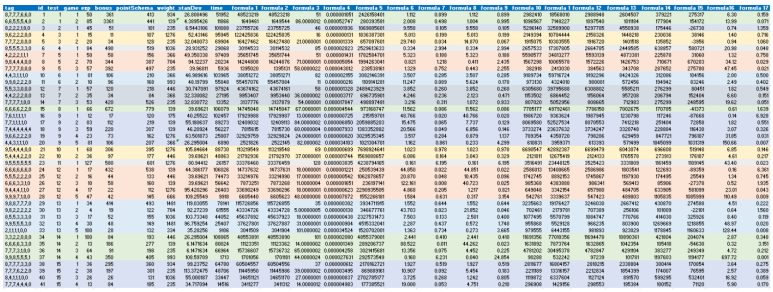


Figure 4.45: Data obtained difficulty 2 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.46].

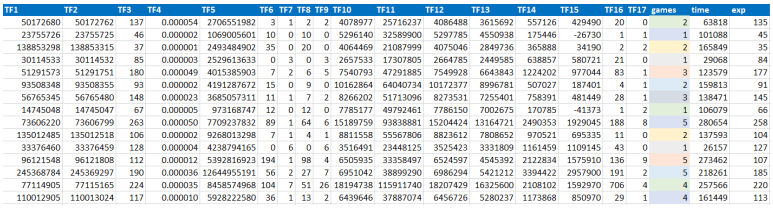


Figure 4.46: Summary obtained difficulty 2 by clustering

Data Graphically shows in this case that the number or schemas solved in one game of 2 seconds is 2 [figure 4.47].

This is the behaviour of players playing a game of difficulty 2 [figure 4.48].

The chosen formula have 2 picks with 2 and 3 schemas solved, in the other hand 4 and 5 schemas solved present a incremental behaviour [figure 4.49] [figure 4.50].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.51].

The following image represents the relationship between games vs time Average: 149527 Total games: 15 [figure 4.52].

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.53].

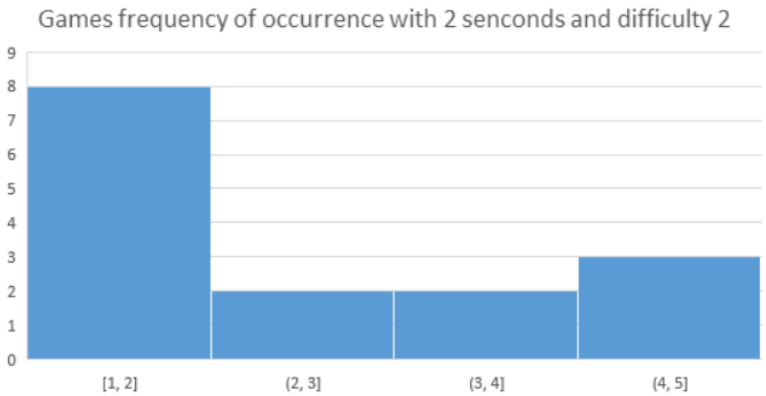


Figure 4.47: Games frequency of occurrence with 2 seconds and difficult 2

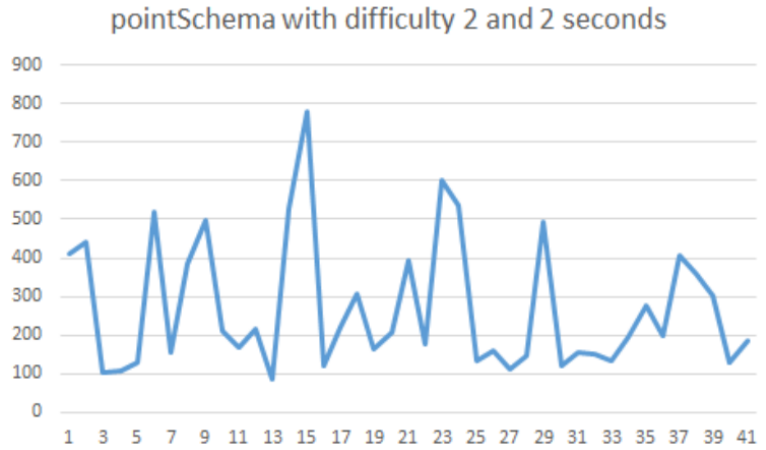


Figure 4.48: PointSchema with difficult 2 and 2 seconds

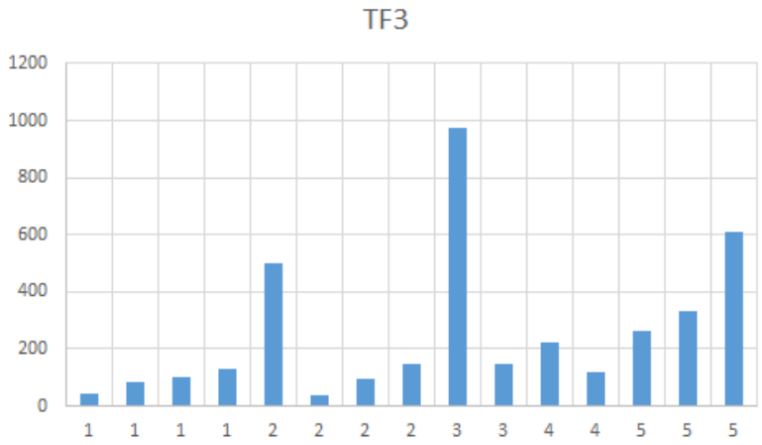


Figure 4.49: Formula 3 difficult 2

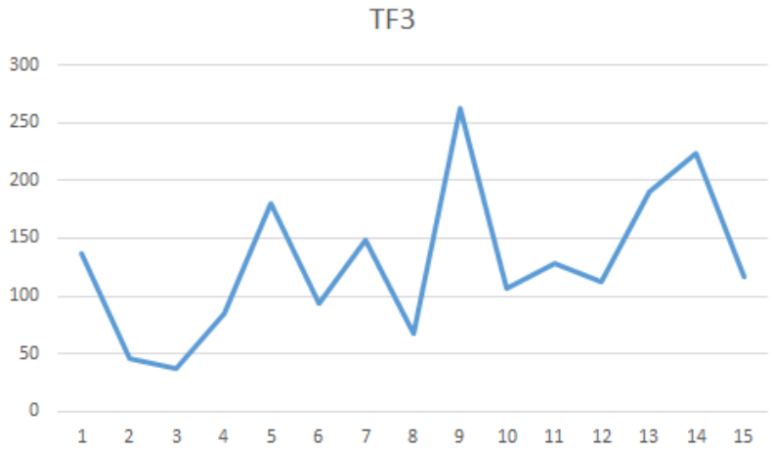


Figure 4.50: Formula 3 difficult 2 Line

game	TF3
1	46
1	85
1	102
1	128
2	500
2	37
2	93
2	145
3	977
3	148
4	224
4	117
5	263
5	330
5	609

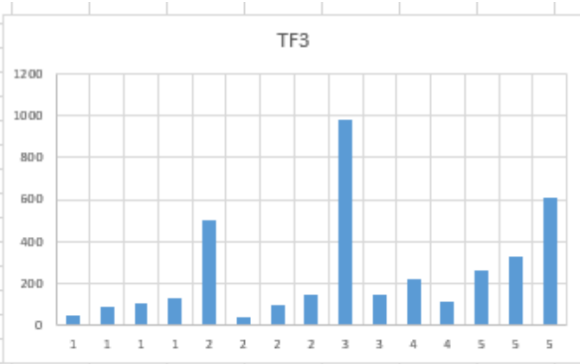


Figure 4.51: Games vs Formula 3 difficult 2

games	time
2	63818
1	101088
2	165849
1	29068
3	123579
2	159813
3	138471
1	106079
5	280654
2	137593
1	26157
5	273462
5	218261
4	257566
4	161449

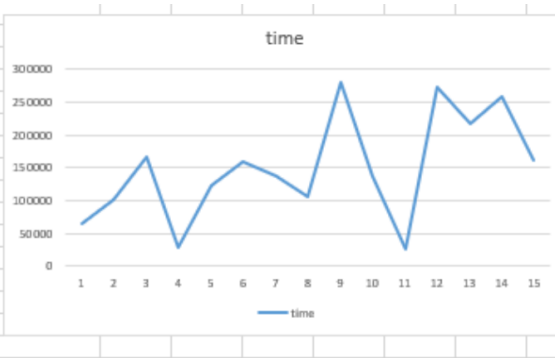


Figure 4.52: Games vs time difficult 2

Row Labels	Sum of total
0	139561
1	119367
2	13266
3	65234
4	49957
5	35452
6	47775
7	4992
8	22323
12	19524
14	1903
15	4145
16	39471
18	19724
20	28150
24	21660
26	4488
28	41630
32	16982
36	1805
40	22102
42	2281
48	15927
56	8313
60	30853
64	33117
70	2354
72	60703
80	1856
84	5352
90	5178
100	27420
120	9402
128	13708
144	10280
160	26146
168	4635
180	28788
196	25816
224	9778
288	2792
?	245486
Grand Total	1289696

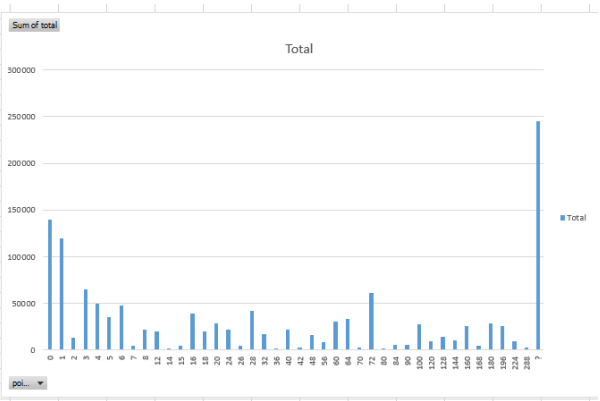


Figure 4.53: Sum of Total by points of difficult 2

4.3.3 Difficulty 3

The following table is the data obtained by playing on the difficulty 3 found by clustering [figure 4.54]. Each color represent the number of schemas done in 1 game. In this case the users played 22 games, but they had solve different number of schemas each time.

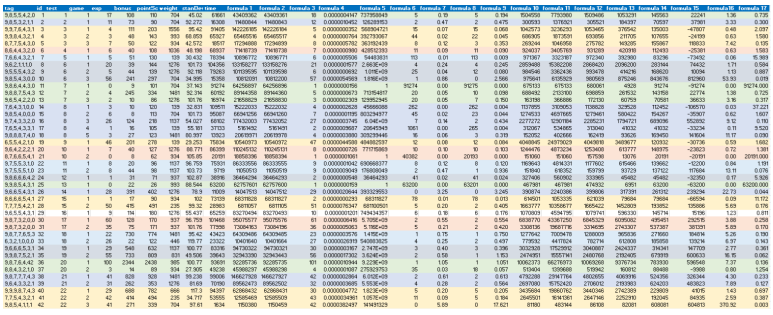


Figure 4.54: Data obtained difficulty 3 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.55].

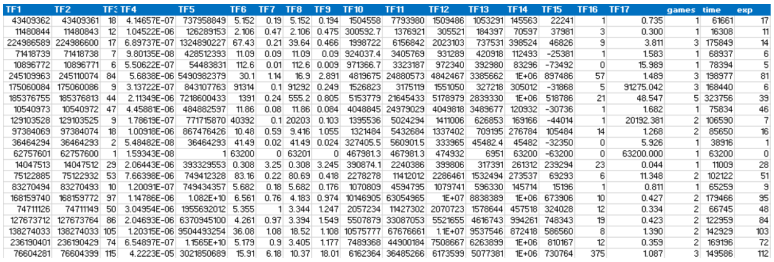


Figure 4.55: Summary obtained difficulty 3 by clustering

Data Graphically shows in this case that the number or schemas solved in one game of 2 seconds is 2 [figure 4.56].

This is the behaviour of players playing a game of difficulty 3 [figure 4.57].

The chosen formula have a non exponential or sequential behaviour. [figure 4.58] [figure 4.59].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.60].

The following image represents the relationship between games vs time Average: 2471783 Total games: 22 [figure 4.61].

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.62].

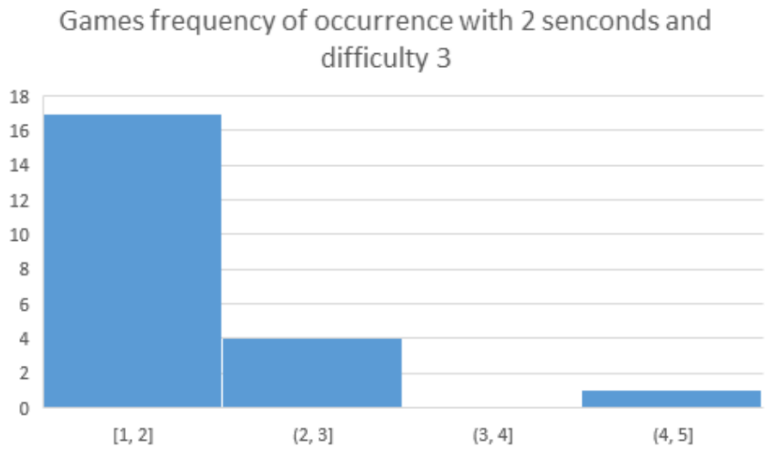


Figure 4.56: Games frequency of occurrence with 2 seconds and difficult 3

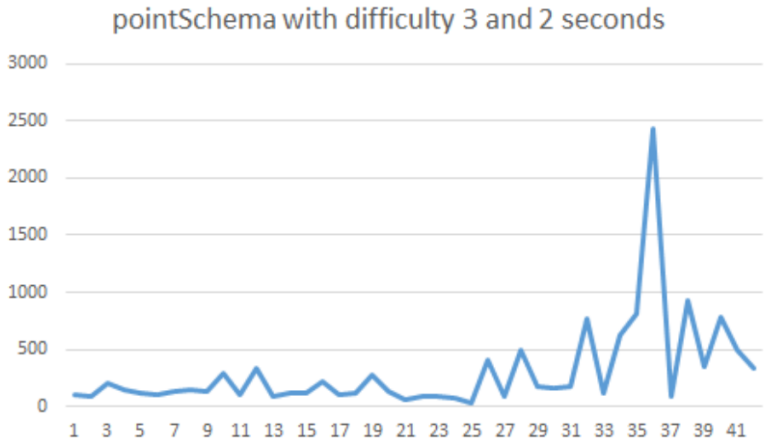


Figure 4.57: PointSchema with difficult 3 and 2 seconds

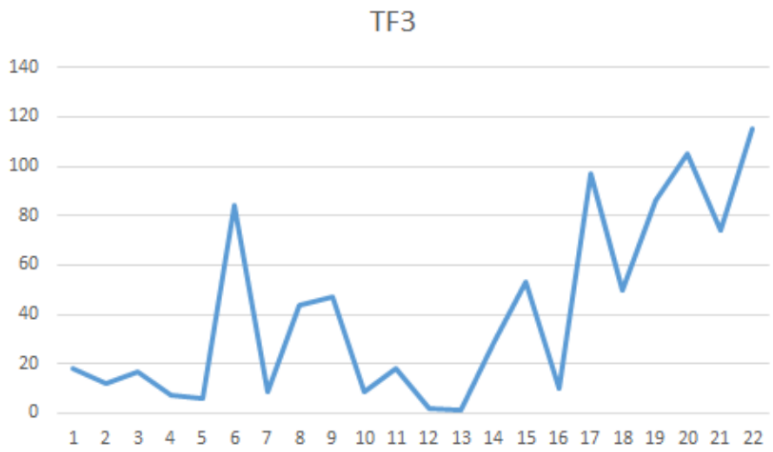


Figure 4.58: Formula 3 difficult 3 Line

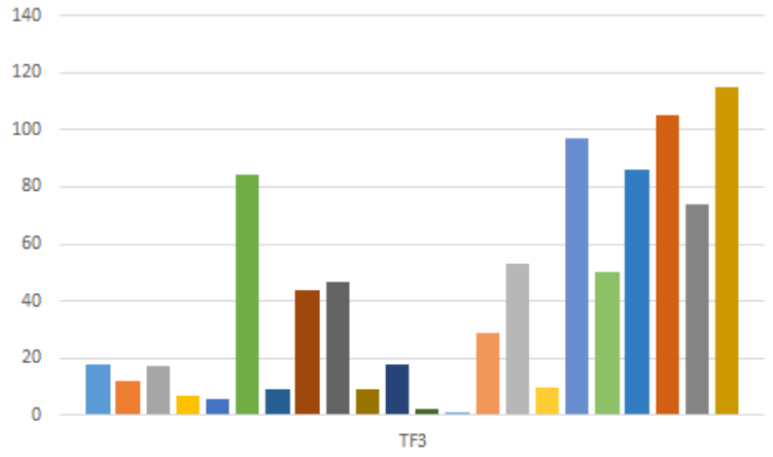


Figure 4.59: Formula 3 difficult 3

games	TF3
1	1
1	2
1	6
1	7
1	10
1	12
1	18
1	29
1	47
2	9
2	18
2	50
2	53
2	74
2	86
2	97
2	105
3	9
3	17
3	84
3	115
5	44

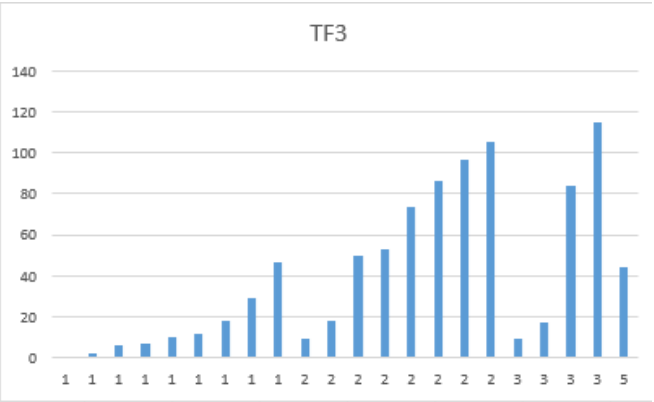


Figure 4.60: Games vs Formula 3 difficult 3

games	time
1	61661
1	16308
3	175849
1	68937
1	78394
3	198977
3	168440
5	323756
1	75834
2	106590
2	85650
1	38916
1	63200
1	11009
2	102122
1	65259
2	179466
2	66745
2	122959
2	142929
2	169196
3	149586

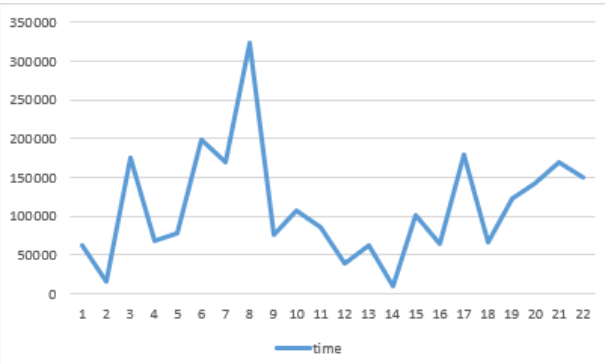


Figure 4.61: Games vs time difficult 3

Row Lab	Sum of total
0	137111
1	119981
2	76865
3	128510
4	38719
5	15851
6	143329
8	46905
9	56276
10	43748
12	45026
14	16277
16	22279
18	46056
20	70005
24	34687
28	22646
32	5828
36	19426
40	22871
48	17319
54	7548
56	7695
60	33034
68	12804
70	1490
72	6098
80	19541
96	16413
100	1726
108	44538
112	13001
120	10401
122	4627
126	7345
128	22847
140	4900
144	27888
180	7168
196	8820
216	10639
224	18864
252	16928
288	6919
476	1803
896	5086
?	328587
Grand Tota	1776425

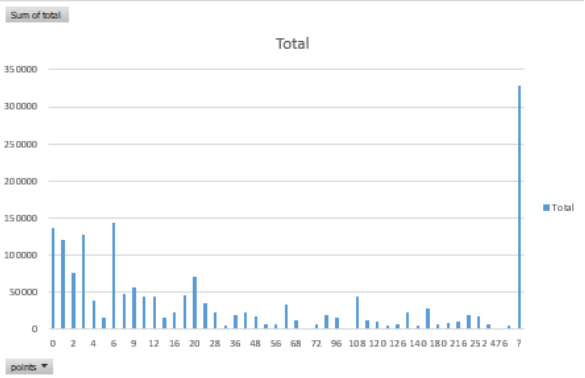


Figure 4.62: Sum of Total by points of difficult 3

4.3.4 Difficulty 4

The following table is the data obtained by playing on the difficulty 4 found by clustering [figure 4.63]. Each color represent the number of schemas done in 1 game. In this case the users played 19 games, but they had solve different number of schemas each time.

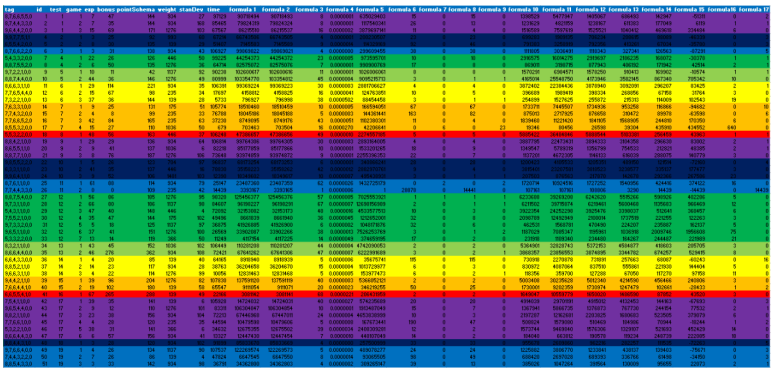


Figure 4.63: Data obtained difficulty 4 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.64].

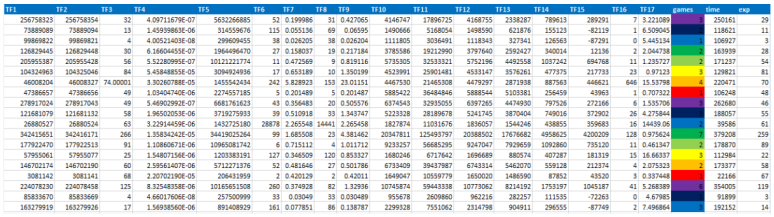


Figure 4.64: Summary obtained difficulty 4 by clustering

Data graphically shows in this case that the number or schemas solved in one game of 2 but in order to let players play we will take in count as maximum 3 in 2 seconds [figure 4.65].

This is the behaviour of players playing a game of difficulty 4 [figure 4.66].

The chosen formula have a non exponential or sequential behaviour but has a pick which means that the user was enthusiastic and it could solve some schemas with good score and good speed [figure 4.67] [figure 4.68].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.69].

The following image represents the relationship between games vs time Average: 171705 Total games: 19 [figure 4.70].

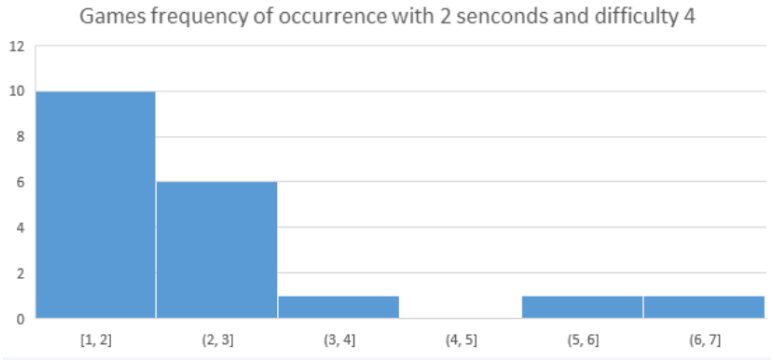


Figure 4.65: Games frequency of occurrence with 2 seconds and difficult 4

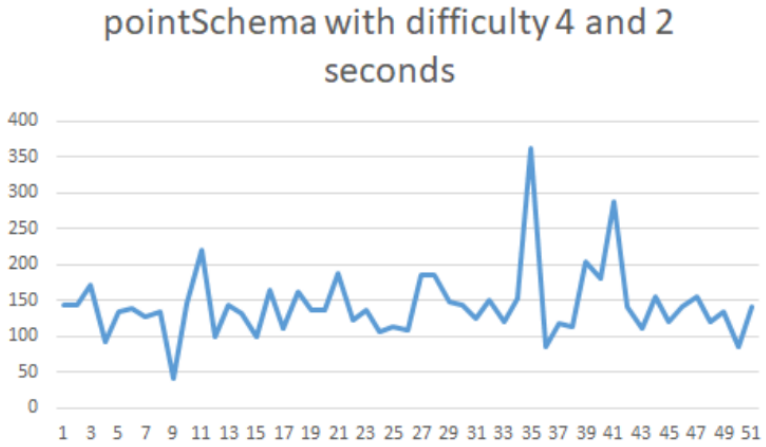


Figure 4.66: PointSchema with difficult 4 and 2 seconds

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.71].

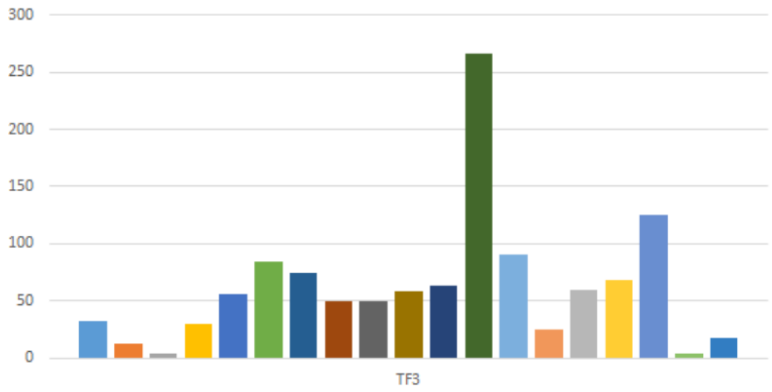


Figure 4.67: Formula 3 difficult 4

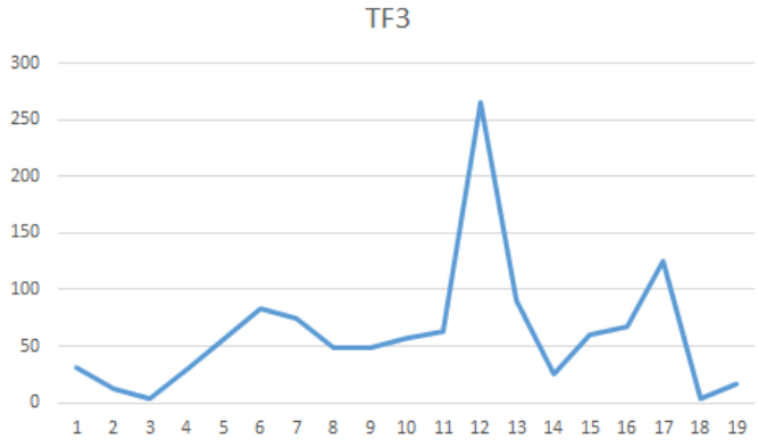
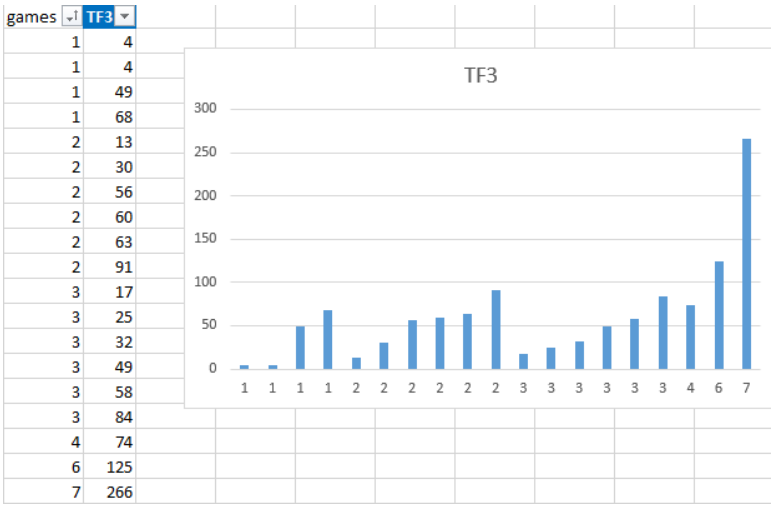
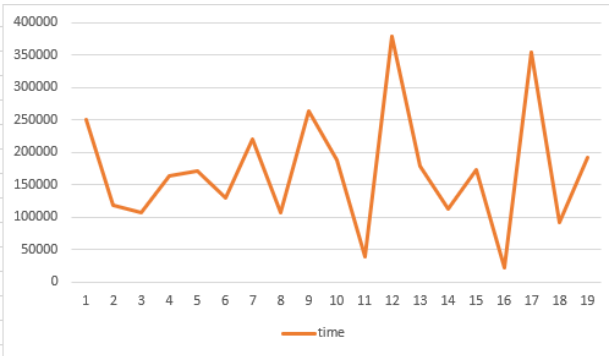


Figure 4.68: Formula 3 difficult 4 Line



games	TF3
1	4
1	4
1	49
1	68
2	13
2	30
2	56
2	60
2	63
2	91
3	17
3	25
3	32
3	49
3	58
3	84
4	74
6	125
7	266

Figure 4.69: Games vs Formula 3 difficult 4



games	time
3	250161
2	118621
1	106927
2	163939
2	171237
3	129821
4	220471
1	106248
3	262680
3	188057
2	39586
7	379208
2	178870
3	112984
2	173377
1	22166
6	354005
1	91899
3	192152

Figure 4.70: Games vs time difficult 4

Row Labels	Sum of total
0	182
1	73
2	21
3	109
4	117
5	12
6	82
7	20
8	9
9	15
10	21
12	42
14	8
16	49
18	73
20	28
22	19
24	28
25	3
26	20
28	14
32	8
40	3
48	2
56	56
96	27
120	3
128	27
144	2
?	350
Grand Total	**1423**

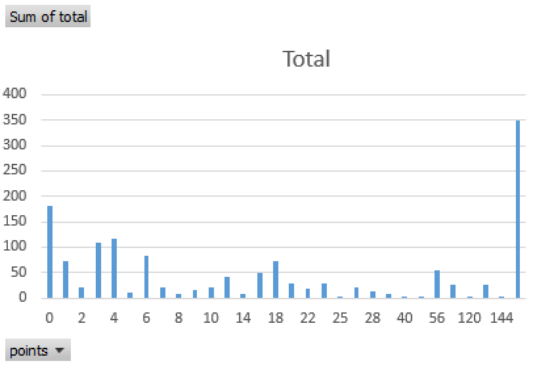


Figure 4.71: Sum of Total by points of difficult 4

4.3.5 Difficulty 5

The following table is the data obtained by playing on the difficulty 5 found by clustering [figure 4.72]. Each color represent the number of schemas done in 1 game. In this case the users played 25 games, but they had solve different number of schemas each time.

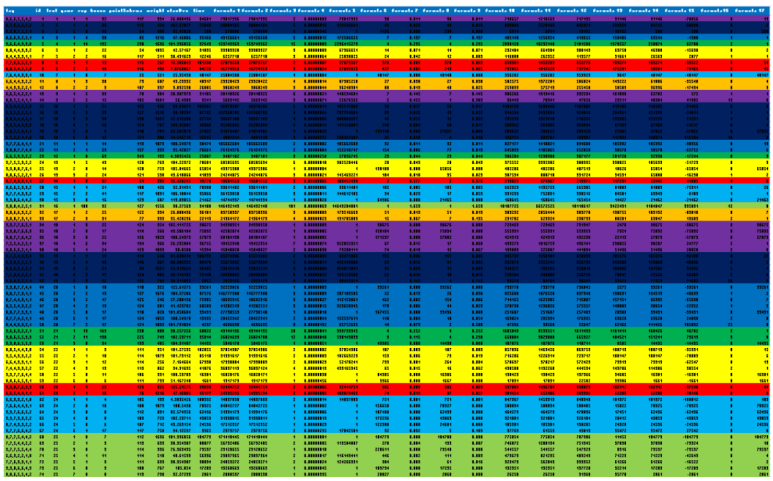


Figure 4.72: Data obtained difficulty 5 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.73].

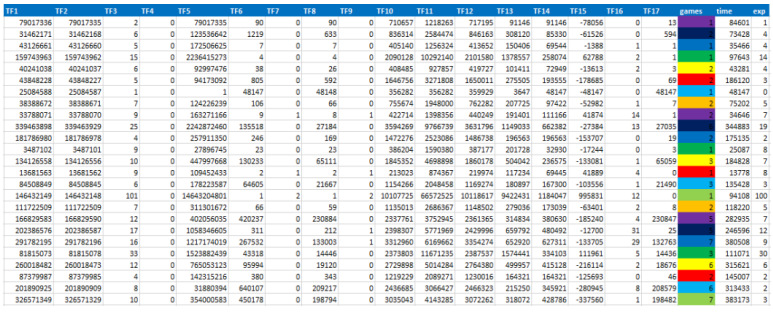


Figure 4.73: Summary obtained difficulty 5 by clustering

Data graphically shows in this case that the number or schemas solved in one game of 2 but in order to let players play we will take in count as maximum 6 in 2 seconds [figure 4.74].

This is the behaviour of players playing a game of difficulty 5 [figure 4.75].

The chosen formula have a pick which means that the user was enthusiastic and it could solve some schemas with good score and good speed [figure 4.76] [figure 4.77].

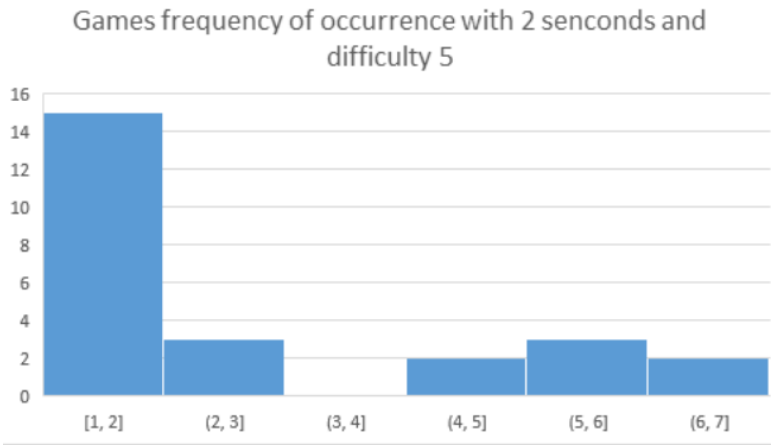


Figure 4.74: Games frequency of occurrence with 2 seconds and difficult 5

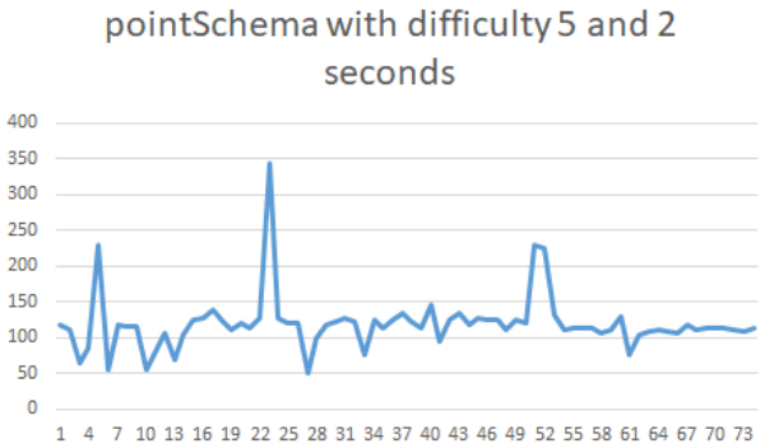


Figure 4.75: PointSchema with difficult 5 and 2 seconds

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.78].

The following image represents the relationship between games vs time Average: 157933 Total games: 25 [figure 4.79].

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.80].

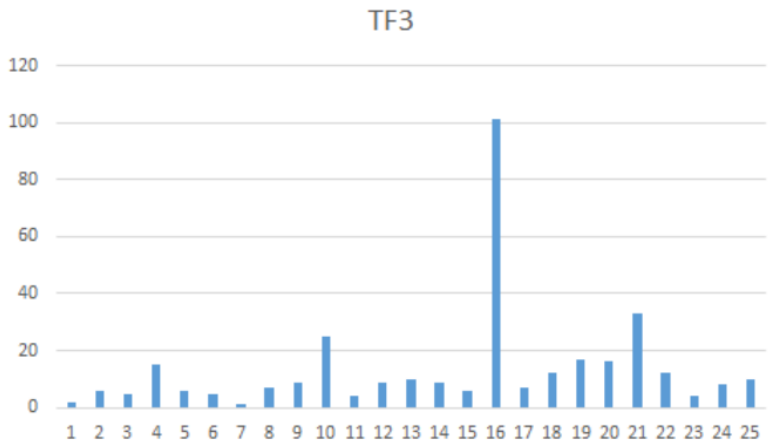


Figure 4.76: Formula 3 difficult 5

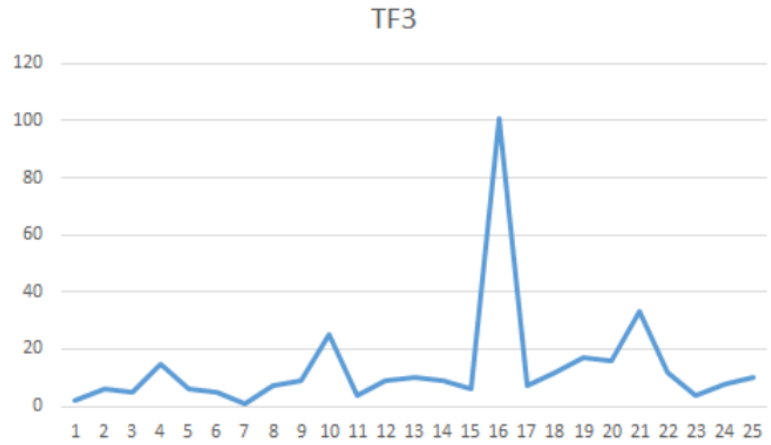


Figure 4.77: Formula 3 difficult 5 Line

games	TF3
1	2
1	5
1	15
1	1
1	9
1	9
1	101
2	6.000003
2	6
2	5
2	7
2	9
2	4
2	7
2	4
3	10
3	6
3	33
5	12
5	17
6	25
6	12.00001
6	8.000003
7	16
7	10

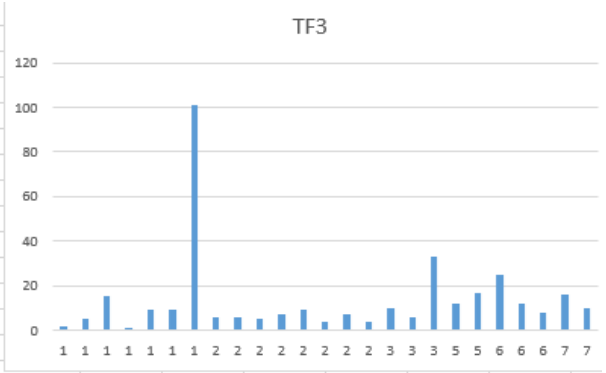


Figure 4.78: Games vs Formula 3 difficult 5

games	time
1	84601
2	73428
1	35466
1	97643
2	43281
2	186120
1	48147
2	75202
2	34646
6	344883
2	175135
1	25087
3	184828
1	13778
3	135428
1	94108
2	118220
5	282935
5	246596
7	380508
3	111071
6	315621
2	145007
6	313433
7	383173

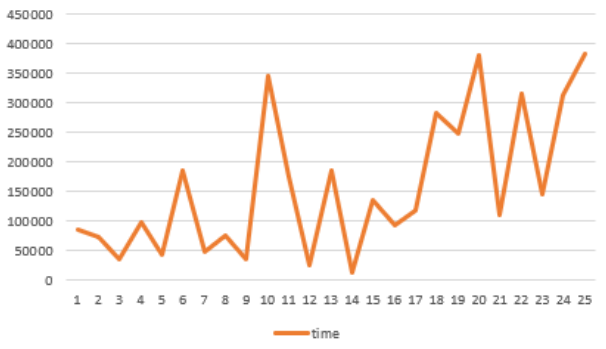


Figure 4.79: Games vs time difficult 5

Row Labels	Sum of total
0	336153
1	120061
2	91696
3	457470
4	116474
5	18325
6	106732
7	4077
8	56029
9	54561
10	20609
12	55473
14	60265
15	4120
16	67522
18	29168
20	37653
24	3382
30	4131
32	5574
40	6158
72	11604
96	2506
144	10057
?	528826
Grand Total	**2208626**

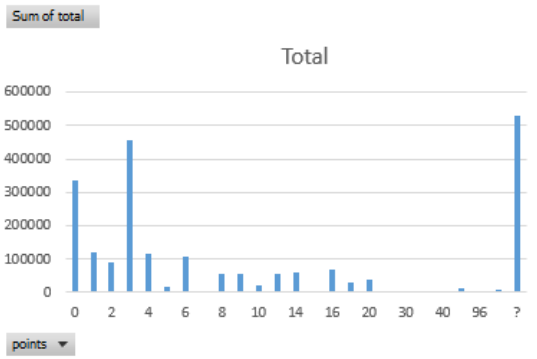


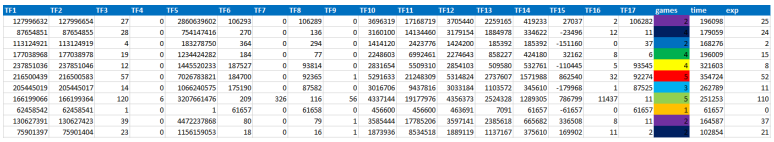
Figure 4.80: Sum of Total by points of difficult 5

4.3.6 Difficulty 6

The following table is the data obtained by playing on the difficulty 6 found by clustering [figure 4.81]. Each color represent the number of schemas done in 1 game. In this case the users played 11 games, but they had solve different number of schemas each time.

Figure 4.81: Data obtained difficulty 6 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.82].



TF1	TF2	TF3	TF4	TF5	TF6	TF7	TF8	TF9	TF10	TF11	TF12	TF13	TF14	TF15	TF16	TF17	games	time	exp
127996632	127996654	27	0	2860639602	106293	0	106289	0	3696319	17168719	3705440	2259165	419233	27037	2	106282	2	196098	25
87654851	87654855	28	0	754147416	270	0	136	0	3160100	14134460	3179154	1884978	334622	-23496	12	11	3	179059	24
113124921	113124919	4	0	183278750	364	0	294	0	1414120	2423776	1424200	185392	185392	-1511160	0	37	2	168276	2
177038968	177038978	19	0	1234424282	184	0	77	0	2248603	6992461	2274643	858227	424180	32162	8	6	4	196009	15
237851036	237851046	12	0	1445520233	187527	0	93814	0	2831654	5509310	2854103	509580	532761	-110445	5	93545	4	321603	8
216500439	216500583	57	0	7026783821	184700	0	92365	1	5291633	21248309	5314824	2737607	1571988	862540	32	92274	5	354724	52
205445019	205445017	14	0	1066240575	175190	0	87582	0	3016706	9437816	3033184	1103572	345610	-179968	1	87525	3	262789	11
166199066	166199364	120	6	3207661476	209	326	116	56	4337144	19177976	4356373	2524328	1289305	786799	11437	11	5	251253	110
62458542	62458541	1	0	1	61657	0	61658	0	456600	456600	463691	7091	61657	-61657	0	61657	1	61657	0
130627391	130627423	39	0	4472237868	80	0	79	1	3585444	17785206	3597141	2385618	665682	336508	8	11	2	164587	37
75901397	75901404	23	0	1156159053	18	0	16	1	1873936	8534518	1889119	1137167	375610	169902	11	2	6	102854	21

Figure 4.82: Summary obtained difficulty 6 by clustering

Data graphically shows in this case that the number or schemas solved in one game is 3 in 2 seconds [figure 4.83].

This is the behaviour of players playing a game of difficulty 6 [figure 4.84].

The chosen formula have 2 pick which means that the user was enthusiastic and it could solve some schemas with good score and good speed [figure 4.85] [figure 4.86].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.87].

The following image represents the relationship between games vs time Average: 20535 Total games: 11 [figure 4.88].

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.89].

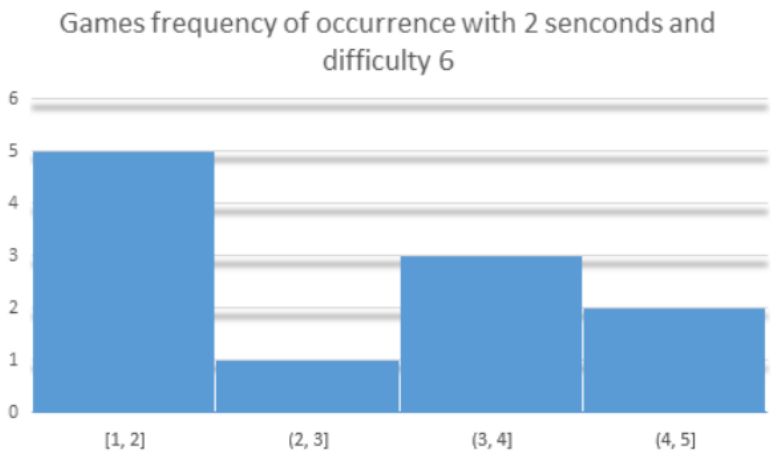


Figure 4.83: Games frequency of occurrence with 2 seconds and difficult 6

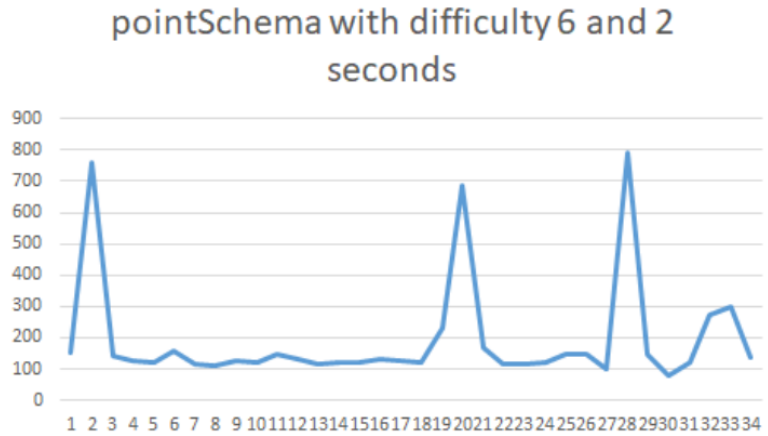


Figure 4.84: PointSchema with difficult 6 and 2 seconds

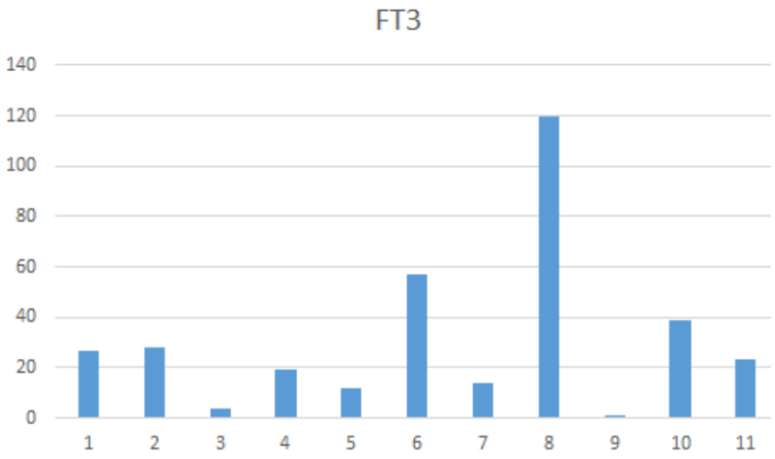


Figure 4.85: Formula 3 difficult 6

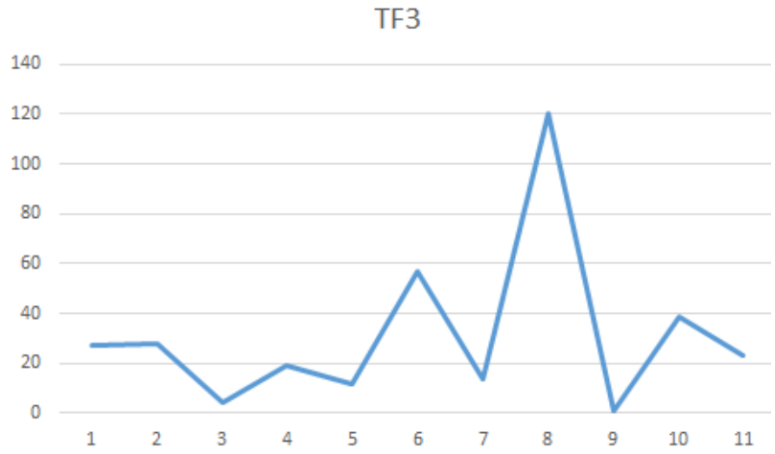


Figure 4.86: Formula 3 difficult 6 Line

games	TF3
1	1
2	27
2	4
2	39
2	23
3	14
4	28
4	19
4	12
5	57
5	120

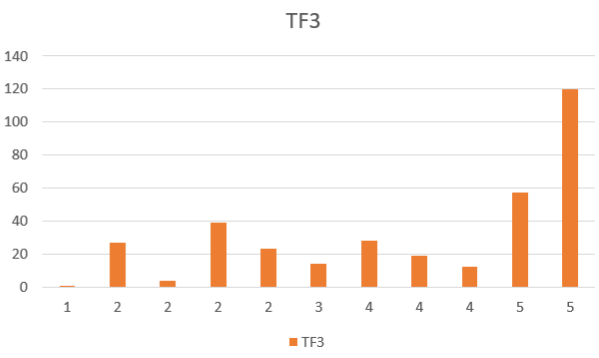


Figure 4.87: Games vs Formula 3 difficult 6

games	time
2	196098
4	179059
2	168276
4	196009
4	321603
5	354724
3	262789
5	251253
1	61657
2	164587
2	102854

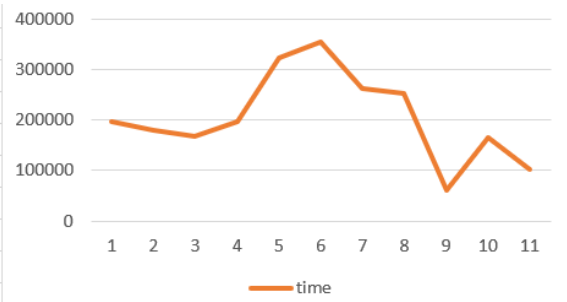


Figure 4.88: Games vs time difficult 6

Row Labels	Sum of total
0	118751
1	69051
2	38138
3	132043
4	34258
5	5209
6	22058
8	23213
9	8798
12	7533
14	27066
16	33753
18	19793
20	4153
24	2429
28	17148
32	13970
36	23198
54	1727
64	10249
84	1314
108	22220
168	18594
324	12774
?	171853
Grand Total	**839293**

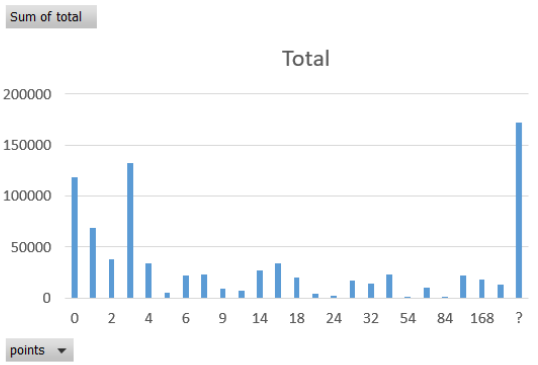


Figure 4.89: Sum of Total by points of difficult 6

4.3.7 Difficulty 7

The following table is the data obtained by playing on the difficulty 7 found by clustering [figure 4.90]. Each color represent the number of schemas done in 1 game. In this case the users played 36 games, but they had solve different number of schemas each time.

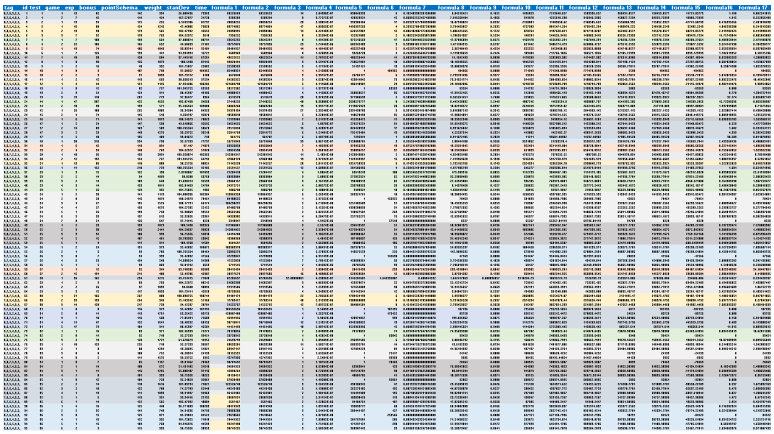


Figure 4.90: Data obtained difficulty 7 by clustering

After of having all the data tabulated, I summarized the data grouped by number of games and number of schemas solved on each game in order to graphic the results [figure 4.91].

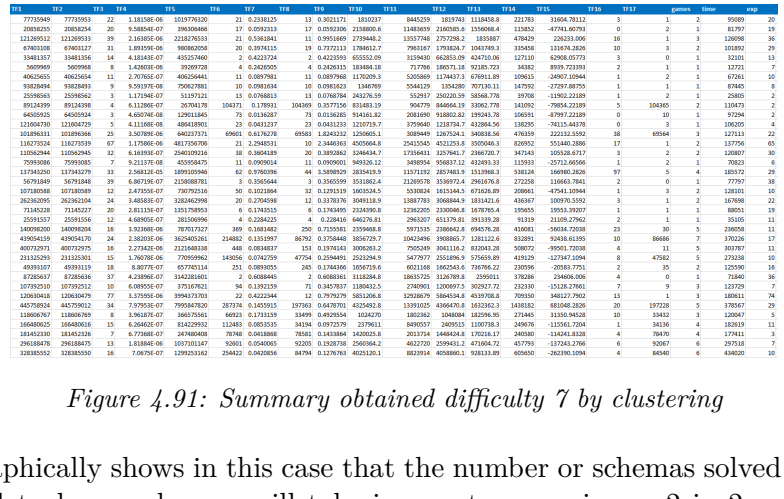


Figure 4.91: Summary obtained difficulty 7 by clustering

Data graphically shows in this case that the number or schemas solved in one game is 1 but to let players play we will take in count as maximum 2 in 2 seconds [figure 4.92].

This is the behaviour of players playing a game of difficulty 7 [figure 4.93].

The chosen formula have a non exponential or sequential behaviour but has 5 picks which means that the user was enthusiastic and it could solve some schemas with good

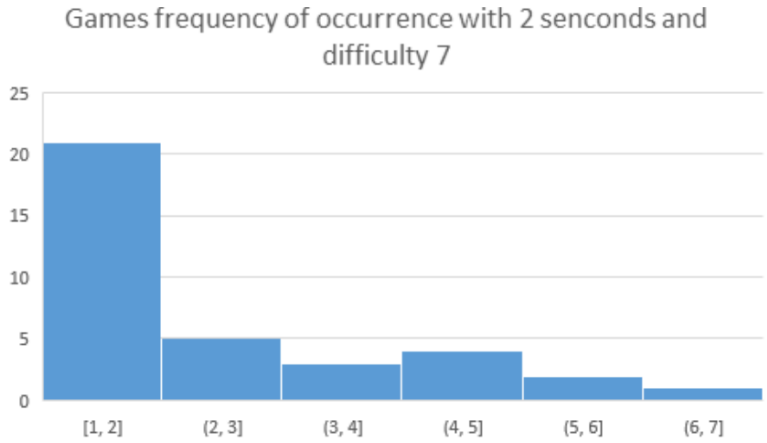


Figure 4.92: Games frequency of occurrence with 2 seconds and difficult 7

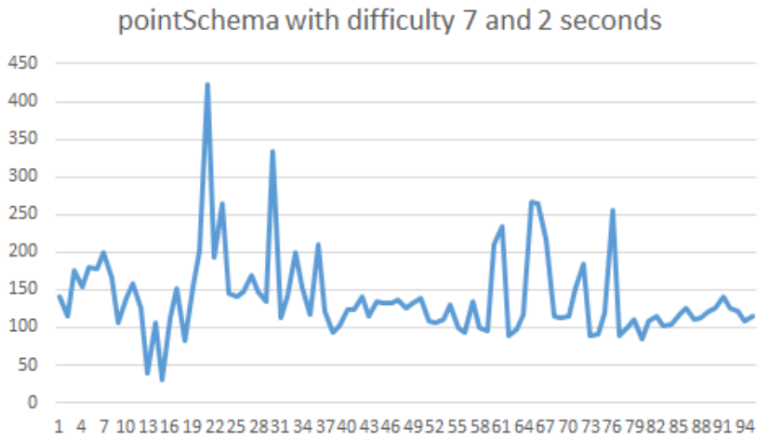


Figure 4.93: PointSchema with difficult 7 and 2 seconds

score and good speed [figure 4.94] [figure 4.95].

The following graph shows the relationship between games and points obtained by the new point system, Formula 3 the chosen one [figure 4.96].

The following image represents the relationship between games vs time Average: 148840 Total games: 36 [figure 4.97].

The following is a pivot table that shows points vs total of points for each game. the ? value means that the user did a mistake but the time was count for the test [figure 4.98].

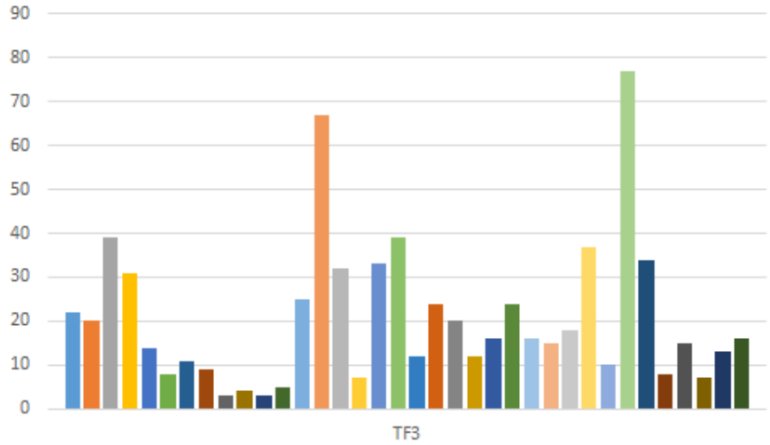


Figure 4.94: Formula 3 difficult 7

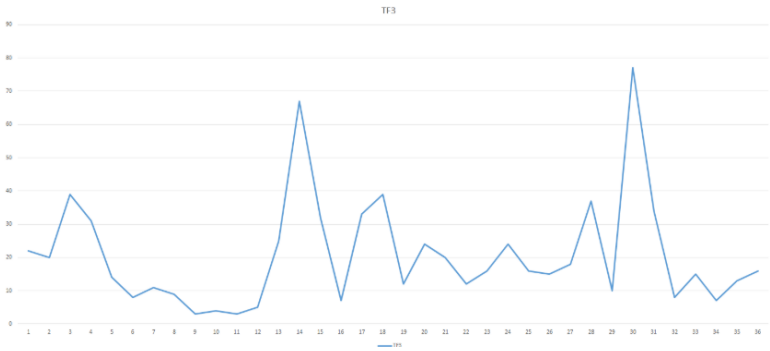


Figure 4.95: Formula 3 difficult 7 Line

games	TF3
1	3
1	3
2	4
1	5
1	7
4	7
1	8
3	8
1	9
3	10
1	11
1	12
2	12
6	13
1	14
4	15
5	15
6	16
5	16
5	16
2	18
1	20
1	20
2	22
2	24
7	24
3	25
2	31
2	32
4	33
5	34
1	37
1	39
3	39
2	67
3	77

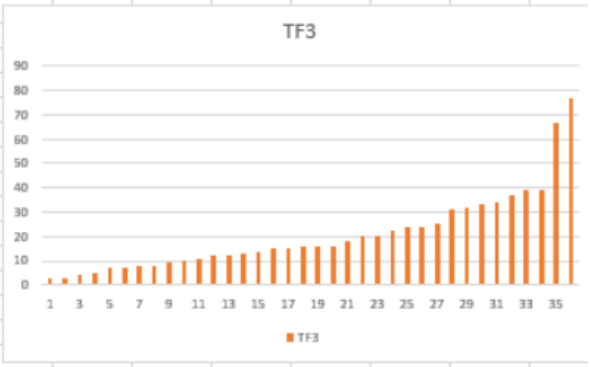


Figure 4.96: Games vs Formula 3 difficult 7

games	time
1	97294
1	25805
2	110473
1	106205
1	70823
4	177411
1	12721
3	120047
1	87445
3	123729
1	67261
1	35105
2	128101
6	297518
1	32101
4	182619
5	273238
6	434020
5	303787
5	236058
2	125590
1	88051
1	81797
2	95089
2	167698
7	370226
3	127113
2	101892
2	120807
4	185572
5	378567
1	71840
1	77797
3	126098
2	137756
3	180611

Average:	148840
Total games:	36

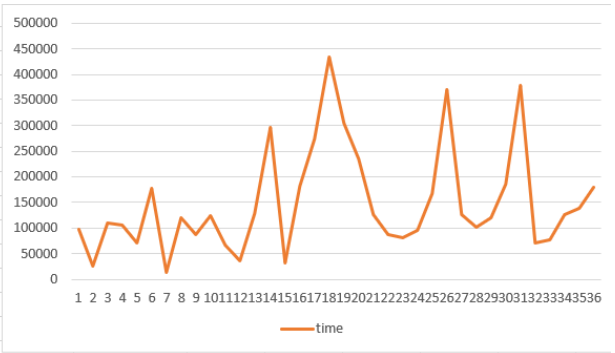


Figure 4.97: Games vs time difficult 7

points	Sum of total
0	329293
1	267243
2	97153
3	250026
4	147309
5	4713
6	274043
8	54972
9	85578
10	45096
12	71801
14	21872
16	130506
18	308163
20	40413
22	16738
24	71467
26	106531
27	4366
28	53709
30	8265
32	32189
34	13932
36	27633
38	10706
40	5865
44	2911
48	34536
72	51252
80	29093
84	46151
96	18418
144	4031
160	3201
180	2008
192	29916
288	10708
?	388614

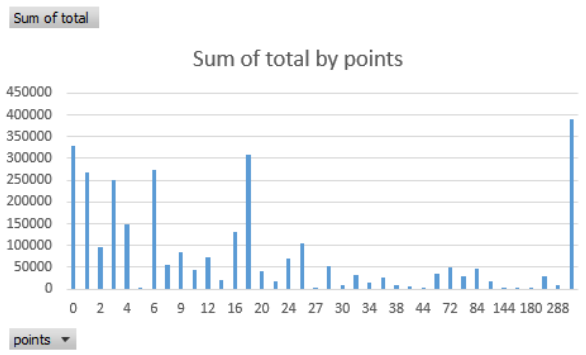


Figure 4.98: Sum of Total by points of difficult 7

The boundaries of each level were calculated by the study of each level behaviour in which the point of attention was time and number of schemas solved in one game. Error played an important role for this study. Many of the players have done mistakes and this represents less time to be consumed.

After having defined all the levels and the requirements, the next step was thinking about boosters and how them must be related to the levels. As we know, boosters can be given to users for free in a random period of the game, after had achieved some tasks or had pass some difficult levels, users seem them as a reward.

Reward in MAK07 are going to be shown as a medal, the following are examples of the image representation of them.

TYPE	TROPHY	Graphic Representation
LEVEL	1 to 35	
TIME	Morning 3 days in a row	
	Morning 5 days in a row	
	Morning 10 days in a row	

Figure 4.99: Table of trophies and graphical representation

	Morning 25 days in a row	
	Morning 50 days in a row	
	Afternoon 3 days in a row	
	Afternoon 5 days in a row	

Figure 4.100: Table of trophies and graphical representation cont. 2

Figure 4.101: Table of trophies and graphical representation cont. 3

	Evening 5 days in a row	
	Evening 10 days in a row	
	Evening 25 days in a row	
	Evening 50 days in a row	

Figure 4.102: Table of trophies and graphical representation cont. 4

Figure 4.103: Table of trophies and graphical representation cont. 5

	Night 50 days in a row	
Perseverance	Challenge of the day x 3	
	Challenge of the day x 5	
	Challenge of the day x 10	

Figure 4.104: Table of trophies and graphical representation cont. 6

	Challenge of the day x 25	
	Challenge of the day x 50	
Athletic	Training of the day x 3	
	Training of the day x 5	

Figure 4.105: Table of trophies and graphical representation cont. 7

	Training of the day x 10	
	Training of the day x 25	
	Training of the day x 50	
Warrior	Tournament player x 3	
	Tournament player x 5	
	Tournament player x 10	
	Tournament player x 25	
	Tournament player x 50	

Figure 4.106: Table of trophies and graphical representation cont. 8

Invincible	Winner challenge x 3	
	Winner challenge x 5	
	Winner challenge x 10	
	Winner challenge x 25	

Figure 4.107: Table of trophies and graphical representation cont. 9

	Winner challenge x 50	
	Winner tournament x 3	
	Winner tournament x 5	
	Winner tournament x 10	
	Winner tournament x 25	
	Winner tournament x 50	
Challenges	Hard player x 100	
	Hard player x 500	
	Hard player x 1000	
	Hard player x 5000	
	Hard player x 1000 000	
	Hard player x 7 000 000	
Tournaments	Invincible x 100	

Figure 4.108: Table of trophies and graphical representation cont. 10

	Invincible x 500	
	Invincible x 1000	
	Invincible x 5000	
	Invincible x 1000 000	
Solo game	Champion x 100	
	Champion x 500	
	Champion x 1000	
	Champion x 5000	

Figure 4.109: Table of trophies and graphical representation cont. 11

	Champion x 1000 000	
High quality	1 Scheme In a challenge	
	2 Scheme in a challenge	
	3 Scheme in a challenge	
	4 Scheme in a challenge	
	5 Scheme in a challenge	
speed	3 x 72	

Figure 4.110: Table of trophies and graphical representation cont. 12

	4 x 72	
	5 x 72	
	6 x 72	
	3 x 78	
	4 x 78	
	5 x 78	

Figure 4.111: Table of trophies and graphical representation cont. 13

	6 x 78	
	4 x 84	
	5 x 84	
	6 x 84	
	7 x 84	
	4 x 90	
	5 x 90	
	6 x 90	
	7 x 90	
Chronometry	Less than 10119 milliseconds	
	Less than 11135 milliseconds	

Figure 4.112: Table of trophies and graphical representation cont. 14

	Less than 10489 milliseconds	
	Less than 8570 milliseconds	
	Less than 11591 milliseconds	
	Less than 9881 milliseconds	
	Less than 10211 milliseconds	
draw	draw	
daring	Daring challenge x 5	
	Daring challenge x 10	
	Daring challenge x 25	

Figure 4.113: Table of trophies and graphical representation cont. 15

	Daring challenge x 50	
Boosters	Freeze	
	skip	
	Multiply score	
	hint	
	poison	
Social	Share	
	rank	

Figure 4.114: Table of trophies and graphical representation cont. 16

Chapter 5

Conclusion

3 main topics were covered with this thesis. the first one was the point system of MAK07 that was the door which opens the design of gamification components cross over the full system which was done with test and simulations of different formulas according to the normal behavior of users of MAK07. The second one was the classification of inputs that allows the design of levels of MAK07 and the definitions of requirements for each level. This classification was done thanks to applying a technique of clusterization of the input data finding groups of similar characteristics. The third one was the design and test simulation of a progressive game using an increasing combination of numbers in order to make the game difficulty more progressive.

The design of gamification on MAK07 from a high level point of view was enriched by documenting several use cases, list of requirements, user interfaces and definition of the components.

5.1 Future work

The gamification components designed in this thesis will be integrated in the main game and deploy on the store as soon as possible. As the theory of gamification says about feedback loop, the game will be constantly monitored in order to understand the new motivations and to manage feedbacks of users.

Levels can be increased over the time as well in solo game the stops on the path can be added in order to give more challenges to MAK07 users.

From the architectural point of view, the structure of MAK07 gives the possibility to scale in horizontal way thanks to the technologies of MongoDB and Docker.

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Glossary

Gamification Use of game elements in a non-game context, use of game thinking and game mechanics to solve problems and engage audiences that are not exactly new, use of game elements in a non-game system to improve the user experience, is an informal term for the use of video game elements in a non-game system to improve the user experience and create hitch, integration of game dynamics in a site, service, community, content or campaign, in order that derives participation, is the interaction of game mechanics in a non-game environment to increase the engagement of audience with loyalty and fun . iii, 1–3, 5, 6

MAK07 Math game composed by 7 balls, each ball has a number and have the target of arrive to 1 unique ball with value 0 using basic operations like addition, subtraction multiplication and division. iii, 2, 3