



Team Name:

Tiny Maze

Team Members

Luca Scano: 896305

Stefano Pittalis: 889981

Alice De Girolamo: 901417

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Pharmageddon:

Game Design Document

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1. Design History

[Version 1.0 dated 10/04/2017]: First version

[Version 1.1 dated 23/04/2017]: Section 3 was better defined.

[Version 1.2 dated 14/05/2017]: Game interface and flowchart has been improved, added the online shop; Hud has been redefined (no bars but circle and different disposition). Mixer mechanics has been improved with a more complex and precise formula.

[Version 2.0 dated 14/06/2017]: Added detailed stats number for all characters and drug-ammos combinations. Added future available item in the shop (maps, and skin characters). Redefined the mixer mechanics. Timer details and spawning points have been set. Map has been designed and assets have been found to implement it.

2. Vision Statement

Pharmageddon is an Isometric Third Person Shooter team based game.

The player embodies someone in need for her favourite drug.

Hurry up, the pharmacy is closing and the other rival teams want to enter!

The player will engage in a tremendous battle for the last drug, after forming a team with other drug junkies.

Each character is featured by a particular favorite drug.

The player can shoot drug against enemies and teammates and can assume herself the drug. Be aware and remember:

Medicines can be mixed and have different effects on different character.

Cooperation is essential. The player has to decide how to use the drugs.

Should she assume the bonus drug or shoot it on her team mates? Or should she shoot the drug on the enemy hoping to combine a mix effect with the help of her teammate?

The junkies battle for the pharmacy is began, will she succeed?

2.1 Game logline

“Addictions are Weapons!”

2.2 Gameplay Synopsis

The game is a **third person** team shooter with **isometric view** (with a cartoon style) in which teams of 4 characters that are pharmaceuticals addicts, shoot each others with drug-ammos.

Each player will be spawned with her teammates at the beginning of each match, and will engage in a fight with the opposing team, that will end only after a certain amount of time.

Battle duration is regulated by a timer (10 minutes each battle). At the end of the battle the

team with the most points will be the winner and will be able to enter into the pharmacy.

The main weapons are the **drugs**. Drugs are spawned in the map and every character can collect them as ammos.

Drugs all have different **effects**, which can vary depending on the **class** the player had chosen. Depending on the selected character class and the drug type, every drug-ammo can improve or damage the character statistics for a certain amount of time.

Drugs can be mixed. Mixes are formed when more than one drug (up to two drugs) has been activated on a certain character. Depending on the type of the drugs, and the class the player had chosen, they can cause powerful raise (or drop) in the statistics, for a limited amount of time.

The player is **free to choose who to apply** the drug effect:

- Apply to herself, (if the drug is good for her class) gaining a bonus.
- Apply to an ally: boosting her stats (or dropping her stats, depending on the drug type).
- Shoot to an enemy: drop her stats (or raising her stats, depending on the drug type).

This choice is vital to the well faring of the team: it can reward teams with fast reaction time and coordination, while discouraging players from ignoring **teamwork**.

3. Audience, Platform, and Marketing

3.1 Target Audience

The theme and the setting of the game is of interest for the casual players (since the general theme for the game is a crazy one), while the emphasis on the teamwork aspect (and the strategic elements of the mixes) allure some of the more hardcore players.



Fig 1: Bartle's diagram. The white point indicates where Pharmageddon is located.

3.1.1 Gender

In order to better identify the target demographic for our game, we decided to use some statistics highlighting game preferences by gender¹:

¹ Info taken from <http://quanticfoundry.com/2017/01/19/female-gamers-by-genre/>

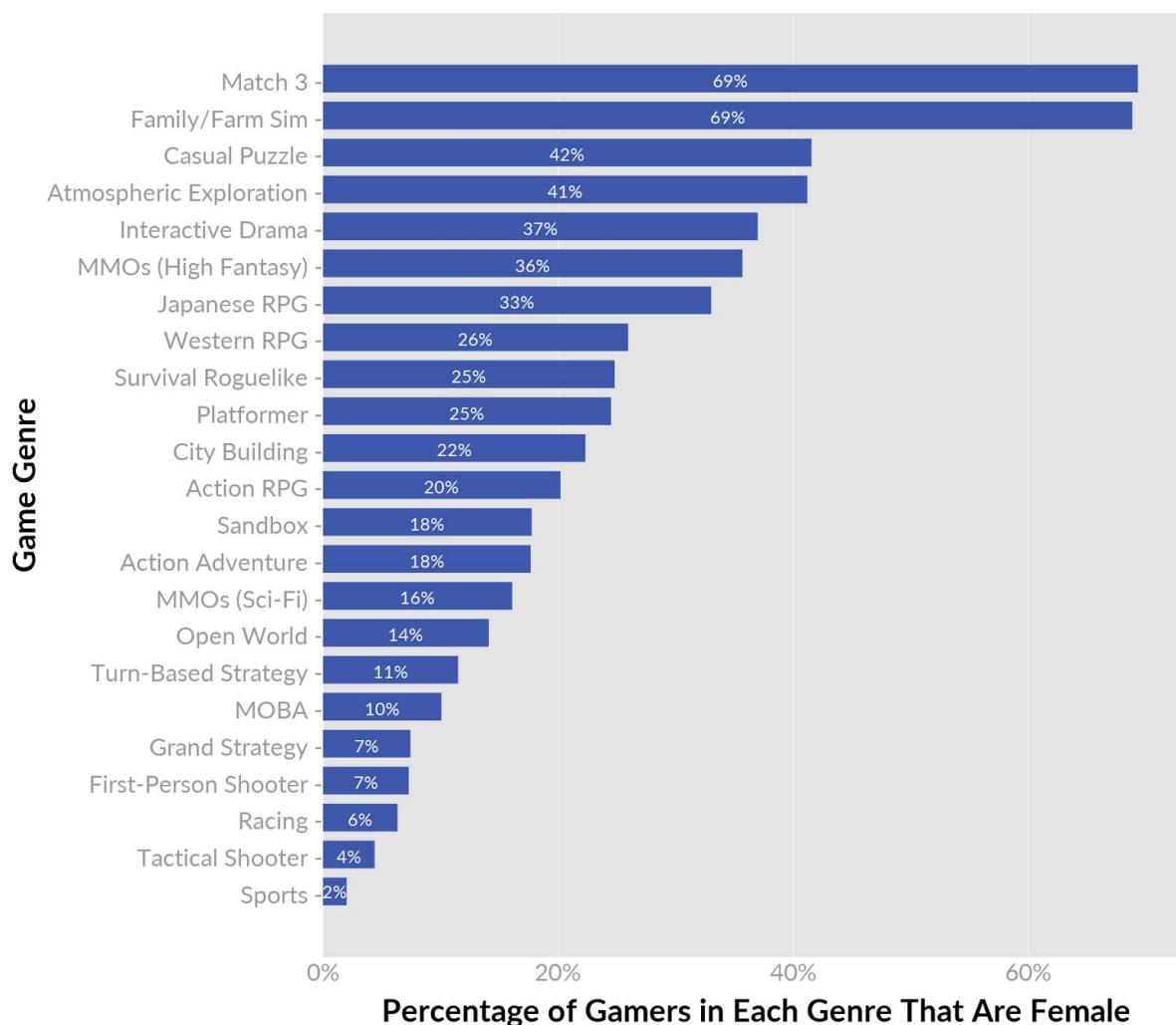


Fig 2.

Since the core of our game is a shooter, we can expect to **attract mainly male players**, who are the majority of the player for this genre.

3.1.2 Age

We decided to use the free tools offered by **Google AdWords**² to compare the audience of our more direct competitors. Below we reported all the results.

² Datas taken from <https://adwords.google.com>

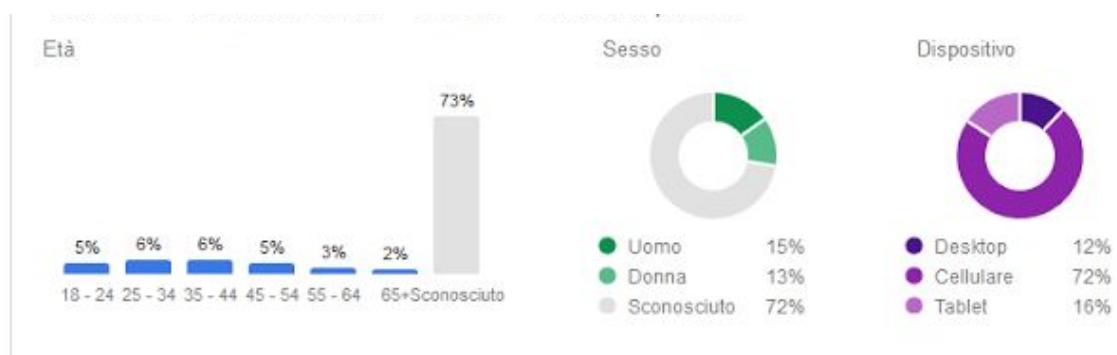


Fig 3: Google AdWords Stats about our competitors game audience.

Even with all the noise in the data due to the unknown gender of many viewers, we can notice that the majority of the players that visit our competitor's game sites are in the **age range** that span from **25 to 44** years old. In contrast to the general distribution of gender in shooter games (as we show in paragraph 3.1.1), with this aimed demographic, we can notice that men and women are almost evenly distributed as players of our competitors. This info, compare to the Fps game non multiplayer (as shown in figure 3) gives us a larger target audience than the average shooter game.

3.1.3 Audience Conclusion

We can expect to have hardcore and casual players of **both the female and male sex**, between **25 - 44** years. We expect to have, during the first three years, 50.000 subscribers (as analyzed in GTD 3.1 paragraph).

3.2 Platform

PC

The controls for playing must be **fast and responsive**: based on fast game as "*League of Legends*", a PC allows greater control of the characters. Also **mouse and keyboard** are more suited for shooter.

3.3 System requirements

The system requirements are :

- OS: Windows XP SP2+, Mac OS X 10.8+, Ubuntu 12.04+.
- Graphics card: DX9 (shader model 3.0) or DX11 with feature level 9.3 capabilities.
- CPU: SSE2 instruction set support.
- Internet connection.

Controls:

- mouse.
- keyboard.

3.4 Top performers

3.4.1 Enter the Gungeon

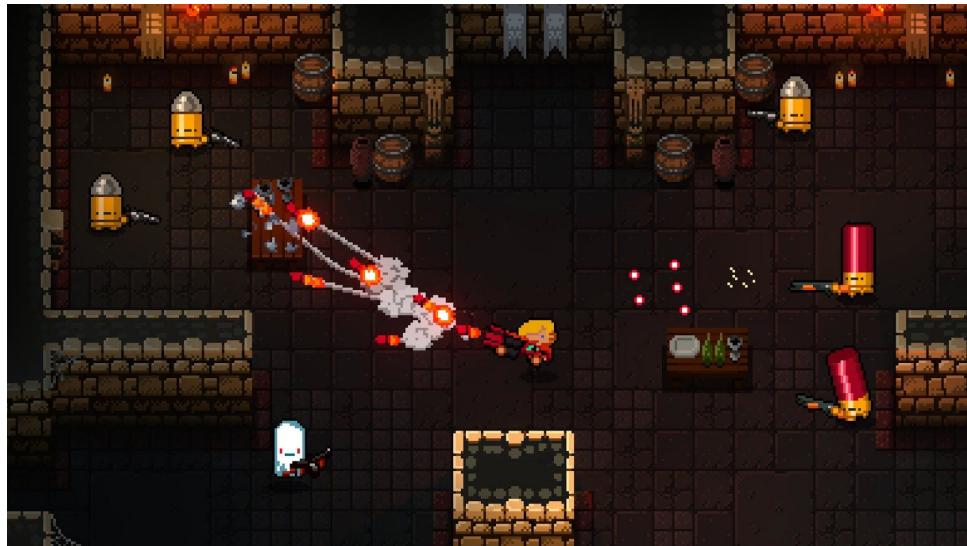


Fig 4: In game scene for *Enter the Gungeon*, note the bullet hell component.

Enter the Gungeon is a **fast-paced** bullet hell shooter with **roguelike** elements. The player chooses between the four protagonists, all with different special abilities, such as calling for support or lock picking chests. A second player is able to join in for co-op mode and control a fifth character. While the player descends the *Gungeon*, they are set to go through multiple floors, each with a random number of rooms in it. While the rooms are predefined, the constellation of rooms in a floor is **procedurally generated**.

3.4.2 Soul Knight

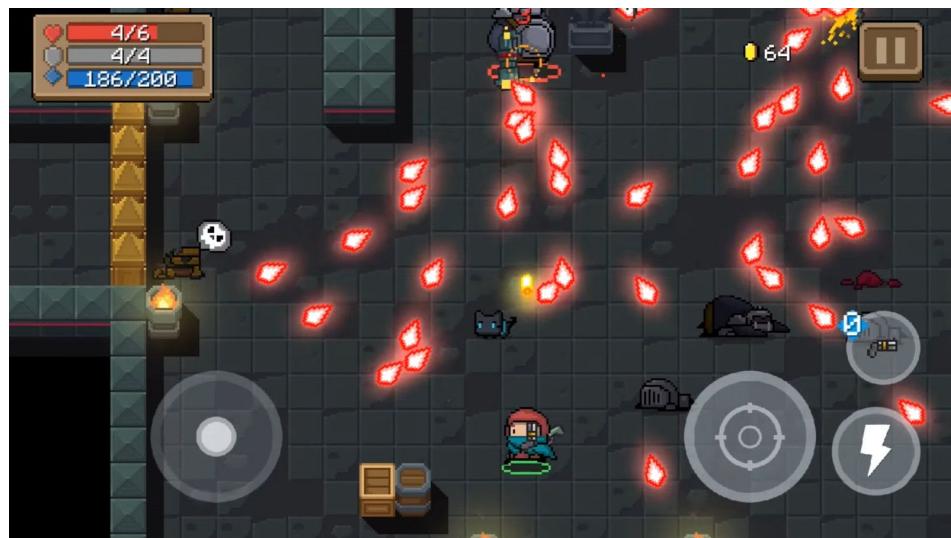


Fig 5: Soul Knight in game scene, also here note the bullet hell component.

Similarly to the previous game, **Soul Knight** is a *roguelike* bullet-hell game, where the player has to explore a procedurally generated maze while collecting progressively powerful weapon. While stylistically similar, this game can boast some really *precise control* for a mobile game.

3.4.3 Nuclear Throne



Fig 6: Nuclear Throne in game scene, bullet hell component.

Nuclear Throne is a *top-down shooter action* game. The game consists of two main game modes, single-player, and a local co-operative gameplay mode. The player controls one of a total of 12 characters, 10 of which must be unlocked through play. Each character has an *ability* unique to them, adding an additional element to the gameplay, while keeping the game simplistic.

The game has a *leveling system* that allows to get different mutations and choose what would benefit the character the most out of a selection of four, randomly selected mutations.

3.4.4 Team Fortress 2



Fig 7: Team Fortress 2 in game scene, note alleys in team.

Team Fortress 2 gameplay focuses around two opposing **teams competing** for a combat-based objective. In the game's fiction, the teams are composed of mercenaries hired by two feuding brothers to protect the company assets belonging to one brother while trying to destroy those of the other; the teams are thus represented by the names of these companies: Reliable Excavation & Demolition (RED) and Builders League United (BLU). Players can choose to play as one of nine character **classes** in these teams, each with his own unique strengths, weaknesses, and weapons.

3.5 Feature comparison

3.5.1 Platform

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
Microsoft Windows, OS X, Linux	PlayStation 4, Microsoft Windows, macOS, Linux	Android	Microsoft Windows, OS X, Linux, PlayStation 4, PlayStation Vita, Xbox One	Microsoft Windows, Linux, macOS, Playstation 3, Xbox 360, Ouya

3.5.2 Player Interaction Pattern

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
Team Based	<i>Co-op, Single Player</i>	<i>Single Player</i>	<i>Co-op, Single Player</i>	<i>Team Based</i>

3.5.3 Genre

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
Action, bullet-hell, fast paced, co-op	Action, bullet-hell, fast paced, roguelike	Action, bullet-hell, fast paced, roguelike	Action, bullet-hell, fast paced, roguelike	Action, fps

3.5.4 World

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
Arena, level-based	Procedurally generated	Procedurally generated	Procedurally generated	Arena, level based

3.5.5 Controls

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
Keyword, mouse	Keyword, mouse, controller	Touchpad	Keyword, mouse, controller	Keyword, mouse, controller

3.5.6 Graphic Style

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
<i>3D, colorful, funny</i>	<i>Pixel, retro, colorful, funny</i>	<i>Pixel, retro, colorful, funny</i>	<i>Pixel, retro, colorful, funny</i>	<i>3D, colorfull, funny</i>

3.5.7 Artificial Intelligence

Pharmageddon	Enter the Gungeon	Soul Knight	Nuclear Throne	Team Fortress 2
<i>None</i>	<i>Enemy AI</i>	<i>Enemy AI</i>	<i>Enemy AI</i>	<i>Enemy Bot</i>

3.5.8 Feature conclusion

Our game is characterized by some ***unique features***:

- ***Frenetic pacing.***
- ***Strong cooperation between teammates.***
- ***Demential humor.***

In addition *Pharmageddon* is the only game that mix all the strong points of the previous games, while adding the new ***mixing drugs*** mechanic in the gameplay.

We can collocate our game in this unexplored slice of market:

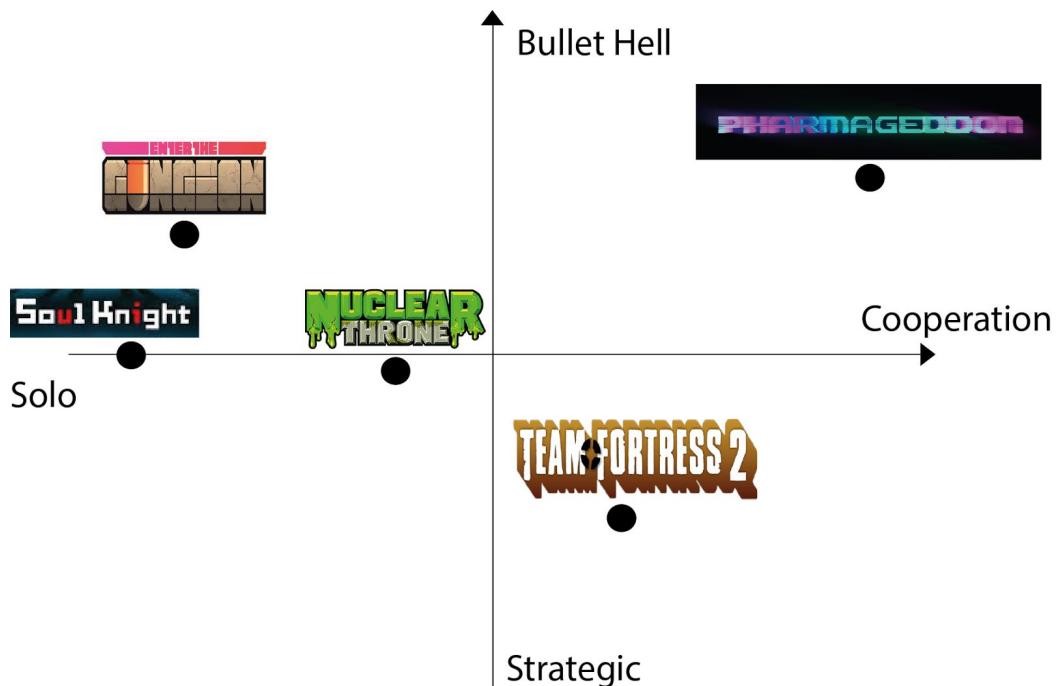


Fig 8 : We collocate our game in a new slice of market .

4. Legal Analysis

The “*Pharmageddon*” **name** is free from copyright. The resources and assets used in the game are produced by our team of developers and/or are available with a **free license**.

3D models are made with Blender, a software released under GPL license that allow you to commercialize your creations.

The project is implemented in **Unity**, with a **Personal Edition** version; if you want to remove the Unity logo at start, you might want to buy a Pro license.

We have deeply analyzed licenses for all used software and media that will be used in the game in every GTD paragraphs.

5. Gameplay

5.1 Overview

- The gameplay is a third person fast paced **bullet hell** in which the player can chose between 4 classes and join a team of 4 players.
- Special drug-ammos can be picked up from the floor of the arena.
- Matches are team death matches (from 2 up to 6 teams).
- Every player can respawn, get time limited power ups or malus and mix the effects of the different types of drug-ammos.

5.2 Gameplay description

The game is only multiplayer.

The player can join a lobby or create a lobby. Every lobby is composed by at least 2 to a maximum of 6 teams.

Each team has 4 players. The player can choose a lobby or create it. The player can choose the lobby only if the lobby takes place in a map that she has purchased.

After the lobby and team are chosen, the player has to select one character from 4 different classes. The player can also equip special item or choose different characters skin if she has purchased them in the shop.

Every character has different stats, is distinguished by a different drug addiction and has his own special drug-ammo. Drugs are used as ammos and are shot against teammates or enemies. Assuming drug-ammo (or being hit by drug-ammos) can activate different mix effect that change, in benefits or not, the player stats.

Every player starts with only standard (normal) drug-ammo. Assuming or being hit by a special drug-ammo activates the relative stats effect and a timer: when the timer reaches zero, the stats return to their normal level.

After 50 seconds in the character selection area, the battle will automatically start (the last selected character is used if the player doesn't select in time one): this is done to ensure that the match starts up within a maximum time

Every battle lasts **10 minutes**.

At the beginning of the match every player is spawned in different spawning points in the map, according to team membership. Medkits and drugs-ammos are spawned in different spawning points.

Shooting with special drugs-ammos can activate mix effects in the target player, also assuming drugs-ammos can activate different a mix on the player who assumes that. The activated combination, produces different score points, depending on the character and drug-ammos type.

At every moment any player can activate an effect on herself, on her team mates (positive effects) or on her enemies (negative effects), by shooting at them or by pressing the right click and assuming the equipped drug.

The player wants to activate bonus effect for herself and her team mates, she also wants to activate malus effect on enemies.

Every activated effects starts a **timer**. The duration of this timer lasts few seconds depending on the type of shot received.

In order to activate **mix effects** (2 drugs at the same time) the player has to cooperate with her team mates shooting **together** against the same target enemy.

Since the mix lasts few seconds teammates have to repeatedly and continuously shoot the enemy in order to obtain an elongated effect of the mix on her.

The player can pick medi-kit in the map to heal herself, she can look for cover behind obstacles or even flee around the map.

During the battle medkits and drug-ammos are respawned according to timers.

The player can always shot with standard ammos(infinite amount).

If the player dies and the battle isn't finished yet, she will respawn in her initial spawning position.

The winning condition of the battle is to gain more points than other teams before the time is up: points are gained by killing an enemy or activating a mix drug effects.

In order to gain more points, the player has to shoot to the enemy and helps her team mates doing so.

After 10 minutes the battle will end anyways and the scoreboard is shown with player personal points and team points with the winners highlighted (player and teams). Personal player points are added to the player preexisting points.

5.3 Gameplay Flowchart

Note: actions located in a green rectangle are better described in their following dedicated graph.

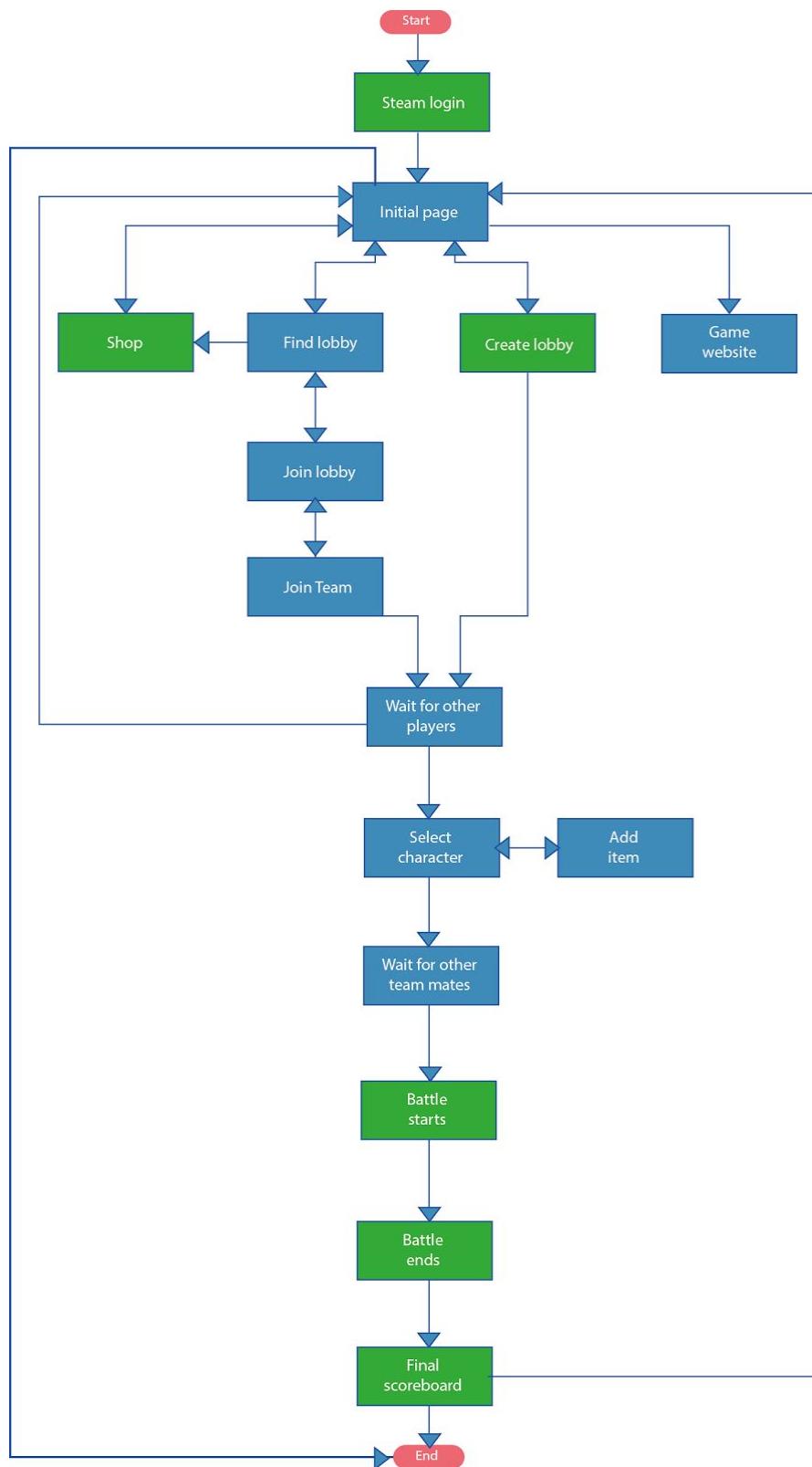


Fig 9 : Gameplay Flowchart.

5.3.1 Final scoreboard

In case of victory the final scoreboard shows how many pharmacoins have been won.

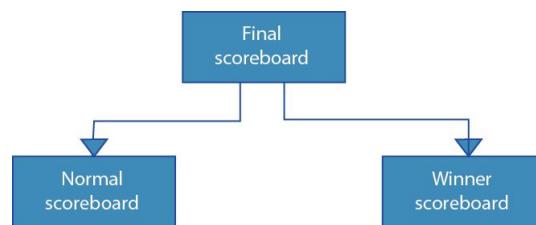


Fig 10 : Scoreboard Flowchart.

5.3.2 Shop

In the shop (fig 11) is possible to purchase different virtual goods: items, characters, unlock maps and buy pharmacoins.

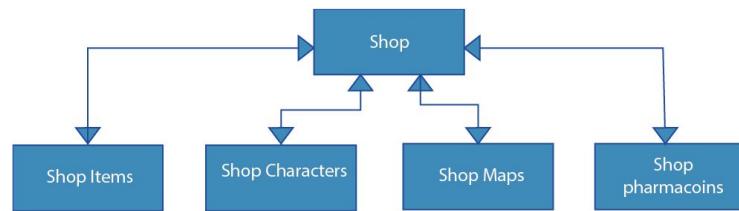


Fig 11 : Shop Flowchart.

5.3.3 Steam Initial page

In the Steam initial page (fig 12) the player can login or create a Steam account. Inside Steam the player can play *Pharmageddon*. (Note: dashed lines represents prosecution in the game flowchart presented in fig 9).

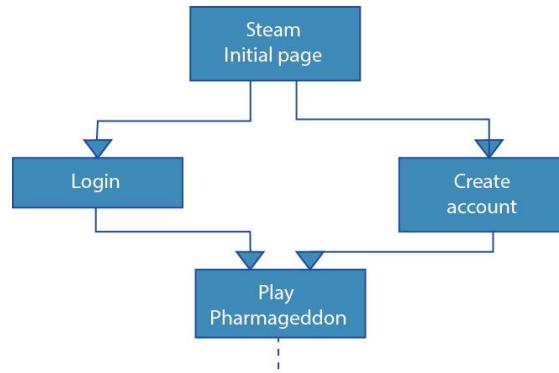


Fig 12 : From Steam to Pharmageddon Flowchart.

5.3.4 Battle flowchart

This flowchart (presented in fig 13) represents gameplay flowchart.

In purple dashed rectangle are described actions activated automatically at the start of the game: the player cannot interact with these actions. Loop arrows indicates that the action is always presents: the player can always sees scoreboard and drug-ammos and medikit are respawned for all the battle duration according to their timers.

The “End Battle” rectangle indicates that the small engagement between two players (not be confused with the battle in its entirety) is ended, due to the death of one player.

This loop continues until the end of 10 minutes.

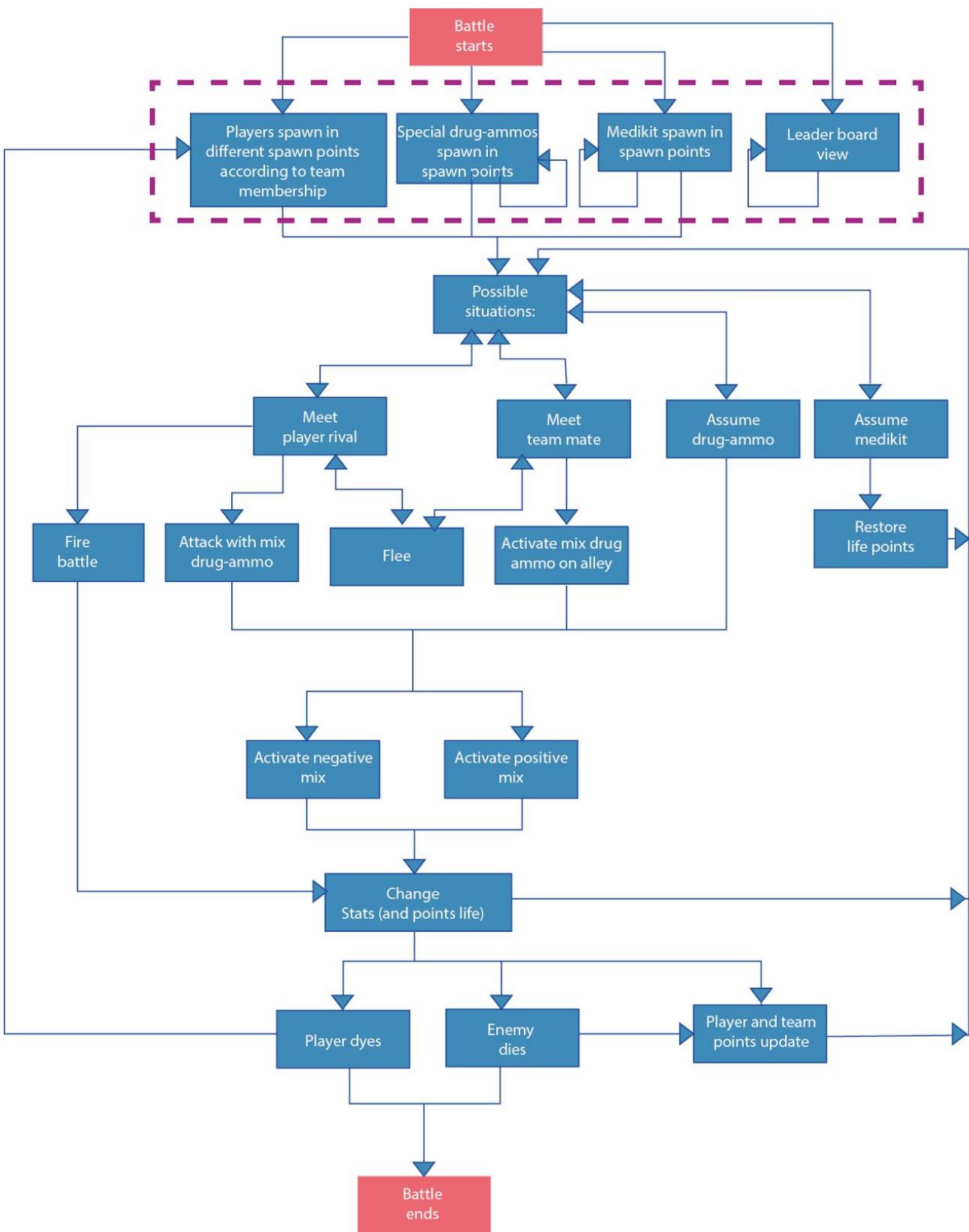


Fig 13 : In battle Flowchart.

5.4 Controls

- WASD to move around
- Mouse to aim
- Left Click to shoot the equipped shot (drug-ammo)
 - the player can shoot singles shots or multiple shots by holding the mouse button
- Scroll Wheel scroll through the inventory (the auto equipped drug-ammo is the first drug-ammo in the inventory)
- Right Click to assume the selected drug-ammo
- Shift+Direction dodge
- Tab to show scoreboard in game

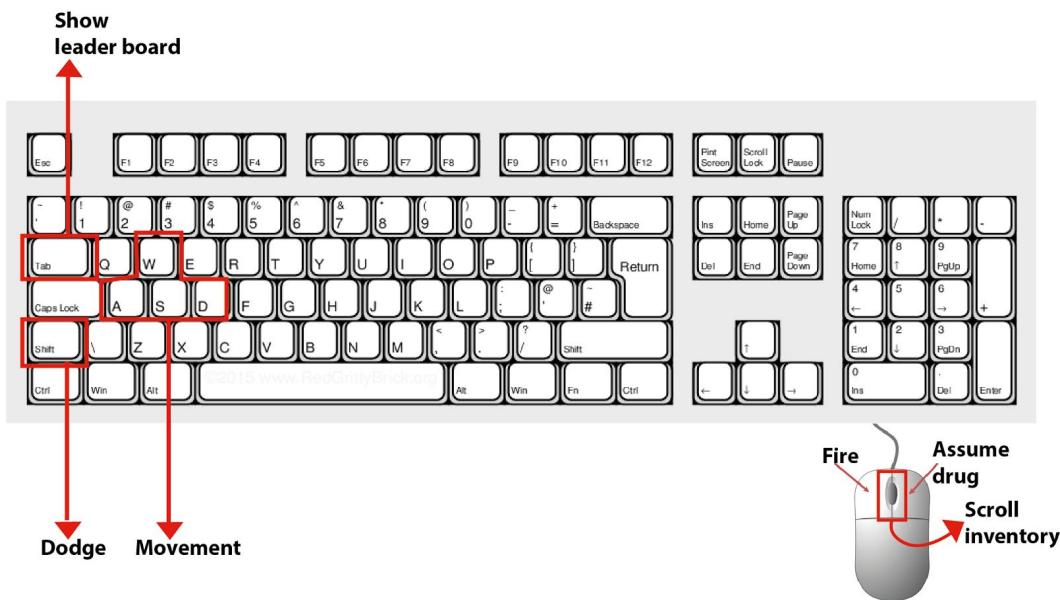


Fig 14 : Keyboard and mouse controls mapping.

5.5 Modes and other features

The game is **multiplayer only**. The player can create a **lobby** (or choose one, if it already exists) composed from a **minimum of 2 to a maximum of 10 teams**.

The player is then automatically added to one team and asked to chose a name and a color.

Every team is composed of 4 players: the player has to **wait** in the lobby for other players to come and fill the remaining positions. For example: if in a lobby there are 4 teams, 16 players are needed to start the battle. **The battle doesn't start until all the player's positions are filled**. The player is given the possibility to return to the initial page and find (or create) another lobby.

In game, membership of a team is identified by a color under the player's feet.

5.5.1 Player and connection problem

In case of player disconnection, **the battle continues without interruptions**: the disconnected player receives **-10 points** in her global score.

To further discourage players from quitting a game, after quitting 10 consecutive times, she receives **-100 points**.

This “counter” is reset after the tenth time.

5.6 Game Characters

Our **core mechanic** is the mix of different drug-ammos type to achieve a combined effect on a certain player (enemy or ally).

This core mechanic is strictly bind to the characters typology and their different stats. In fact **every character typology is effected in different way by different drug-ammos**.

We’re going to explain in details character’s and drug-ammo’s stats.

5.6.1 Characters design and stats

The player can choose between four different generic classes.

Each class has this attributes:

- ***Life points:***
Maximum life points is **150**.
- ***Fire rate:***
Maximum is **10 bullets/second**.
- ***Movement speed:***
Maximum speed in uniform straight motion is **20**.
- ***Defence***
Maximum defence is **100**.
- ***Basic damage attack***
Maximum attack is **100**.

The four classes have different balancing of the attributes’ values:

- the **tank** class: characterized by low speed, more life points and defence.
- the **scout** class: characterized by high speed and little damage attack.
- the **damage dealer** class: characterized by few life points and high damage attack.
- the **standard** class: characterized by balance of all statistics.

In addition to that every character is positively influenced by one specific drugs (their favorite drugs addiction). Drugs and mixed drugs, depending on the class membership, will cause different effect (see paragraph 5.8.5 for more details).

5.6.2 Characters types: PCs

Main PCs are stereotypical: they **personify different drug addictions**.

We will launch the game with four representative characters, one for each class.

After launch, there will also be 8 more characters available in the shop: 2 for each class.

Unlockable characters have the same base stats of the class of membership, with a **variance of 10%**: they also change the **drug** associated to them.

Each PC has his own **sad life story description**, a **special drug-ammo** and a **different skin gun**.

Main PCs, with their favorite drug, for every families are:

1. the schizophrenic (the damage dealer): benzodiazepine.
2. the coffee-junkie (the scout): coffee pills.
3. the body builder (the tank): steroids.
4. the hypochondriac (the standard): placebo pills.

Additional characters will be released after the launch, with their brand new favorite drugs:

Character	Base Class	Drug	Stats Modifiers from base class ³
Bipolar	Scout	Sedative	+5% speed, -5% damage attack.
University Student	Scout	Greenbull	+10% speed, -10% damage attack.
Alcoholic	Tank	Beer	+5% defence, -5% fire rate.
Crossfit Man	Tank	Vitamins / Supplements	+10% defence, -10% fire rate.
Smoker	Standard	Nicotine Pills	+3% speed, +3%defence, -6% damage attack.
Ancient Smoker	Standard	Opium	+3% damage attack, +3% fire rate, -3% speed, -3% defence.
Disco Man	Damage Dealer	LSD	+10% damage attack, -5% life points.
Alternative Guy	Damage Dealer	Mushrooms	+5% speed, +5% fire rate, -10% defence.

5.6.3 PCs Technical Card

Full life points is supposed to be 200 points, the other 4 stats are 100 points. the sum of the

³ Base stats are taken from image 25 to 28.

values of all the 6 stats is 600 points.

Of the 600 points, 290 up to 330 points are used to balance every class and the remaining 270 up to 310 points are added and balanced when a special effect is activated. The detailed four main characters' description stats:

The Hypochondriac

Special drug-ammo



Placebo:
[Tic Toc]
+3 drug-ammo damage

Tic Toc Emily



Stats

Life points: 100
Fire rate: 50% [=5]
Movement speed: 50% [=10]
Defence: 50% [=50]
Basic damage attack: 50% [= 50]

Background History

Oh! Sweet, little Tic Toc Emily. She used to call to her doctor 10 times a day. When the doctor became tired and didn't answer to her anxiety.... Well.... Coff... Sweet lovely Emily , we all love you and your dirty rifle.

The Schizophrenic

Special drug-ammo



Benzodiazepines:
+3 drug-ammo damage

Twin Lucy



Stats

Life points: 70
Fire rate: 30% [=3]
Movement speed: 50% [=10]
Defence: 30% [=30]
Basic damage attack: 80% [= 80]

Background History

Lucy was a normal girl until she met a special friend: Rufus, the big immaginary rabbit. He gives her friendly advices such as beautiful make up and dress ideas. Rufus is a very quite and peaceful creature, Lucy less....

fig 15 : Hypochondriac and Schizophrenic technical cards.

The BodyBuilder

Special drug-ammo



Steroids:
+3 drug-ammo damage

The fabulous Sergej



Stats

Life points: 150
Fire rate: 40% [=4]
Movement speed: 30% [=6]
Defence: 60% [=60]
Basic damage attack: 40% [= 40]

Background History

Sergej wasn't so fabulous and he was a very sad and poor man. He began to work in a circus as an elephant cage cleaner but he was still very sad. So he decided to become in short time the strongest man with a little chemical help.... And now we have the fabulous Sergej!

The Coffee-junkie

Special drug-ammo



Coffee:
+3 drug-ammo damage

Geoffrey the Hot Guy



Stats

Life points: 90
Fire rate: 60% [=6]
Movement speed: 70% [=14]
Defence: 40% [=40]
Basic damage attack: 30% [= 30]

Background History

Geoffrey is a very busy and charming man. He's an actor. With these long moustache and charming and sexy look he can only works in some "special" film category. He needs large coffee quantity to face up to the nightly, em coff, and tiring movie footage.

Fig 16 : In page 29 Bodybuilder and Coffee-junkie technical cards.

5.6.4 Concepts for characters inspiration

Geometric simplicity

The game world is inspired by **voxel art** so it's important that also characters models are low poly and inspired by **quads geometry**.

Style and feeling

The reference style is a cartoon, funny and colored style. The game has an ironic and funny component so it's important to express it in the characters design (don't be so serious, it's a bullet funny party!).





Fig 17-18-19-20 : Concept for characters inspiration.

5.7 Ammunitions: drug-ammos

Mixing drugs-ammos is the core mechanic.

Each character has always her weapon (a strange type of shotgun), the weapon itself is not swappable. The player can change her equipped **ammunitions** from the inventory.

The ammunitions are of two kinds:

- **Standard drug-ammo**

Every player can always shoot standard ammos that inflicts a medium amount (-2 points life) of damage to the opponents. The standard ammos amount is infinite.

- **Special drug-ammo**

They randomly spawn in the game (see paragraph 9.3.2 for more details), they are of many types as characters types.

For example, we report the four special drug-ammos for the four main characters (the hypochondriac, the bodybuilder, the schizophrenic, the coffee-junkie).

They are:



Fig 21 : 4 special drug-ammos for the hypochondriac, the bodybuilder, the schizophrenic, the coffee-junkie.

The players can collect them just passing on them in the map. There are no limitation on the amount of ammos a player can collect. Every type of special ammo has a different effect when the opponent gets hit depending on the character type (see paragraph 5.8.5 for more details). In addition (after the game launch) there will be eight new drug-ammos (as described in 5.6.2 paragraph) unlocked buying new characters. They will be: *sedative, greenbull, beer, vitamins and supplements pills, nicotine pills, opium, lsd, mushroom*.

Every pill have 4 different types of effects depending on the **class membership** of the affected character :

- **+ (Bonus)**
For a brief period of time some character's stats are slightly enhanced.
- **++ (Major bonus)**
For a longer period of time some character's stats are significantly enhanced.
- **- (Malus)**
For a brief period of time some character's stats are slightly decreased.
- **-- (Major Malus)**
For a brief period of time some character's stats are significantly decreased.

Example:

A player with the *Hypochondriac character* assumes OR get shot by a drug-ammo of *Placebo*

which has a “Major-Bonus” effect because the combination *Hypochondriac-Placebo* is Major-Bonus.

Instead if a player playing as *Schizophrenic* assumes OR get shot by a drug-ammo of *Placebo*, this combination outcome as a Major- Malus for the character.

The exact combinations of ammos oh each character will be explained in 5.8.5 paragraph.

Every special drugs-ammo damages the opponent’s life (-3 point life), even for benefit effect activated.

Drugs-ammos can be shot to other players (enemy or ally) or self-assumed

Drugs-ammos rules are:

- The player can **assume only one** drug-ammo at time (“assume” means by himself,not shot from others).
- Assuming or been shot by a drug-ammo will start a **timer**. For all the timer duration the effect will be activated. The **timer is only one for the whole effect** (see paragraph 5.8.5 for timer explanation) Once the timer is up, the effect vanishes.
- Drugs-ammos effects can be **combined in pairs** :
if a player has been shot by a drug-ammo and is currently under the effect of that,if she’s suddenly hit again by another player,from the 2 shots will derive a mixed effect that will be applied on the player hit.
- At least one of the 2 pills must be shot from **another player**. The same player can’t activate a mix. **The two drugs-ammos in the mixer must be shot by different players**.
- If a character is under the influence of 2 drugs-ammos and **gets hit with a third drug ammo** this ammo makes only its damage but **not activate another mixer**. When the two slots mixer are full **the third ammo cannot activate another effect** until the mixer timer is finished.
- If the player is under the effect of the first drug-ammo and then is shot by another drug-ammo then the timer is reset and restarts according to the new effect timer.

5.8 Rules

5.8.1 Actions and mechanics

There are 4 players per team and at least 2 teams (at most 6). At the beginning of the match every player choose 1 class between the 4 possible (the tank, the damage dealer, the scout, the standard).

5.8.2 Movements and shooting

- Players can move in all 4 directions using WASD keys/gamepad left analog stick.
- Players can rotate moving the mouse around.
- Players can shoot towards the direction they are facing with left click.
- There are two drug-ammos type: standard and special. The player can collect in the

- inventory special ammos picking them in the map. Standard ammos are always available.
- In any time the player can scroll and so change which type of drugs-ammo to equip from the inventory of the collected drug-pills.
- The type of drugs-ammo equipped is the one that is shot. If there is not a drugs-ammo type in the inventory the standard shot is automatically equipped.
- The equipped shot has 2 different possible uses: it can be assumed by the player herself (right click) or shot towards the enemy (left click). Standard shot can just be shot, not assumed.*
- Every drugs-ammo does a certain amount of damage to the opponent. Both standard-ammos and special-ammos don't make lots of damage.

5.8.3 Medkit, Healing and Death mechanics

- Health doesn't normally self regenerate: the damage adds up and consume the health bar.
- Once the health bar is empty the character dies.
- When the character dies then respawns after a few seconds (**5 seconds**) on the spawn point of his team; no action needed (see paragraph 9.3.1 for spawning points).
- Players cannot change class during respawn.
- The healing process can be achieved only with medi-kit.

Medkit

Another item that can be found in the game is the **medkit**, they are automatically assumed when the player passes on them, they cannot be stored for later use. They restore a set amount of the player health bar (**+30 life points**). If the total life points sum exceeds the maximum life it is clamped to the maximum.

Medikit, as drugs-ammos, are spawned during the battle (see paragraph 9.3.2 for more details about spawning medkits points).

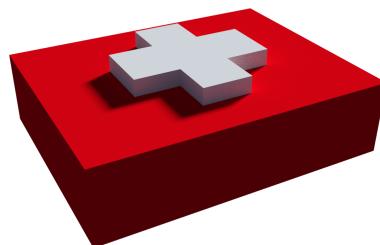


Fig 22: Pharmageddon medikit concept.

5.8.4 Damage

The real damage applied to the player is obtained from the following formula:

$$\text{Damage} = \text{ShotDamage} + (\text{PlayerAttackDamage} - \text{PlayerTargetDefense})/5$$

5.8.5 The Mixer

The mixing formula used for the 4 changing stats (attack, fire_rate, defence, speed) is:

$$\text{effect} = \text{single_stat_sum} \times M1 \times M2$$

Since mixer is a very important mechanic we're going to explain in detail every weight present in the formula.

The M1 weight

In the formula two important weight are present.

M1 comes from the different effect a particular drug-ammo has on a character.

Every character has its own special drug-ammo, signed in green, other drug-ammo will affect in different ways (see the following tables rules from page 37 to 41).

Every class family has one strong weakness (signed in red), following the scheme in figure 23.

Note: in figure 23 we use our main characters to represent the classes. So the hypochondriac is the standard class, the schizophrenic the damage dealer class, the coffee junkie the scout class, the bodybuilder the tank class.

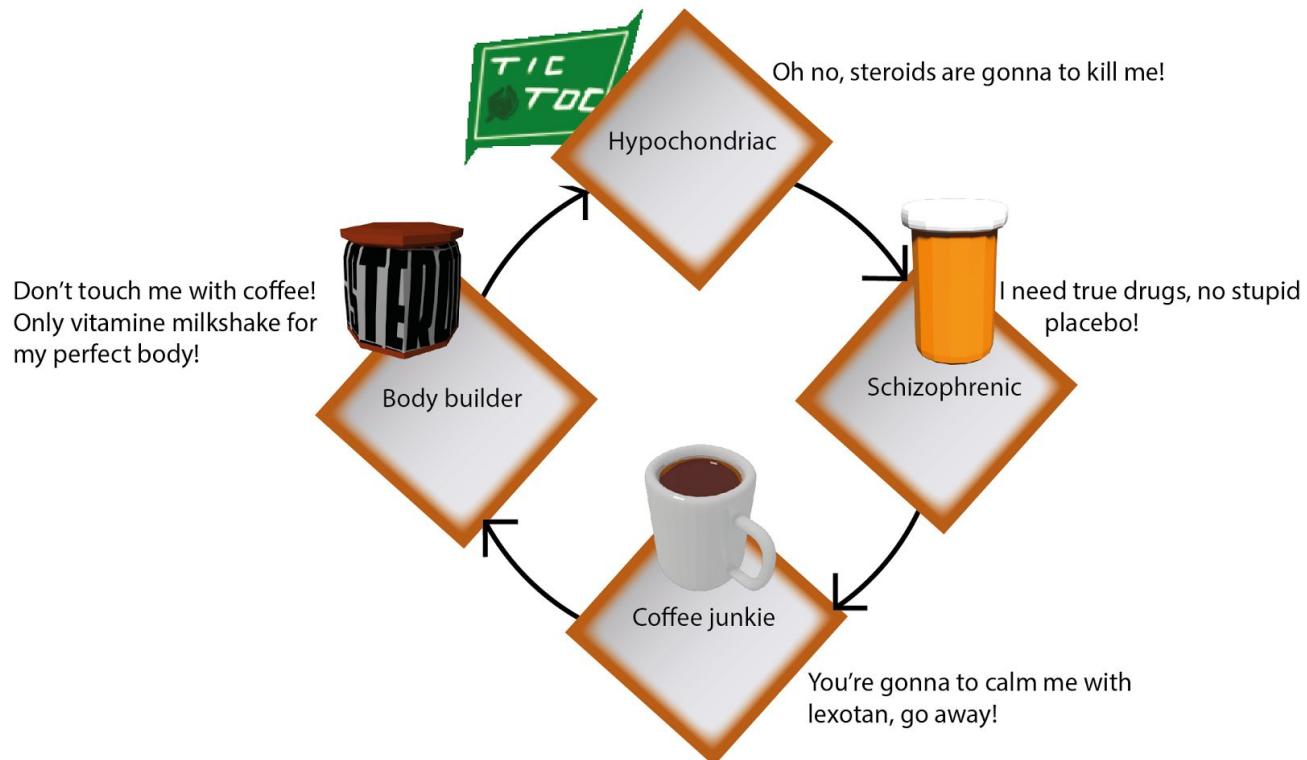


Fig 23 : weakness and strength for the 4 classes.

Explanation: in the chart above, the arrow coming out of the "hypochondriac" class shows that the bullets of this class are particularly effective against the "schizophrenic" class. The arrow entering the "hypochondriac" class shows instead how the bullets of the "bodybuilder" class are particularly effective on the "hypochondriac" class. The phrases in the graph above explain the weakness scheme for all the classes.

We report our symbology already used in 5.7 paragraph:

- + : Bonus
- - : Malus
- ++ : Major Bonus
- -- : Major Malus

The **M1 weight** is obtained by summing the two single drug-ammos effects and **mapped the result in a range of 0-1**. For details mapping see image 24.

The schizophrenic

Single drug-ammo effect:

placebo	coffee	steroids	benzodiazepine
--	+	-	++

Mix effect:

MIX (two drugs)	coffee	steroids	benzodiazepine	placebo
coffee	+ , +	+ , -	+ , +	+ , --
steroids	- , +	- , -	- , ++	- , --
benzodiazepine	++ , +	++ , -	++ , ++	++ , --
placebo	-- , +	-- , -	-- , ++	-- , --

The coffee-junkie

Single drug-ammo effect:

placebo	coffee	steroids	benzodiazepine

-	++	+	--
---	----	---	----

Mix effect:

MIX (two drugs)	coffee	steroids	benzodiazepine	placebo
coffee	++,++	++,+	++,--	++,-
steroids	+,++	+,+	+,-	+,-
benzodiazepine	--,++	--,+	--,--	--,-
placebo	-,++	-,+	-,--	-,-

The body builder

Single drug-ammo effect:

placebo	coffee	steroids	benzodiazepine
+	--	++	-

Mix effect:

MIX (two drugs)	coffee	steroids	benzodiazepine	placebo
coffee	--, --	-- ,++	--, -	-- ,+
steroids	++ ,--	++ ,++	++, -	++, +
benzodiazepine	-,--	-,++	-,-	-,+
placebo	+,-	+ ,++	+,-	+ ,+

The hypochondriac

Single drug-ammo effect:

placebo	coffee	steroids	benzodiazepine
++	-	--	+

Mix effect:

MIX (two drugs)	coffee	steroids	benzodiazepine	placebo
coffee	--	-,-	-,+	-,++
steroids	--,-	--, --	--, +	-- ,++
benzodiazepine	+,-	+,-	+,+	+,++
placebo	++, -	++, --	++, +	++, ++

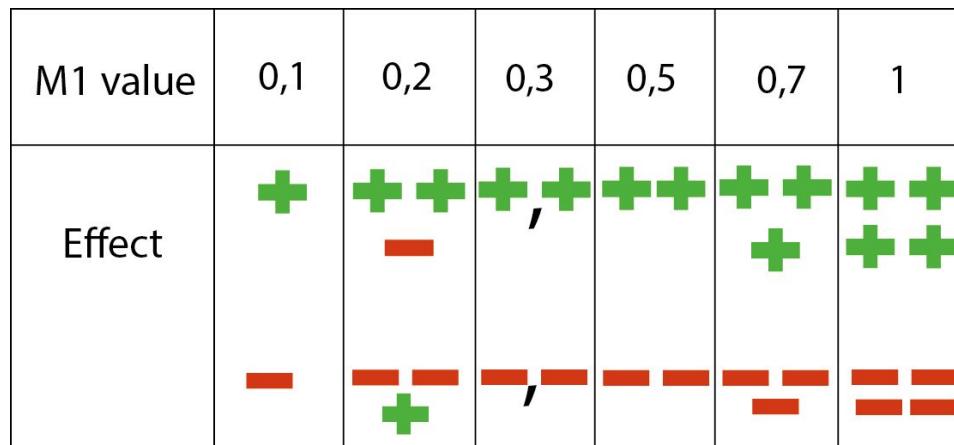


Fig 24 : How M1 weight is mapped.

Notes:

- The resulting effect of a mix is commutative ([++, +] is the same as [+ , ++]).
- Some combinations may cancel each other ([+ , -] and [++, -]), and do not form a mix that changes the basic statistics.

The M2 weight

The second weight is M2. This weight help the mixer to mitigate the negative effect.

This weight can have two values: **0,5 or 1**.

0,5 is for the **negative effect** combination (effect down the abscissa axis).

1 is for the **positive effect** combination (effects up the abscissa axis).

The single_stat_sum_factor

Single_stat_sum_factor are obtained from drug-ammo special features. Every combination

drug-ammo and character's class (tank, scout, standard and damage dealer), causes different stats variation.

Details can be seen in the following images (from 25 to 28).

Effect on Hypochondriac caused by

Tic Toc Placebo

Coffee

Steroids

Benzodiazepines

Character that gets the Pill

Character: Hypochondriac
Shot: PLACEBO

Life

Stats that get affected

Life_Percentage: 0

Defence

Defence_Percentage: 0.1

Speed

Speed_Percentage: 0.15

Attack

Attack_Percentage: 0.15

Attack Speed

Attack Speed_Percentage: 0.1

Segno del modificatore

Signum: 1

Tipo di malus/bonus

Malus_bonus: MAJOR_BONUS_

Character that gets the Pill

Character: Hypochondriac
Shot: COFFEE

Life

Stats that get affected

Life_Percentage: 0

Defence

Defence_Percentage: 0.03

Speed

Speed_Percentage: 0.04

Attack

Attack_Percentage: 0.05

Attack Speed

Attack Speed_Percentage: 0.06

Segno del modificatore

Signum: -1

Tipo di malus/bonus

Malus_bonus: MALUS_

Character that gets the Pill

Character: Hypochondriac
Shot: STEROIDS

Life

Stats that get affected

Life_Percentage: 0

Defence

Defence_Percentage: 0.15

Speed

Speed_Percentage: 0.1

Attack

Attack_Percentage: 0.1

Attack Speed

Attack Speed_Percentage: 0.15

Segno del modificatore

Signum: -1

Tipo di malus/bonus

Malus_bonus: MAJOR_MALUS_

Character that gets the Pill

Character: Hypochondriac
Shot: BENZODIAZEPINE

Life

Stats that get affected

Life_Percentage: 0

Defence

Defence_Percentage: 0.08

Speed

Speed_Percentage: 0.1

Attack

Attack_Percentage: 0.08

Attack Speed

Attack Speed_Percentage: 0.08

Segno del modificatore

Signum: 1

Tipo di malus/bonus

Malus_bonus: BONUS_

Fig 25 : All drug-ammo combination on the Hypochondriac and stats variations.

The figure displays four separate configuration panels, each showing the effects of a specific combination on a 'Schizophrenic' character's statistics. Each panel includes a small icon of the corresponding item (Tic Toc Placebo, Coffee, Steroids, or Benzodiazepines) above it.

Tic Toc Placebo:

Character that gets the Pill	
Character	Schizophrenic
Shot	PLACEBO
Life	
Stats that get affected	
Life_Percentage	0
Defence	
Defence_Percentage	0.05
Speed	
Speed_Percentage	0.15
Attack	
Attack_Percentage	0.15
Attack Speed	
Attack Speed_Percentage	0.05
Segno del modificatore	
Signum	-1
Tipo di malus/bonus	
Malus_bonus	MAJOR_MALUS_

Coffee:

Character that gets the Pill	
Character	Schizophrenic
Shot	COFFEE
Life	
Stats that get affected	
Life_Percentage	0
Defence	
Defence_Percentage	0.08
Speed	
Speed_Percentage	0.07
Attack	
Attack_Percentage	0.08
Attack Speed	
Attack Speed_Percentage	0.1
Segno del modificatore	
Signum	1
Tipo di malus/bonus	
Malus_bonus	BONUS_

Steroids:

Character that gets the Pill	
Character	Schizophrenic
Shot	STEROIDS
Life	
Stats that get affected	
Life_Percentage	0
Defence	
Defence_Percentage	0.02
Speed	
Speed_Percentage	0.1
Attack	
Attack_Percentage	0.1
Attack Speed	
Attack Speed_Percentage	0.02
Segno del modificatore	
Signum	-1
Tipo di malus/bonus	
Malus_bonus	MALUS_

Benzodiazepines:

Character that gets the Pill	
Character	Schizophrenic
Shot	BENZODIAZEPINE
Life	
Stats that get affected	
Life_Percentage	0
Defence	
Defence_Percentage	0.15
Speed	
Speed_Percentage	0.1
Attack	
Attack_Percentage	0.1
Attack Speed	
Attack Speed_Percentage	0.15
Segno del modificatore	
Signum	1
Tipo di malus/bonus	
Malus_bonus	MAJOR_BONUS_

Fig 26 : All drug-ammo combination on Schizophrenic and stats variations.

The figure displays four separate character status adjustment panels, each corresponding to a different drug or ammunition combination for a 'Coffee_junkie' character. The panels are arranged in a 2x2 grid.

- Top Left:** Titled 'Effect on Coffee junkie caused by [Tic Toc]'. It shows a character portrait and a green Tic Toc placebo pill icon. The panel includes fields for 'Character' (set to 'Coffee_junkie') and 'Shot' (set to 'PLACEBO'). It lists various stats with their percentage changes: Life (0%), Defence (0.06%), Speed (0.1%), Attack (0%), Attack Speed (0.1%), and Segno del modificatore (Signum: -1). The 'Tipo di malus/bonus' field is set to 'MALUS_'. Below the panel is a red Steroids pill icon labeled 'Steroids:'.
- Top Right:** Titled 'Effect on Coffee junkie caused by Coffee:'. It shows a character portrait and a white coffee cup icon. The panel includes fields for 'Character' (set to 'Coffee_junkie') and 'Shot' (set to 'COFFEE'). It lists various stats with their percentage changes: Life (0%), Defence (0.15%), Speed (0.15%), Attack (0.13%), Attack Speed (0.1%), and Segno del modificatore (Signum: 1). The 'Tipo di malus/bonus' field is set to 'MAJOR_BONUS_'. Below the panel is a yellow Benzodiazepines pill icon labeled 'Benzodiazepines:'.
- Bottom Left:** Titled 'Effect on Coffee junkie caused by STEROIDS:'. It shows a character portrait and a red Steroids pill icon. The panel includes fields for 'Character' (set to 'Coffee_junkie') and 'Shot' (set to 'STEROIDS'). It lists various stats with their percentage changes: Life (0%), Defence (0.07%), Speed (0.08%), Attack (0.1%), Attack Speed (0.05%), and Segno del modificatore (Signum: 1). The 'Tipo di malus/bonus' field is set to 'BONUS_'. Below the panel is a red Steroids pill icon labeled 'Steroids:'.
- Bottom Right:** Titled 'Effect on Coffee junkie caused by BENZODIAZEPINE:'. It shows a character portrait and a yellow Benzodiazepines pill icon. The panel includes fields for 'Character' (set to 'Coffee_junkie') and 'Shot' (set to 'BENZODIAZEPINE'). It lists various stats with their percentage changes: Life (0%), Defence (0.05%), Speed (0.15%), Attack (0%), Attack Speed (0.2%), and Segno del modificatore (Signum: -1). The 'Tipo di malus/bonus' field is set to 'MAJOR_MALUS_'. Below the panel is a yellow Benzodiazepines pill icon labeled 'Benzodiazepines:'.

Fig 27 : All drug-ammo combination on the Coffee junkie class and stats variations.

Tic Toc Placebo:

Character that gets the Pill
Character: Bodybuilder
Shot: PLACEBO

Life
Stats that get affected: Life_Percentage: 0

Defence
Defence_Percentage: 0.1

Speed
Speed_Percentage: 0.15

Attack
Attack_Percentage: 0.05

Attack Speed
Attack Speed_Percentage: 0.1

Segno del modificatore
Signum: 1

Tipo di malus/bonus
Malus_bonus: BONUS_

Coffee:

Character that gets the Pill
Character: Bodybuilder
Shot: COFFEE

Life
Stats that get affected: Life_Percentage: 0

Defence
Defence_Percentage: 0.2

Speed
Speed_Percentage: 0.05

Attack
Attack_Percentage: 0.2

Attack Speed
Attack Speed_Percentage: 0.1

Segno del modificatore
Signum: -1

Tipo di malus/bonus
Malus_bonus: MAJOR_MALUS_

Steroids:

Character that gets the Pill
Character: Bodybuilder
Shot: STEROIDS

Life
Stats that get affected: Life_Percentage: 0

Defence
Defence_Percentage: 0.2

Speed
Speed_Percentage: 0.2

Attack
Attack_Percentage: 0.15

Attack Speed
Attack Speed_Percentage: 0.1

Segno del modificatore
Signum: 1

Tipo di malus/bonus
Malus_bonus: MAJOR_BONUS_

Benzodiazepines:

Character that gets the Pill
Character: Bodybuilder
Shot: BENZODIAZEPINE

Life
Stats that get affected: Life_Percentage: 0

Defence
Defence_Percentage: 0.1

Speed
Speed_Percentage: 0

Attack
Attack_Percentage: 0.05

Attack Speed
Attack Speed_Percentage: 0.1

Segno del modificatore
Signum: -1

Tipo di malus/bonus
Malus_bonus: MALUS_

Fig 28 : All drug-ammo combination on the Bodybuilder and stats variations.

After the game launch, in the shop, buying new characters, there will be eight new drug-ammos (as described in 5.6.2 paragraph). They will be: sedative, greenbull, beer, vitamins and supplements pills, nicotine pills, opium, lsd, mushroom.

Every new drug-ammo belongs to a class family and affect other class families as described in figure 23. The only difference, using this hierarchy, is that the single drug-ammos caused Major_Bonus (++) effect only on its character (for example greenbull will cause Major_Bonus on the student, the student belongs to the scout family, other scout drug-ammo not greenbull are Bonus effect on her and she has weakness and strong described in figure 23).

If two drug-ammos are mixed together then Single_stat_sum_factor is the sum of the same stat. An example, after *The Timer Effect* paragraph will show a mixed effect.

Stats that are changed are: **fire_rate, speed, defence, attack_damage**.

The Timer Effect

Every combined effect (Major_Bonus Major_Bonus, Malus Malus and all effects described in tables from page 37 to 41) activate a different timer. In the following table all possible timers are described.

Positive Effect	Negative Effect	Timer (seconds)
Bonus (+)	Malus (-)	0,2
Major_Bonus, Malus (++, -)	Major_Malus, Bonus (--, +)	0,75
Bonus, Bonus (+, +)	Malus, Malus (-, -)	1,4
Major_Bonus (++)	Major_Malus (--)	2,6
Major_Bonus, Bonus (++, +)	Major_Malus, Malus (--, -)	3,5
Major_Bonus, Major_Bonus (++, ++)	Major_Malus, Major_Malus (--, --)	4

If a single timer is started, for example the Bonus timer, and another Major_Bonus effect became activated then the longest timer will take place on the short timer (in this case Major_Bonus, Bonus) and restarts.

During timer cooldown stats are modified according to previous paragraph (*The single_stat_sum_factor*): at the end of the timer, the stats return to their original values.

Mixed drug-ammos: an example

Let's make an example. Suppose that two teammates decide to help another teammate trying to activate a positive effect.

In this case the scout (coffee junkie) and the damage dealer (the schizophrenic) are shooting respectively with special drug-ammos: steroids and placebo on the tank (bodybuilder alley). (Note that the shooters class is not relevant for the outcome of the mix, just the type of drugs shot)

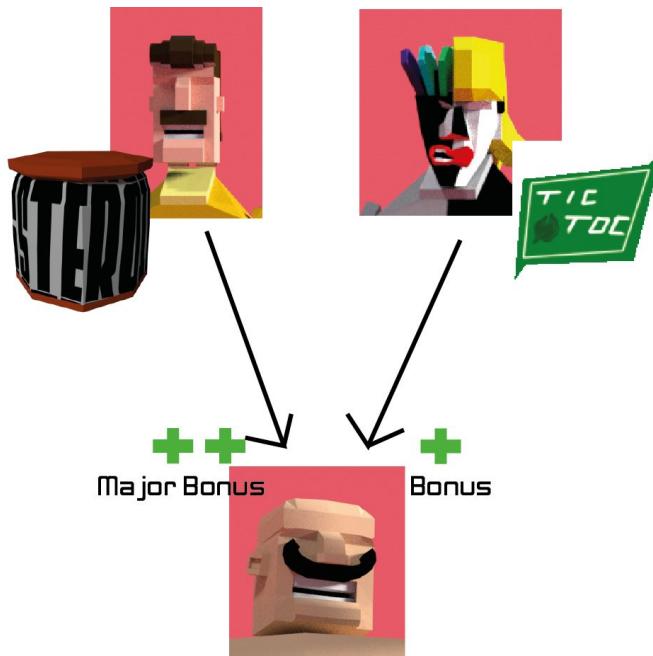


Fig 29 : Mixer example.

Remember that:

$$\text{effect} = \text{single_stat_sum} \times M1 \times M2$$

From tables in page 34 to 37 and weakness and strong in figure 23, we know that the tank get a Major_Bonus (++) from steroids drug_ammos and a Bonus (+) from placebo.

This effect combination (++,+) is mapped as 0,7 in M1 (figure 24).

M2 is 1 because (++,+) is a positive combination.

Now focusing on tank attack stat, it becomes:

$$\text{Attack} = \text{old_tank_attack} \times \text{steroids_tank_combination.attack} + \text{old_tank_attack} \times \text{placebo_tank_combination.attack}$$

The Tank has an attack = 40 (taken from 5.6.3 paragraph about technical cards summarized in figure 16). Figure 28 said that steroids will add +25% to base tank attack, and placebo will add +5% to base tank attack. So the single_stat_sum is +30%. Effect on attack is so $40 = 40 + 100 \times 30\% = 82$.

$\text{effect_on_attack} = 82 \times 1 \times 0,7 = 57,4$: this is the new attack stat.

The timer activated by the Major_Bonus, Bonus combination is 3,5 seconds (see table in page 41).

This calculus is repeated for each of the four stats (attack, fire_rate, defence, speed).

5.8.6 Scoring/winning conditions

In every match there is *a scoreboard which displays two types of points* :

- **Player points:**

Shows in game the total amount of points the player has achieved in the current match.

- **Team points:**

Shows in the pause menu and at the end of the match the total points of the team as sum of the points of the team members.

The matches are time regulated (eg. 10 minutes per match): after the time is out the team with the most points wins.

If a player hits an opponent repeatedly the points build up as follows:

$$\text{Points per hit} = 10 \times N \times K$$

Where :

N is the number of consecutive shots on the same opponent (if you are damaging the opponent you gain points otherwise you loose points, this is given by the sign of K the value)

K depends on the type of malus/bonus the opponent is getting:

Malus / Bonus (depends on the hit character)	K value
+	-1
-	+1
++	-5
--	+5

There are also different actions that give a player additional points, such as:

- Killing an opponent +100 points.
- Complete a Mix +50 points .

The global player score is the sum of her points in every battle played.

6. Interfaces

6.1 Interfaces Legends

We report some interface icon used in the interface presentation:



Slider, change information in vertical order.

Button

Represents intractable ui elements, it changes page.



Rectangles represents Canvas and space for text.



Back button, return to the previous page, see 5.3 Flowchart paragraph for more information.



Exit button, exit the game or exit the overlap current page.



Intractable arrow, change the item in the current page.

Eye drug-ammo animation: During the timer count down, the eye logo watches left, after watches right, this animation goes until the second seconds, after that, the eye opening animation starts and the battle begins.



Fig 30 : logo animation steps.

Note: yellow element are hud elements, see 7 paragraph for more and detailed information.

Logo and text title are the same as shown in the first cover page.

6.2 Interfaces mood

The interface uses neon colors and flat geometric forms.

For palette colors use the bottom image taken from “*Heavy Bullets*” game.

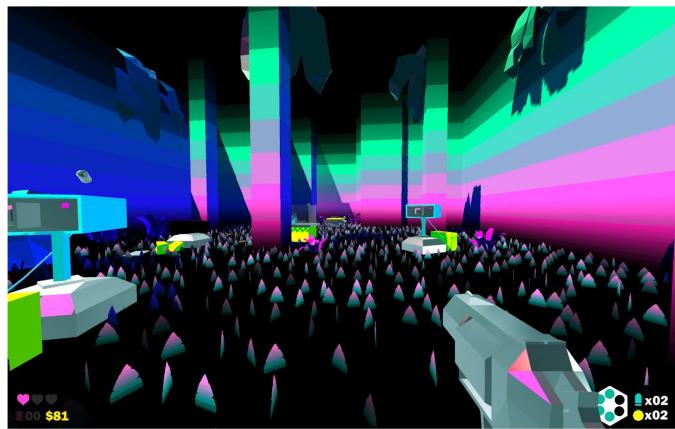


Fig 31 : Heavy Bullet scene in game. Note the color palette.

Canvas are fuchsia with emission light, corner are rounded. Background is black or shows a map or the pharmacy.

The font is essential and geometric.

For global inspiration see the following image (note: this is not a in game interface but only give inspiration).

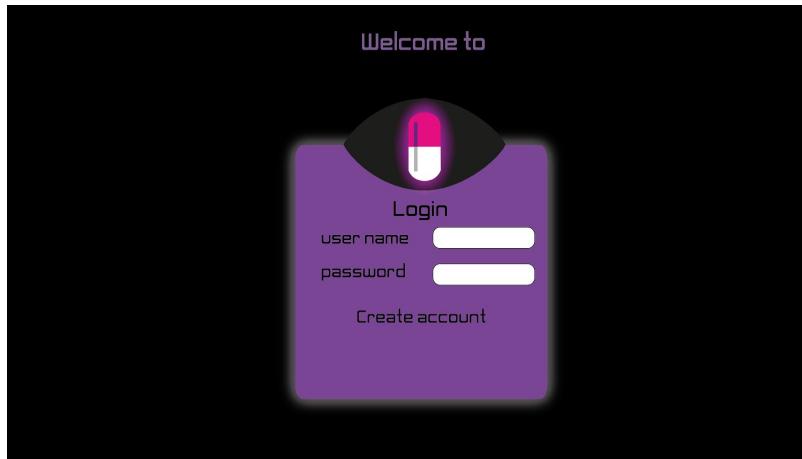


Fig 32 : Example color and font used in canvas.

6.3 Interface subdivisions

6.3.1 Initial page

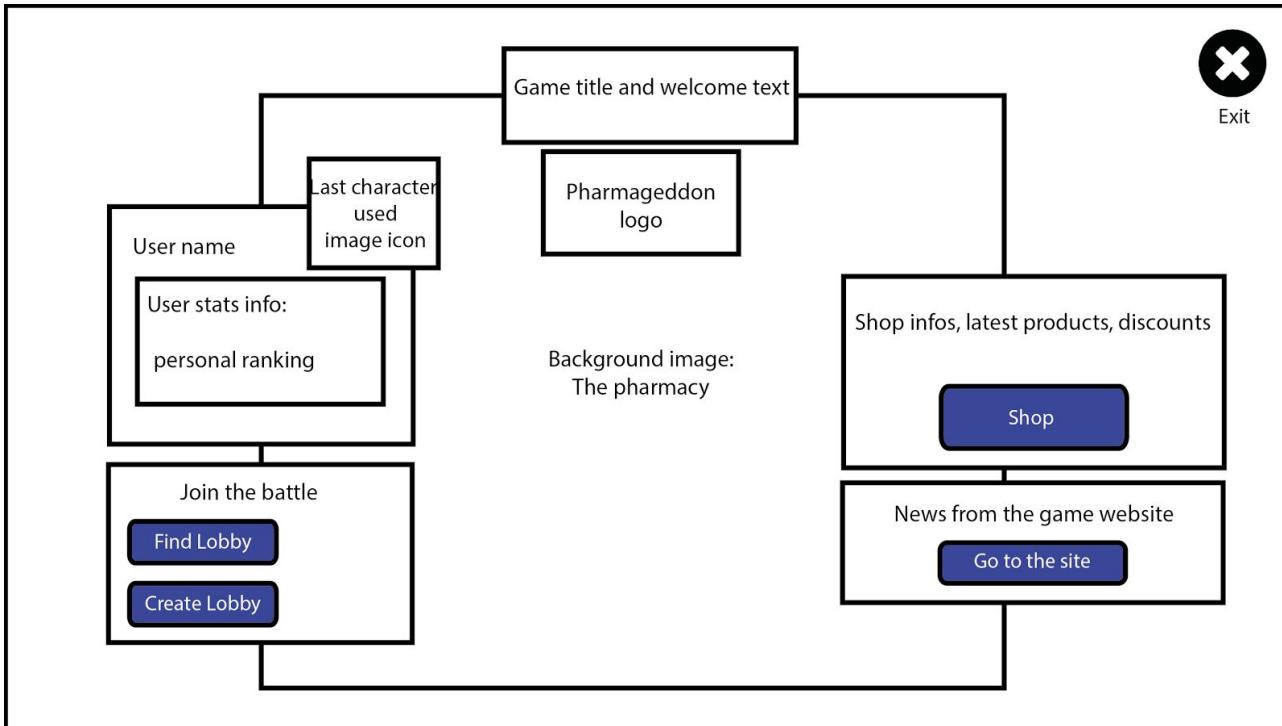


Fig 33 : Initial page wireframe.

This page is the first page the player see. It reports information about player stats (her personal ranking in the leaderboard), online shop (new items, maps, characters skin available, special discounts), news from the game website. From this page is possible to start the battle finding or creating a lobby.

6.3.2 Shops

In this page the player can purchase different virtual goods. In the left canvas, she can select: maps, items and characters. Select one of them will open the corresponding right canvas.

Default opened first page is the map purchased canvas. The player can change item using the two arrows (left and right). Preview icons are shown for every virtual goods with a brief description.

The player can also buy virtual money named pharma-coins. Virtual money page is managed by our backend service (PlayFab) as described in GTD section 5.

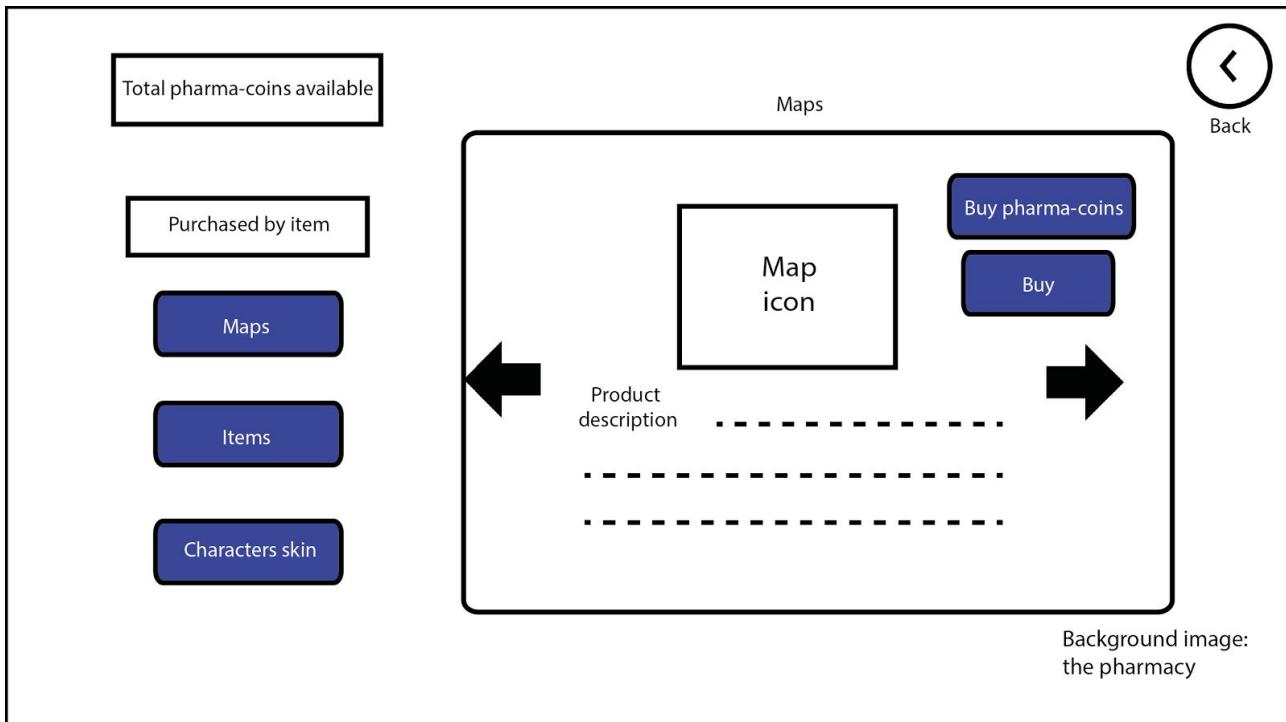


Fig 34 : Map-Shop wireframe.

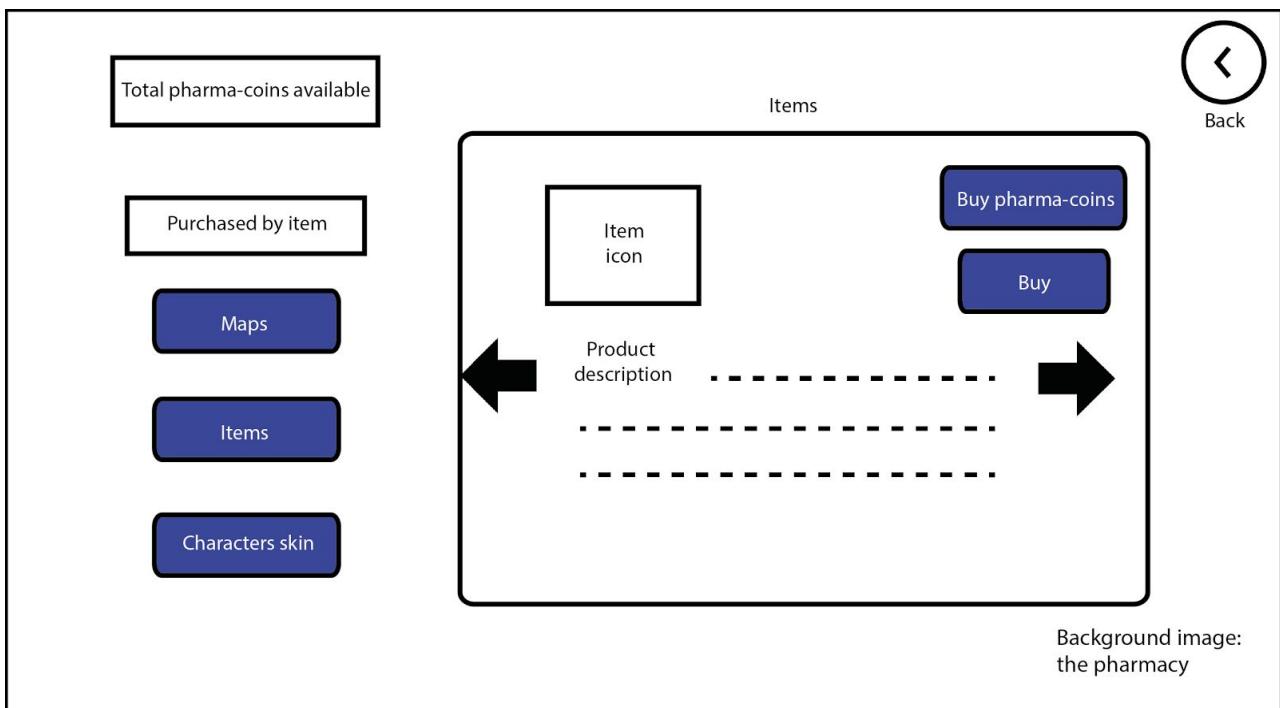


Fig 35 : Item-Shop wireframe.

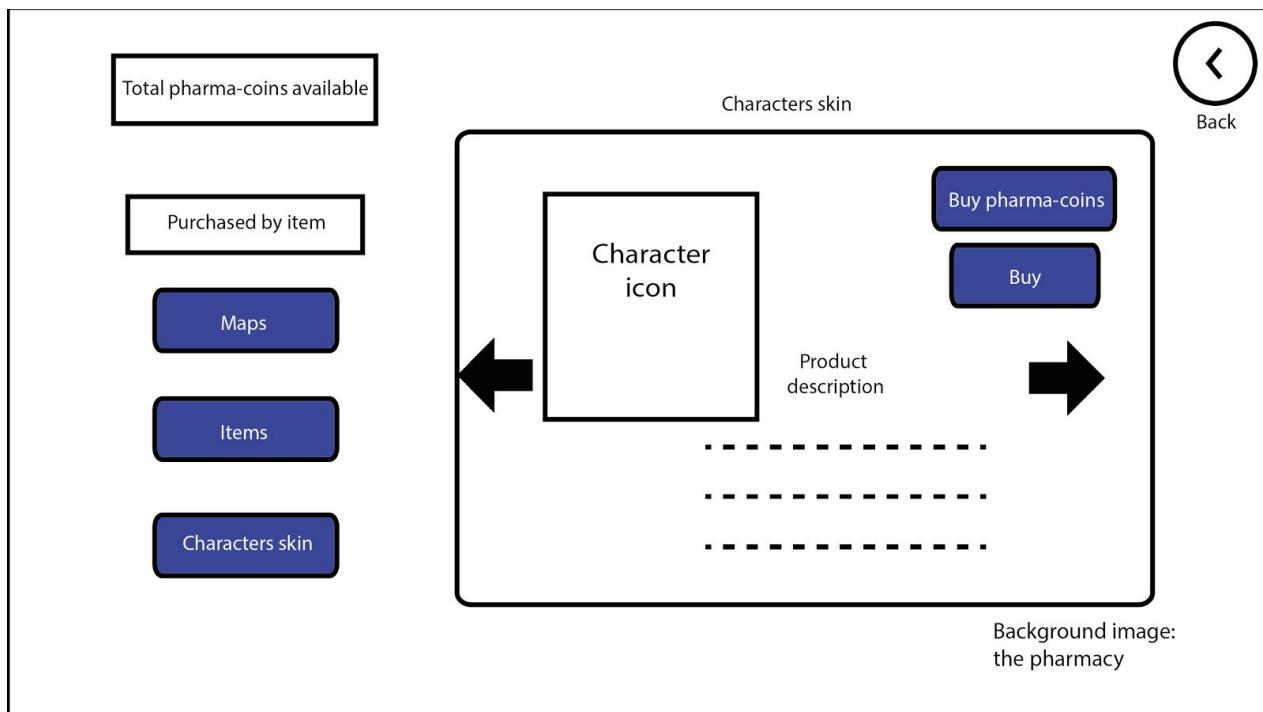


Fig 36 : Character Shop wireframe.

6.3.3 Create Lobby

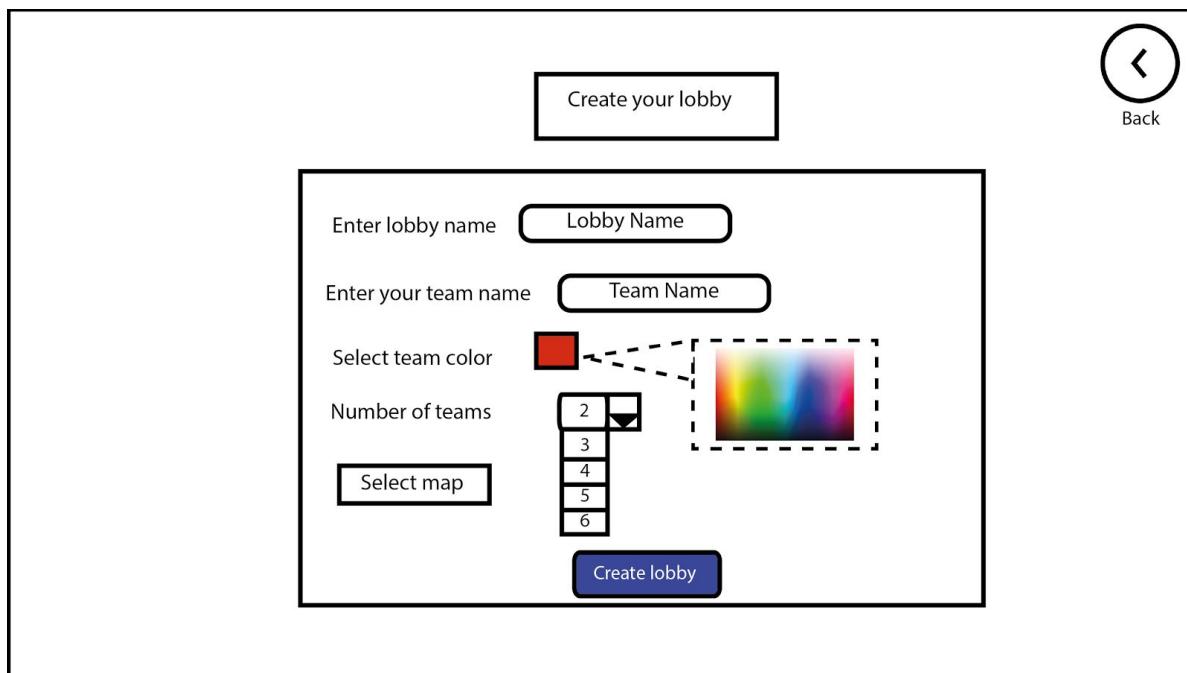


Fig 37 : Create lobby wireframe.

In this page the player can create her own lobby. Information to add in text fields are: lobby name, team name. Creating a lobby will also add the lobby creator to one team.

It's also possible to select the team color. Clicking on the default red color square, a palette will open to show other colors. A slider shows the possible number of teams from 2 (minimum) to 6 (maximum). The default number is 2.

The “Select map” button open another canvas in which the player can decide in which map the battle will start. Only unlocked maps (also from purchase in the shop) are available for the selection and are shown. A brief description is bottom every map icon image. The player can change it using two (right and left) arrows.

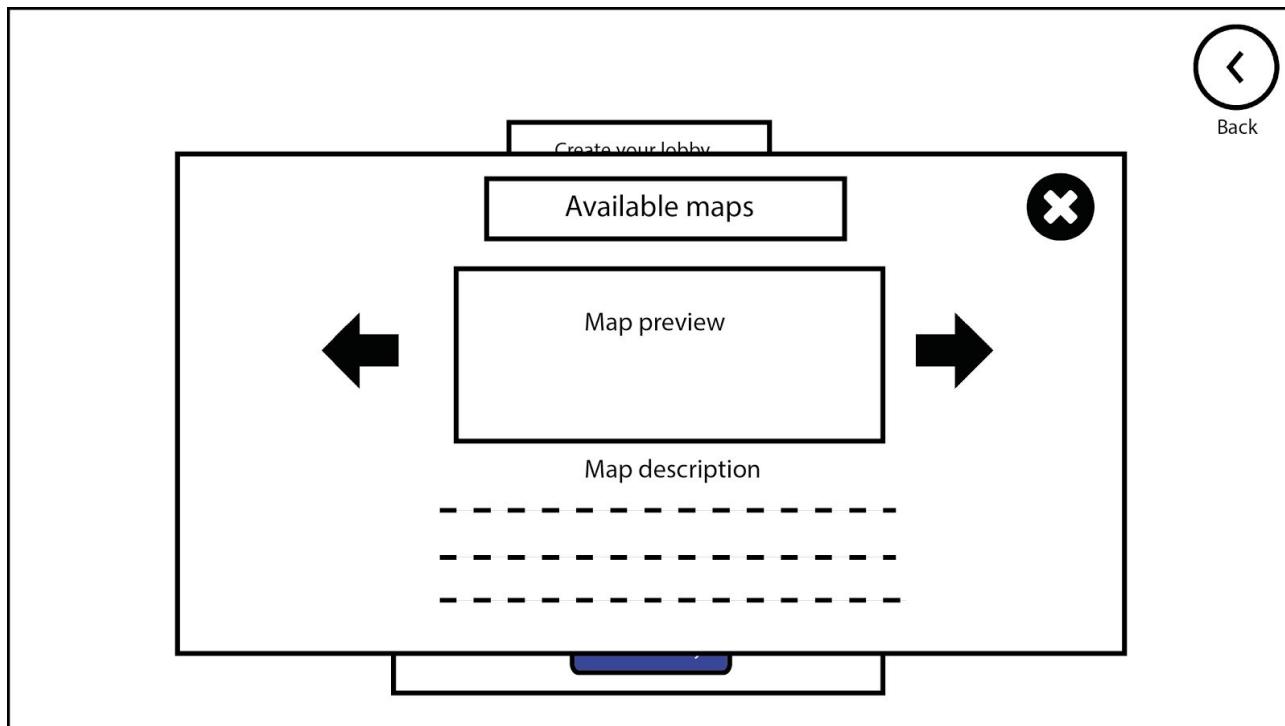


Fig 38 : Available map page wireframe. It's appeared after selecting map.

6.3.4 Find lobby

This page shows available lobbies. Every lobby reports these information: lobby name, map name, number of teams (from 2 to 6).

Note: if the player hasn't already bought the map in which the lobby plays, she can't join this lobby. In this case, she can go directly to the shop.

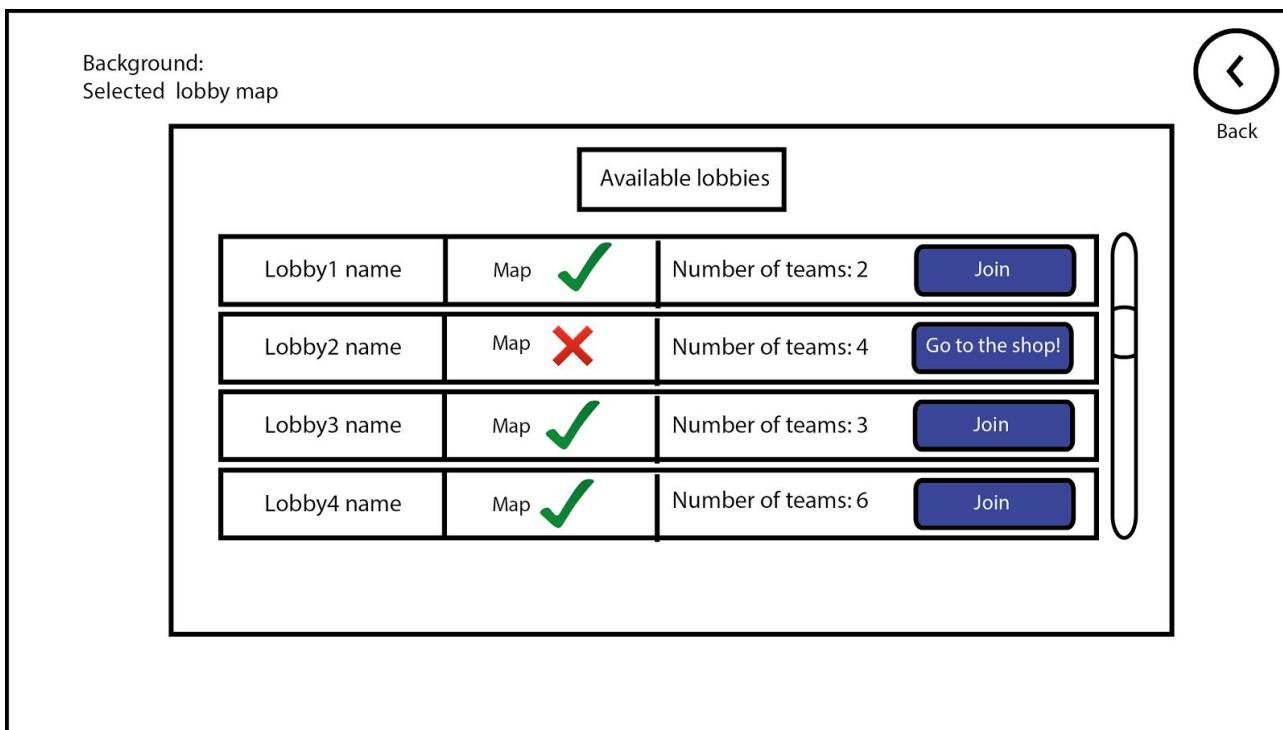


Fig 39 : Available lobbies wireframe.

6.3.5 Select team

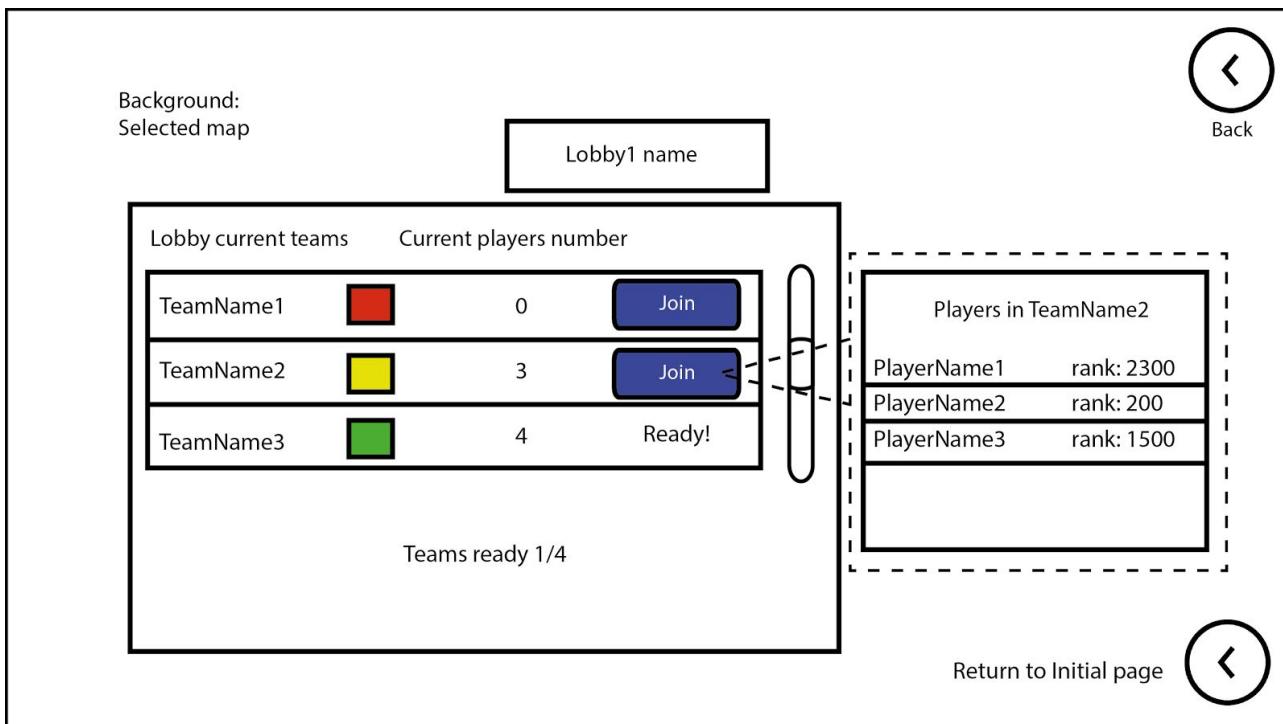


Fig 40 : Select team wireframe.

After lobby selection, the player can choose to join one of the available teams. Number of teams

goes from 2 (minimum) to 6 (maximum). Every team has current numbers players information displayed. If a team has 4 players, it's tagged as "Ready", otherwise the player can join it with the join button. Other team visible information: team name and color team.

When the player selects the *TeamName* text, she can see (on the right) which players have already joined that team and their points. If the player doesn't select the *TeamName* text, the right canvas is already presents but empty (without players information).

The background represents the map image selected for the lobby.

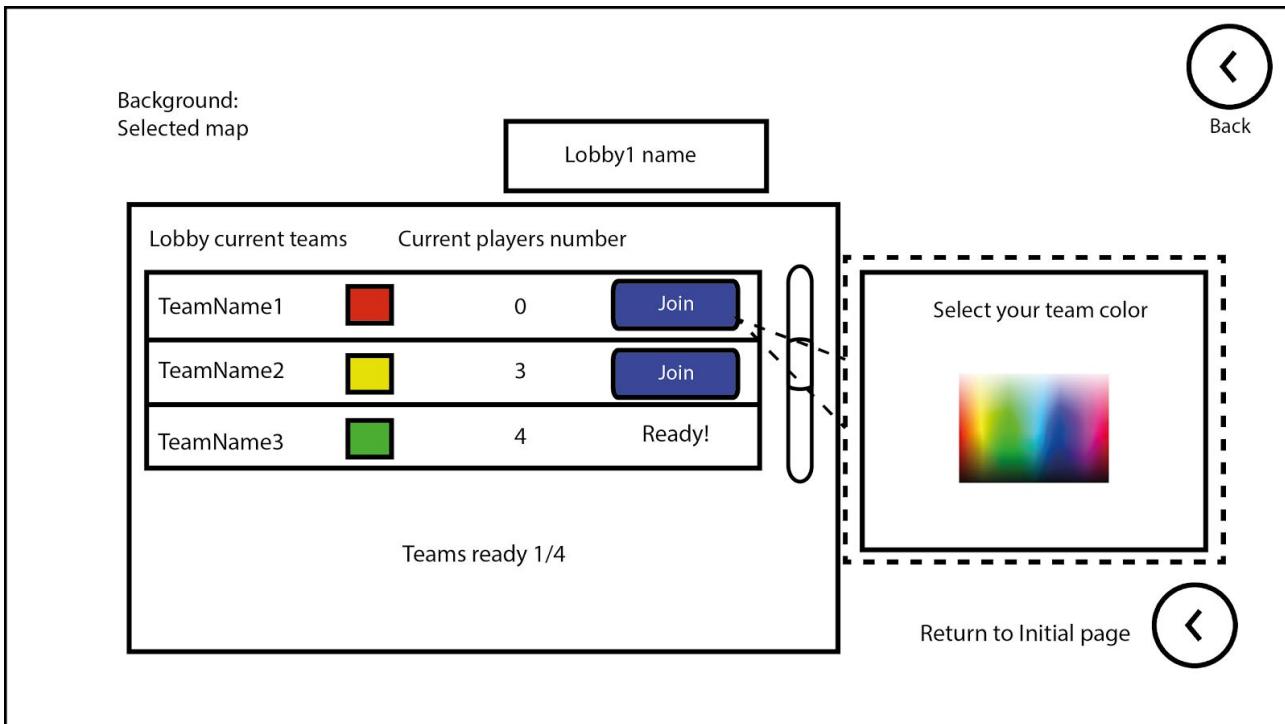


Fig 41 : Select team color if the player is the first to enjoy it.

The player can select the team color if she's joining a 0 players team. In this case the right canvas shows a palette colors for the team color selection. By default 0 teams players have random color.

Information about numbers of team ready is reported in the bottom text field.

In this page is also possible to return to the initial page so the bored player of waiting can chose to create or find another lobby.

6.3.6 Character selection

In this page the player can choose her character using two arrows (right and left) which change the characters. Stats are shown under the character.

In the right canvas there is a brief character description (his background history).

In the left canvas there is the other characters selected by the team mates. An icon shows the

character image with the corresponding player's name.

If the player selects the “Ready!” button, she can't change characters anymore with the arrow but need to wait for the other “Ready” status players shown in the left canvas.

In the upper right corner a timer in seconds is shown: the player has to select and press the “Ready!” button until the 0. **The timer is 50 seconds.** After that, if she hasn't selected a character, the last character in the character canvas is defaultly selected.

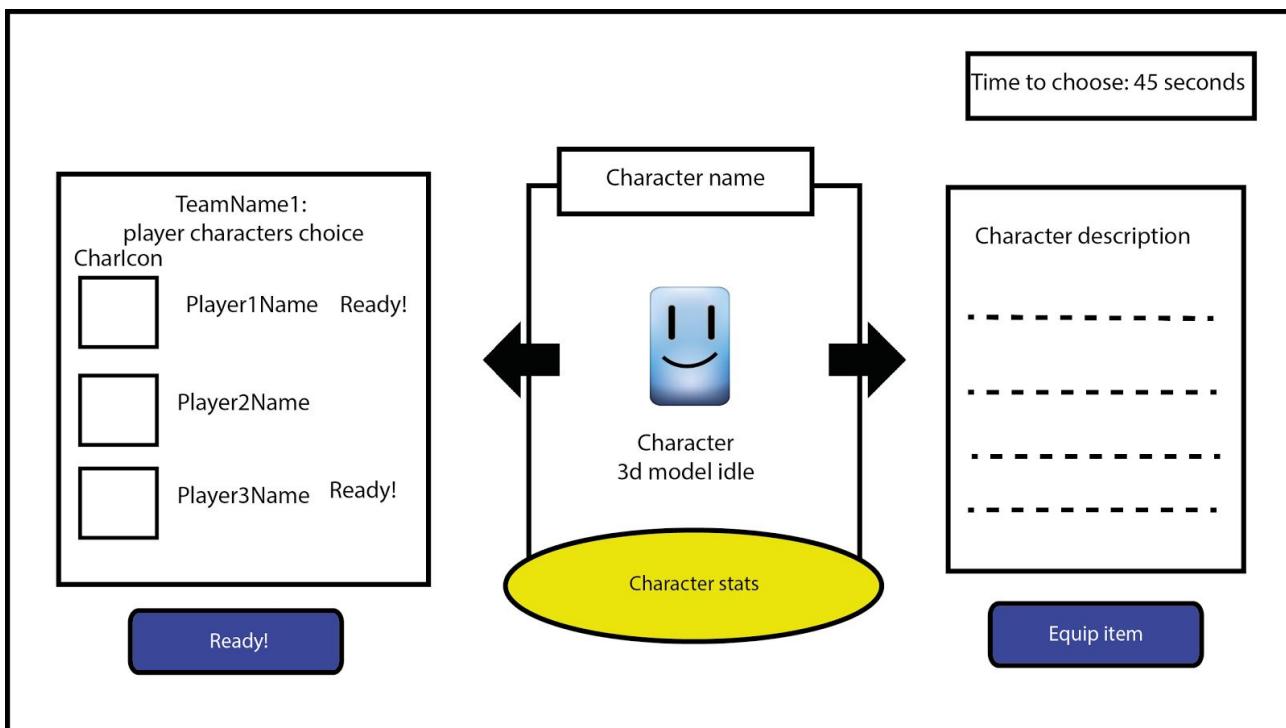


Fig 42 : Select character wireframe.

If the player has unlocked characters from the shop, the first time she enters in this page, a “New!” tag is added in the upper left corner character canvas.

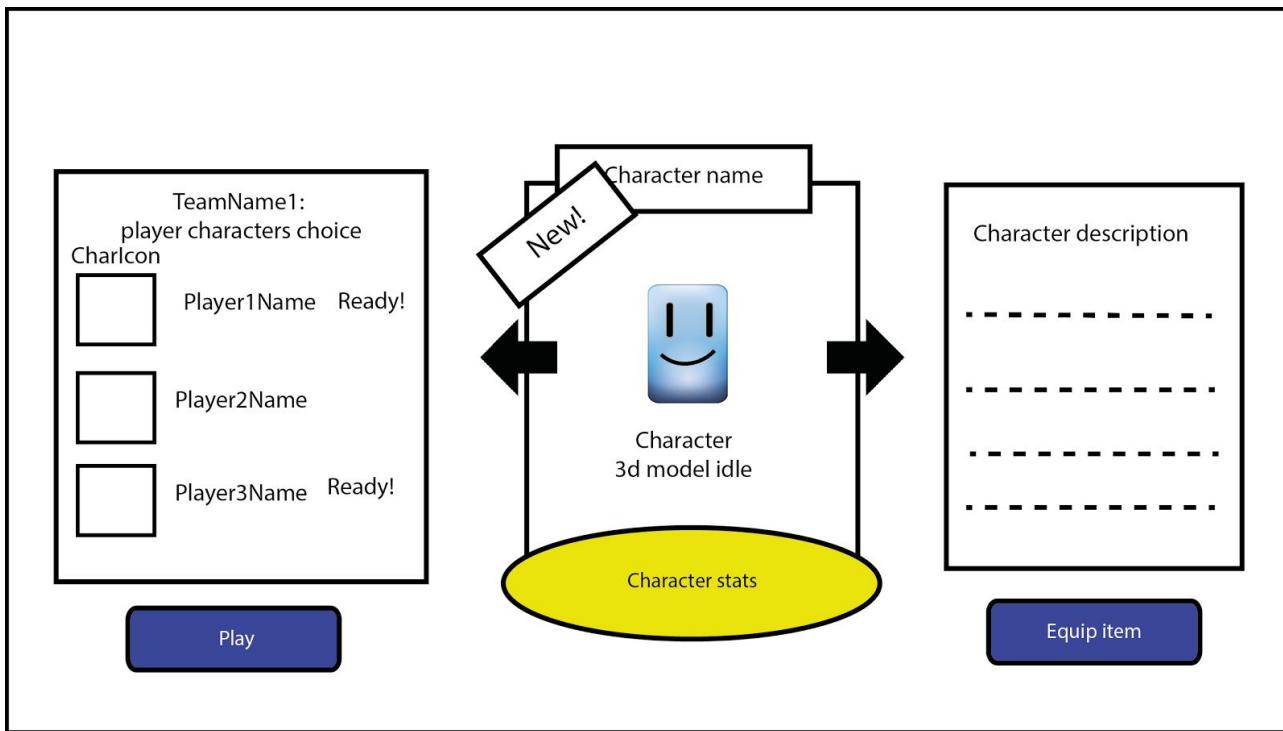


Fig 43 : Select New character wireframe.

Is also possible with the “Equip Item” button to open another overlap page in which the player can equip previously bought item. A preview (in the item icon canvas) shows the selected character with the equipped item. The player can change item (if available) with the two arrows (up and down).

If the player has no bought item, the “Equip item” button is not selectable.

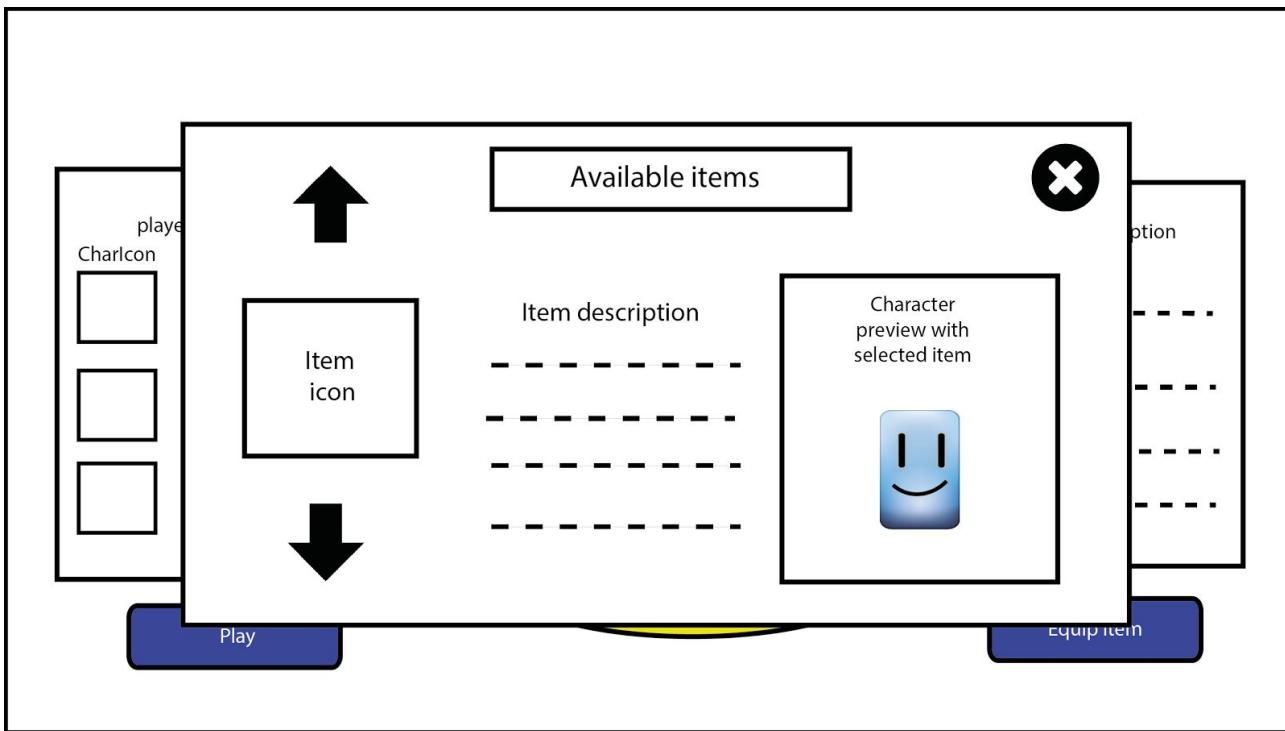


Fig 44 : Equip item on character wireframe.

6.3.7 Battle starts

When the timer ends, another timer starts.

The battle will start in $T = 5$ seconds. This information is shown in another overlapping canvas and in its bottom the pharmageddon logo animation is running until the 0 seconds.

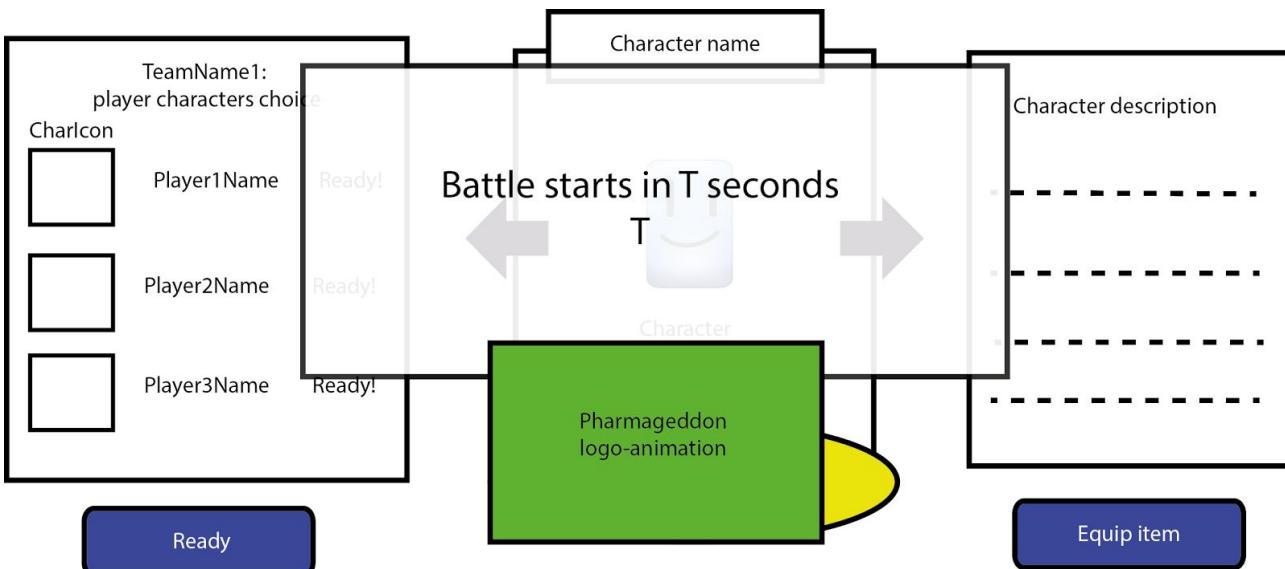


Fig 45 : Battle starts (timer) wireframe.

6.3.8 In game interface

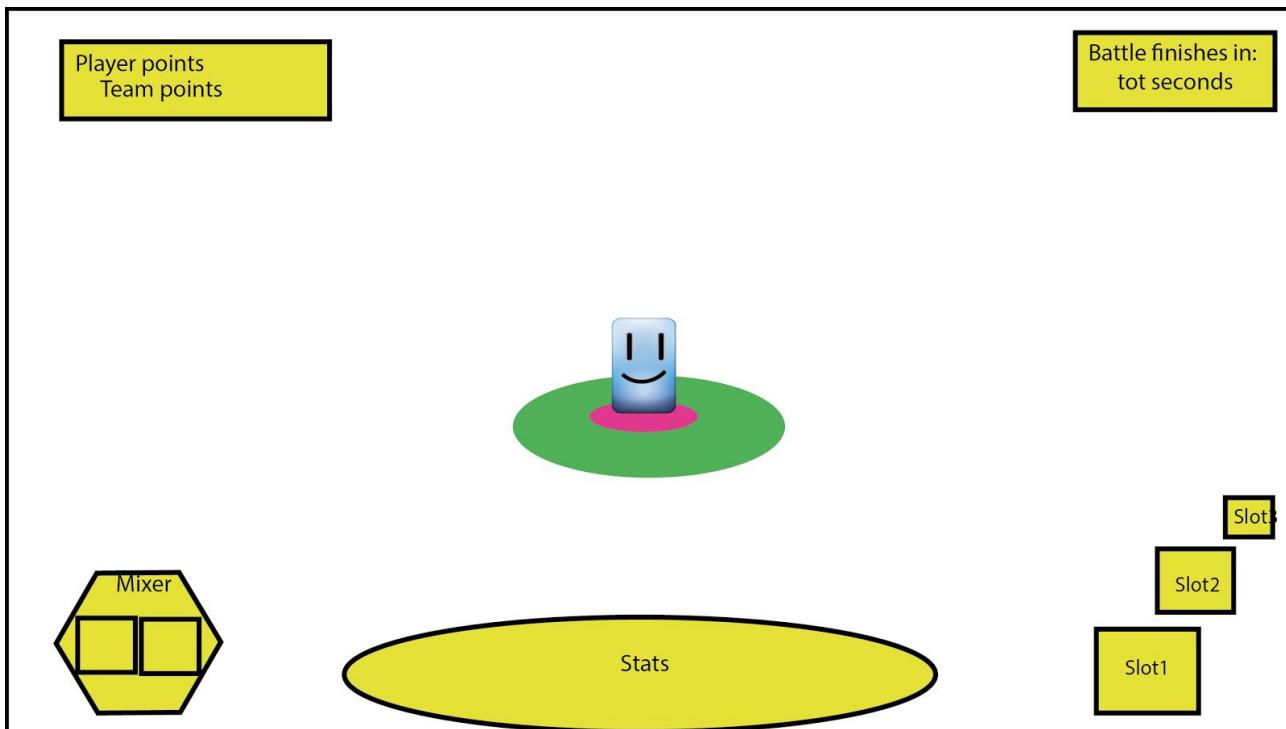


Fig 46 : In game interface wireframe.

This interface is the personal player interface: other players can't see it.

In the upper left corner a timer shows the battle time left in seconds.

In the upper right corner there are personal information about player points and (with smaller text) team points.

In the left bottom corner is shown the mixer: in it there will be a maximum of two drug-ammo icon.

In the right bottom corner is shown the pills slot (3 slots) inventory. The first slot represents the first selected drug-ammo, the second slot represents the second drug-ammo available in the inventory, the third slot represents the third drug-ammo available in the inventory.

Mixer and inventory slots are not shown if there are no available drug-ammo.

In the bottom center are shown player stats.

More and detailed information in 7 HUD section.

During the game is possibile to view the current scoreboard. A page will overlap in the center of the screen game.

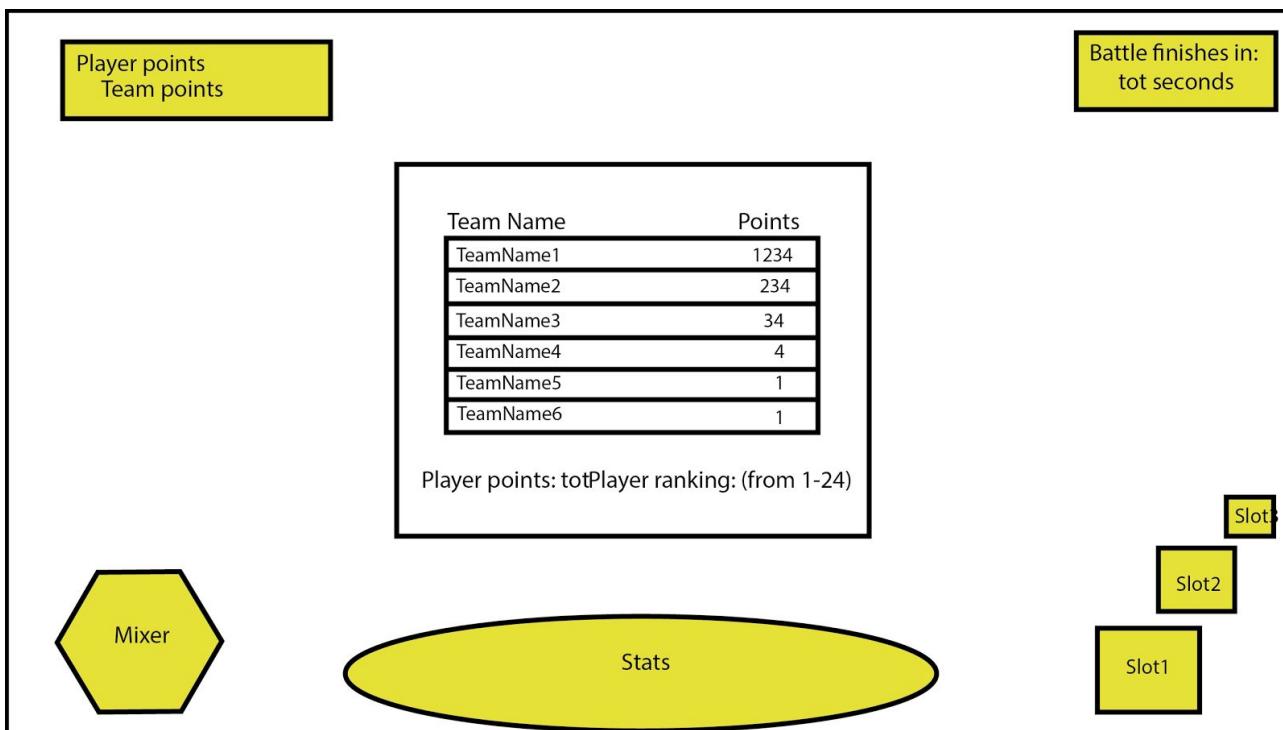


Fig 47 : In game current leader board wireframe.

3.6.9 Final Scoreboard

After the battle ends a scoreboard is shown. Information in it are: list of battle teams with name and total points in crescent (i.e. ranking) order, list of players with personal points gain during the battle in crescent (i.e ranking) order. In the two little right canvas are shown player's team ranking (from 1 to 6) and player personal ranking (from 1 to 24). From this page is possible to return in the initial page.

In case of team victory, additional pharmacoins are added to the player. This information is shown in the upper left corner leaderboard.

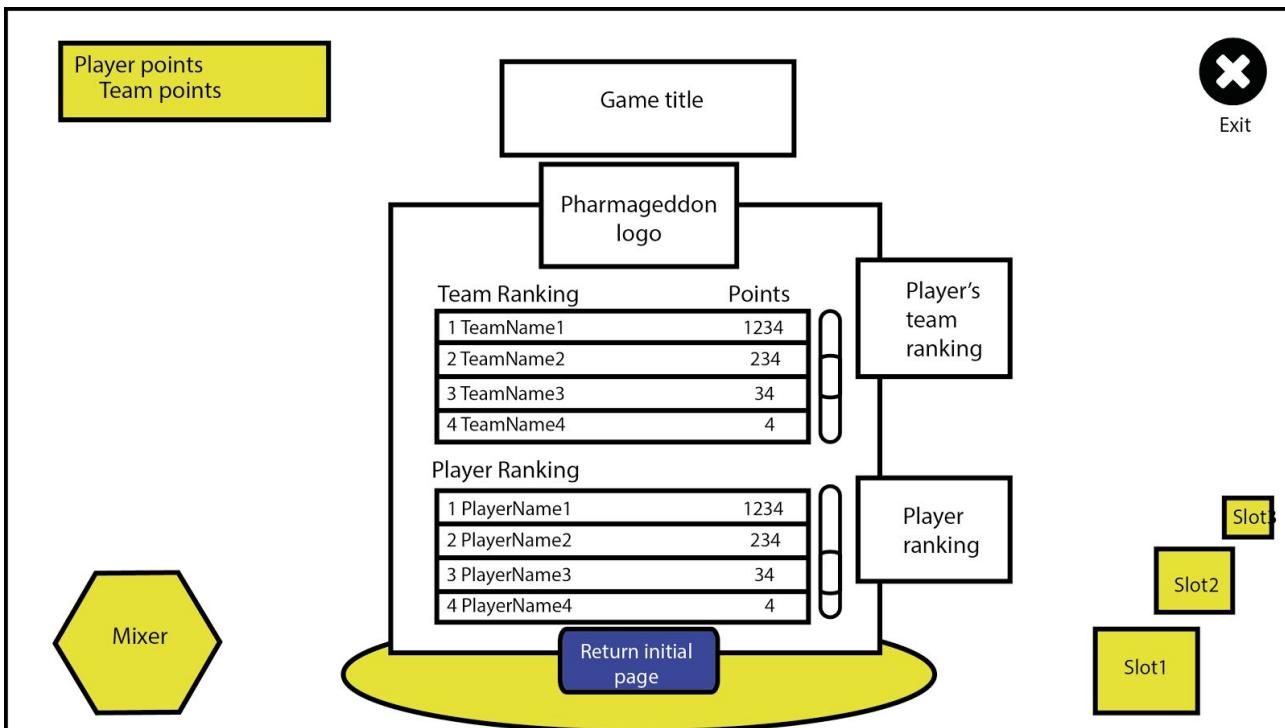


Fig 48 : After the battle, normal Scoreboard wireframe.

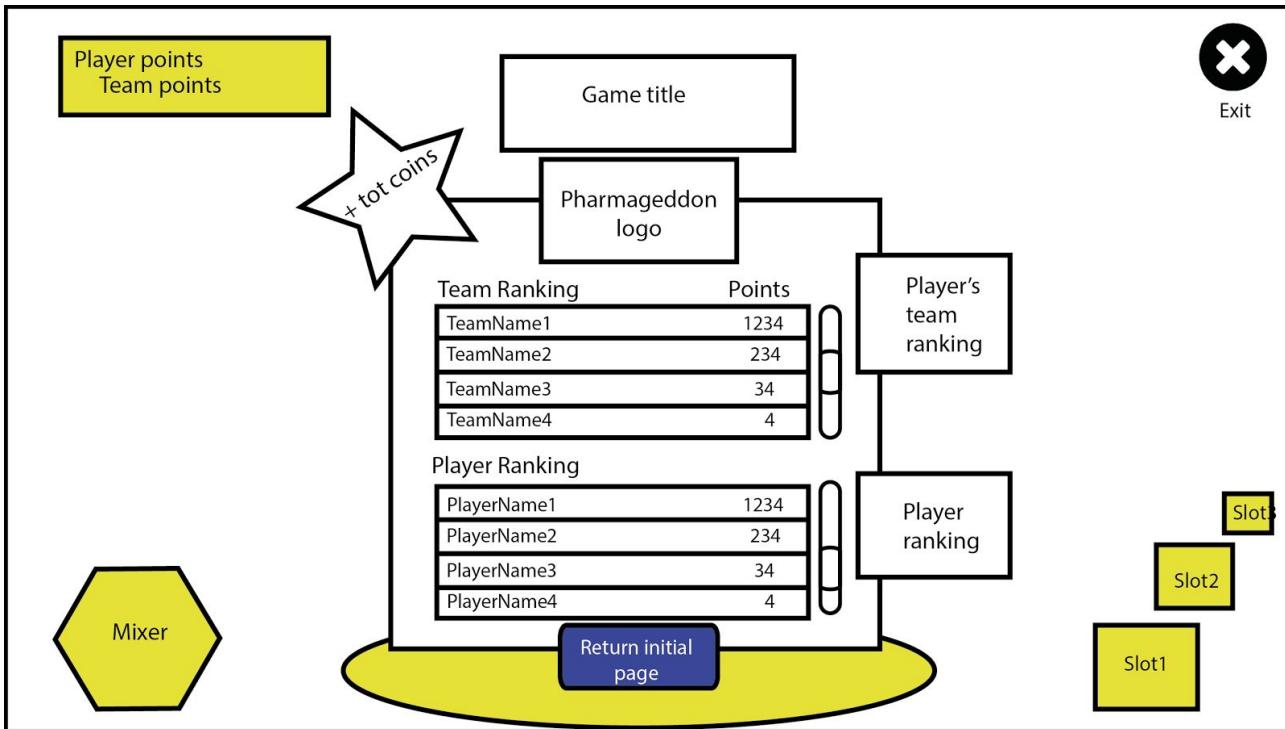


Fig 49 : After the battle, winner Scoreboard wireframe.

7. HUD

7.1 Stats Bars and Timers

The player can constantly see some information about their stats in the hud, places in the bottom half screen.

These information are:

- life points

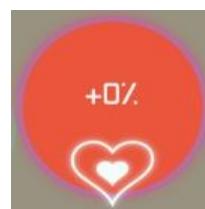


Fig 50 : Life points hud icon.

- defence



Fig 51 : Defence points hud icon.

- speed



Fig 52 : Speed points hud icon.

- attack

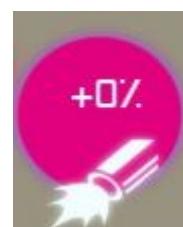


Fig 53: Attack points hud icon.

- fire rate



Fig 54: Fire rate points hud icon.

Every stat is described by: a **flat colored circle**, a **white icon representing the stat itself**, a **written with the percentage bonus or malus activate for that stat**.

Inspiration of circular stats comes from *Sacred* hud game.



Fig 55: Sacred hud, note the circular stats bars.

Circles are not full. The total height is mapped as 1 and then the circle is scaled according to characters normalized initial stats.

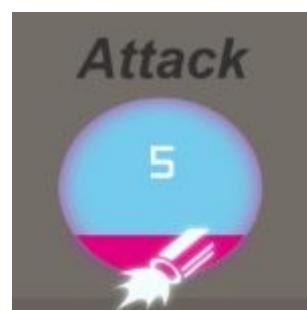


Fig 56: Example of not full attack points container.

Stats disposition and size are:

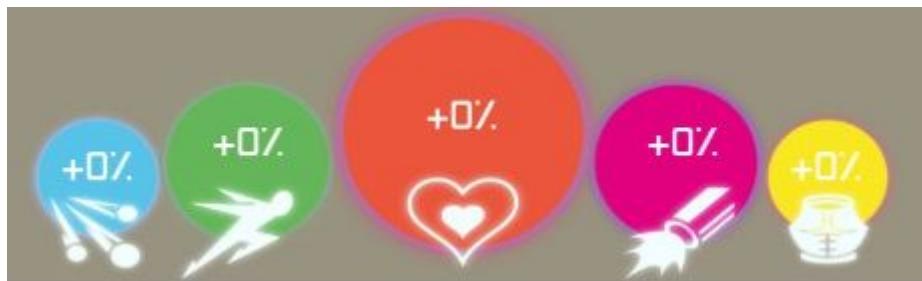


Fig 57: Complete stats hud disposition.

In the middle there's life points, bigger than other stats. Other stats are disposed in decrescent order by size. Note: in the left stats position, cold colors are used, in the other right side are used hot colors.

7.2 The Inventory

The inventory is minimal and collocated in the right bottom corner.

It shows the collected drug-ammos with ammos amount. At the beginning there is only one standard drug-ammo in the inventory. Inventory is made by three slots. The first slot represents the first selected drug-ammo, the second slot represents the second drug available in the inventory, the third slot represents the third drug-ammo available in the inventory. The inventory couldn't be empty: there's always the standard drug-ammo.



Fig 58: Inventory 3 slots disposition.

7.3 The Mix Power Slot

There are two slots placed in the left bottom corner . The slots can contain a maximum of two drug-ammos. It can be empty. The slots represent the activated mix drug-ammos combo effect. They can be empty (no activated power-pill or finished effect). Slot has a simple geometric form.



Fig 59: Mixer with effect timer.

When an effect is activated, the timer will be visible as a text countdown under the mix icon.

7.4 The Score

The personal score is visible in the left top corner, under this information the team score is placed.

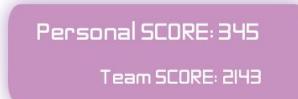


Fig 60: The score canvas.

7.5 The Timer

The remaining time for the battle (from 10 minutes to 0 seconds) is shown in the right top corner.

Time left: 9 min 45 sec

Fig 61: The battle timer canvas.

Hud disposition example:

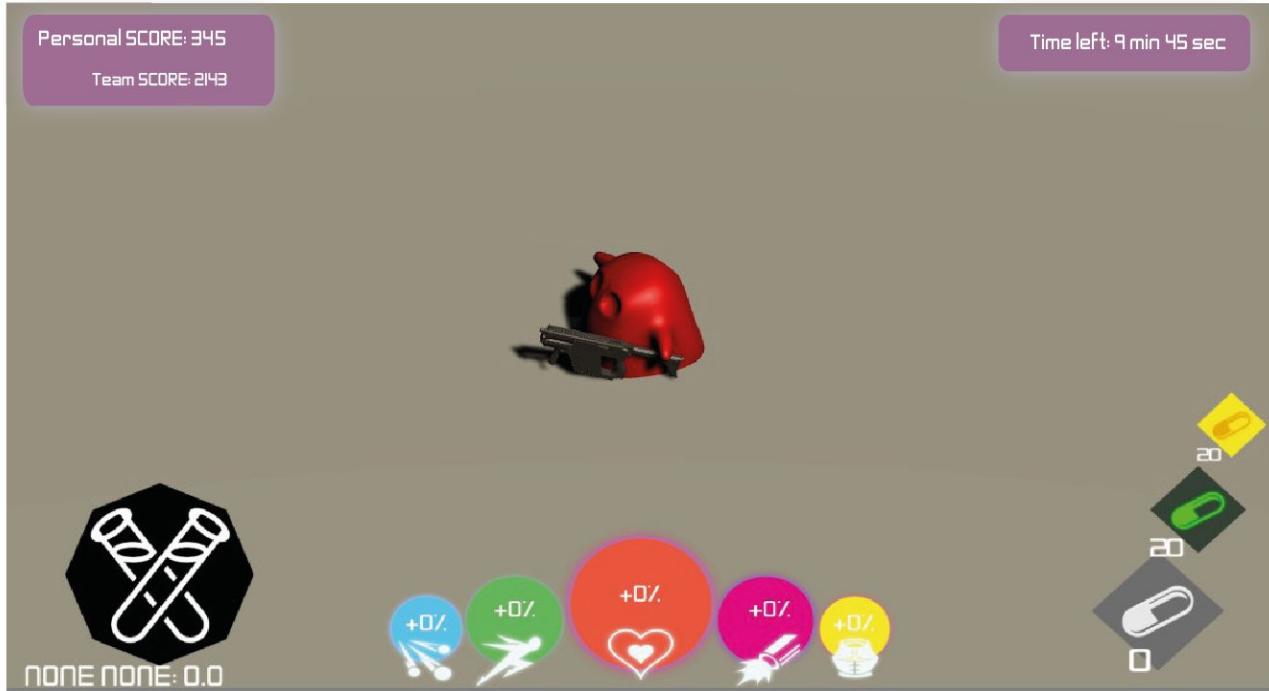


Fig 62: Example of complete hud disposition.

8. Story

8.1 Synopsis

It's late, it's night and the only little pharmacy in your city is closing. You have to fight with your team against other pharmacy "clients" to enter. Will you succeed?

8.2 Backstory

Characters were normal person. They lived shocking background, personal, story that made them junkies. In the character choice, the player can read their sad and emotionally engaging story, this helps to build an empathic link with the player.

9. The Game World

9.1 Levels

There are no actual levels, there is just the choice of the map at the beginning of the match.

9.2 Base elements Map

There are three maps : the **urban map**, the **shaman map**, the **mushroom forest**. The game will be launch with the **urban map**, other two will be available in the shop.

Every maps is based on a different concept linked with the main theme of characters addiction. Maps are supposed to have medium size (i.e 50 characters unit in horizontal). The size is very

important. The game must be very **noisy** and **chaotic**: the player is not supposed to hide for long periods, he has to fight! So the map helps also in the frenetic gameplay rhythm.

The map design is a mixture between arena and street-labyrinthine inspired by the urban environment. Map form is a **square**, viewed in isometric mode.

In the map there are few objects-obstacle. In the center of the map there is a small pharmacy, it's useful only for the background history.

9.2.1 Objects in the map

Other objects in the map: They can be used by player as barricade. Note: objects-obstacles are not big, the player can't stay behind there for long period.

“Curtains”-objects (example small roof)	The isometric view allows the player to see where the enemy is: this makes the gameplay more frenetic. “Curtains”-objects are objects where the player can hide and wait for the enemy.
“Stairs”-objects	Small objects from there you can try to escape, jump but not shoot below (too easy).
“Static”-borders objects (example fake buildings)	They are objects put on the map borders, they limit the game area.
Spawn-drugs	The map has spawn points, a timer will randomly puts drugs in these points.
Street lamp	It's night. Neon street lamps will help you to discover your enemies.
Small and big trashcan	Interactable objects: you can throw them. The only utility is making more chaos!
The pharmacy	Static element, useful for the background history. It's put in the center of the map. Used as normal barricade.
Raised walkways	very few, but you can use them to escape from your enemies. Similar to stairs.
Urban Statue	Static-barricade obstacle. This is a funny element. It changes. How about having the statue of the precedent character winning?
Small fountain	Interactable objects: you can destroy them.

Big fountain	Static-barricade obstacle.
Bushes, trees and bench	Static-barricade obstacle. Make more urban feeling
Buildings barricade	The default and more used barricade typology in the game

9.2.2 Map concept

The background history takes place during the **night**.

Color in the map are very important.

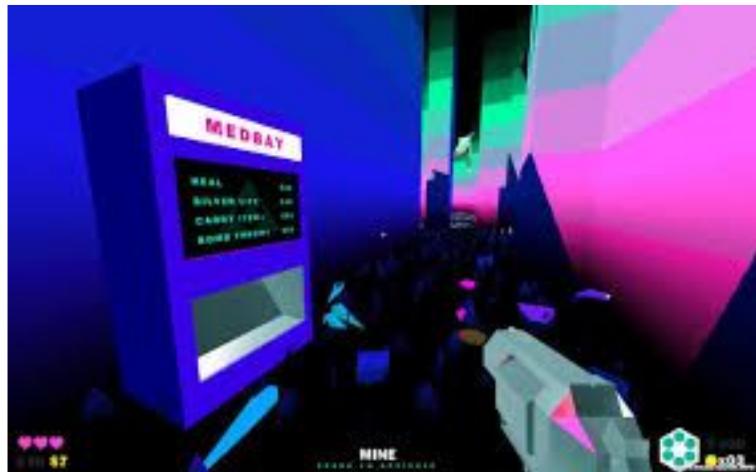
General idea: very colored objects, no global light but windows and other buildings little elements **emit light** (such as street lamps).

The light color is inspired by **neon light** (see the “Heavy Bullet” image below for the light color palette).

The floor has glossy material, so it's reflects more light.

Concepts for inspiration:

The neon light color



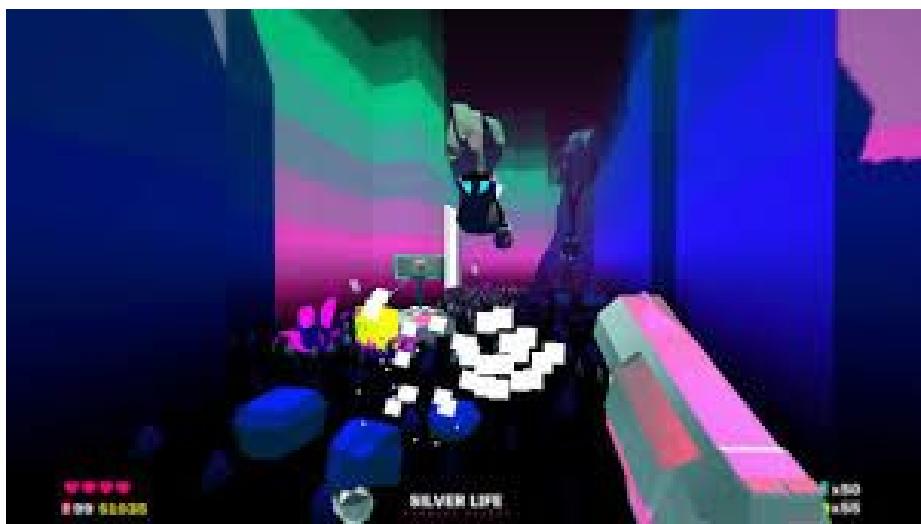


Fig 63-64: Heavy Bullet in game scene, note the neon colors.

Windows and other elements emit neon light.

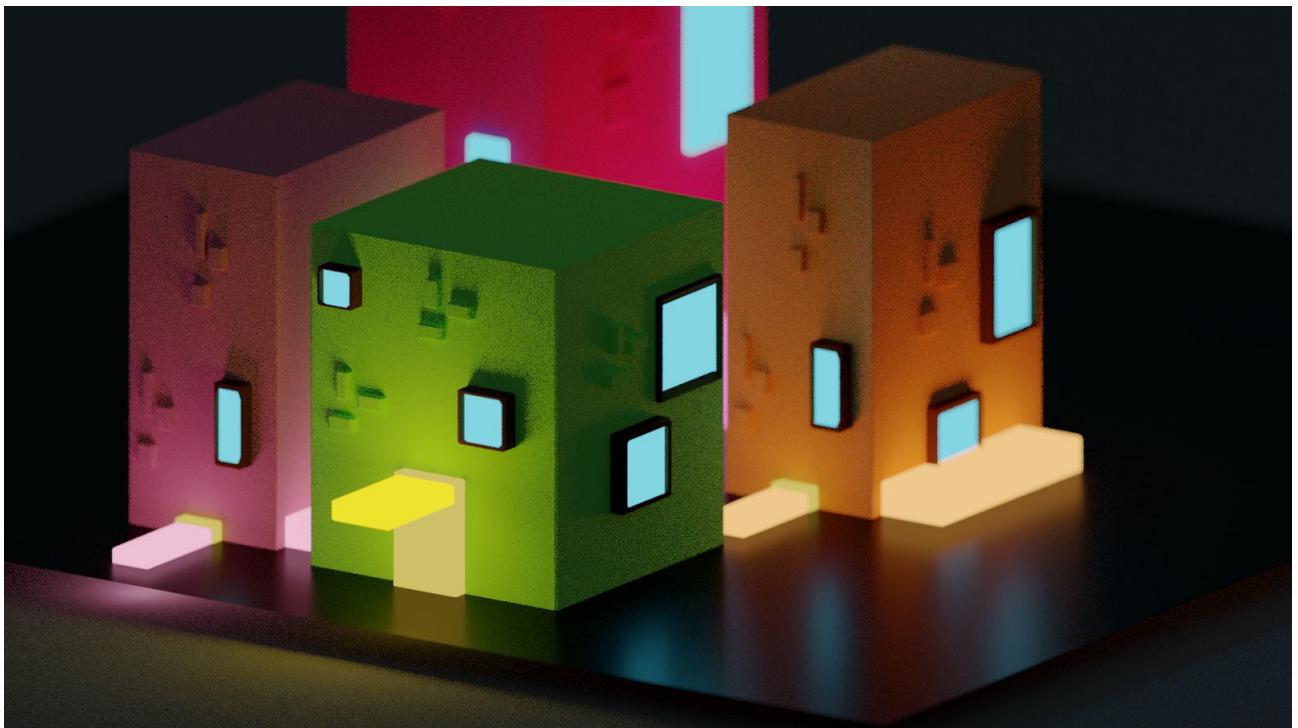


Fig 65: Pharmageddon buildings concept.

The graphic style is inspired by lowpoly artworks with flat textures due to it's simplicity to produce and appeal.



Fig 66-67-68-69: Example of buildings concept.

9.3 Spawn points

9.3.1 Teams and players spawn points

Teams spawn in map **borders**, not in the center. There is one spawn point for each team. Spawn points are deleted in case of lower teams count. See image 70 for spawn points team example.

9.3.2 Medikit and special drug-ammos spawn points

There are fixed spawn points in the map. They are more concentrate in the spawn team areas. Every item spawn point controls every **30 seconds** if is empty, if so it chooses **randomly** one of the four special drug-ammos (**+20 special drugs-ammos**). There are from **6 to 10 spawn drug-ammos points** for each map and they are very near to player spawn points. Medkits are less and there are about **4-6 spawn medkits points hidden**.



Fig 70: Example of spawn points disposition in map.

10. The Shop

10.1 The pharma-coins

Thanks to our backend service (PlayFab as described in GTD section 5) , we can use an inside money game. This money is the **pharmacoin**s. They're represented as pills.

In the shop the player can buy pharmacoin with real money. We take inspiration from *Clash of Clans* store for this feature. So:

- 100 pharma-coins = euro 0,99
- 200 pharma-coins = euro 1,99
- 300 pharma-coins = euro 2,99
- 500 pharma-coins = euro 4,99
- 1000 pharma-coins = euro 7,99
- 2500 pharma-coins = euro 19,99



Fig 71: Clash of Clans gems shop.

10.2 Items, characters and maps

In the shop the player can buy: **items (skin weapons)**, **characters**, **maps**.

Weapons don't add additional benefits.

New characters stats have been described in 5.6.2 paragraph.

We took inspiration from *TeamFortress 2* shop for costs. So:

- items cost 0,99-2,99 euro
- characters cost 1,99-3,99 euro
- maps cost 4,99



Fig 72: Team Fortress 2 shop.

10.3 Winning pharma-coins

If the team wins each players will gain **+30 pharma-coins**.

11. Media List

11.1 Characters

3D models are needed for all the main characters in the game:

- Schizophrenic
- Coffee-junkie
- Body builder
- Hypochondriac

Plus we need 8 characters models (the university student, the alcoholic, the crossfit man, the soker, the ancient smoker, the disco man, the alternative guy).

Take inspiration from 5.6.4 paragraph for characters concept. Each character should come rigging ready for the animations.

11.2 Drug-ammos

We need 3D models for drug-ammos, in particular: the coffee pills, the standard shot, the placebo (the tic toc), the steroids, the sedative, the greenbul ,the beer, vitamins and supplements pills, nicotine pills, opium, lcd, the mushroom.

Every shot is surrounded by a **neon halo** the same color as the drug-ammo.

When a player is affected by a drug-ammo then the **drug-ammo mesh will rotate around the player**.

11.3 Guns

Every characters has its own guns. Guns differ in form and colors. They are stylized according to

the character concept. Refer to figure 73 for concept inspiration.



Fig 73: Guns concept for inspiration.

11.4 Animations

We will need animations for the standard actions of each player:

- Shoot
- Idle
- Walking

11.5 Maps

We need three maps inspired by different theme: the city, the shaman desert, the mushroom forest. Every map must be dark and sets during the night. There are neon particulars in each map. Urban maps has neon details. Urban map has neon windows, shaman map has neon tree, mushroom forest has neon mushrooms. Some inspiration and assets:



Fig 74-75-76: Inspiration for the urban map.

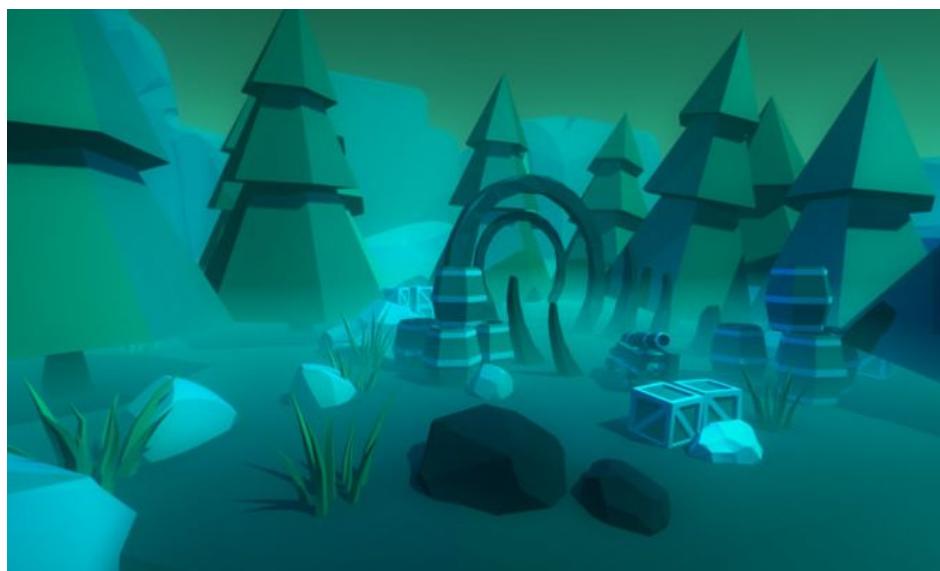


Fig 77: Inspiration for the shaman map (see also image 66-67-68-69).



Fig 78: Inspiration for the mushroom forest map.

11.6 Sound effects

We need few sounds for some actions:

- Sounds for weapons (shooting and collisions). Sounds not serious.
- Medikit assumption.
- Drug-ammo assumption.
- Environmental effects (when something is destroyed in the map).
- Sound for hitting: every characters has his own vocal sound when he's hit .
- Dye sound: every character emits a vocal when dye (a simple "Ah!").

11.7 Musics

We need 10 soundtracks. One soundtrack will be played before entry the battle. 9 soundtracks will be changed according to the different maps. Soundtracks must be 5 minutes so in every battle (10 minutes), 2 different soundtracks will be played.

Inspiration for soundtrack genre: **8 bit music, Undertale music game style, no vocal.**

11.8 Particle effects

11.8.1 Active effect

We need some particle effects in order to **represents the active effect**. We need 12 particle aura effects. Refers to the follow image. Every effect activates a **different circle size** (lower powerful effect activate small circle, more powerful activate bigger circle. Refer to the follow image for correct size). In the image are shown positive effects. **Positive effect** will be shown

with green neon color aura, negative effect with red neon color aura.



Fig 79: Pharmageddon different aura effects concept.

11.8.2 Drug-ammo aura and medikit aura

Medi-kit spawned in the map have particle green effect on it.

Every drug-ammo spawned in the map has different particle color. The particle color changes according to the main drug-ammo color. Every drug-ammos and medkits spawned in the map will rotate on its y axis slowly and are elevated from the floor by half character height.

Particle effect example is shown in the following image.

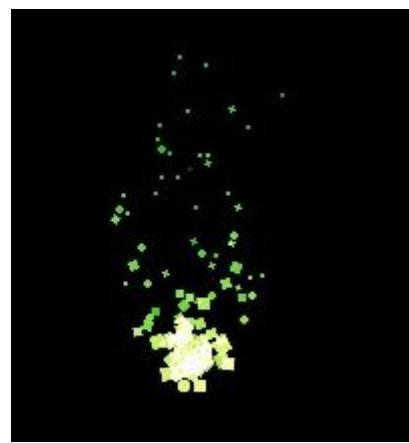


Fig 80: Particle effect for concept.

11.8.3 The team indicator

Every player has an indicator of team membership. This is visible to other player and shown as a circle colored as the team color under character feet. Thi circle is very little, is more littler than

the lowest active effect circle.

12. What we have implemented

12.1 Gameplay

Gameplay has been modified due to **the limited number of players**.

The game is still **multiplayer only**.

The player can join a lobby or create a lobby. We tested only one lobby on a single server, but it's possible for each player to create her own lobby; but in that case she would have to wait for other players to join.

There are **two teams (the Blue and the Red team)**: each team has **from 2 to 4 players**. Teams can have different numbers of players.

After the lobby and team have been chosen, the player has to select one character from 4 different classes. There are **4 available characters**, one for each class family: the **hypochondriac** (the standard class), the **schizophrenic** (the damage dealer class), the **bodybuilder** (the tank class), the **coffee-junkie** (the scout class).

Core mechanics have been implemented so the gameplay is very similar as described in 5.2 paragraph. We report it for reading simplicity with some changes.

Every character has different stats, is described by a different drug addiction and has his own special drug-ammo. Drugs are used as ammos and are shot against teammates or enemies. Assuming drug-ammo (or being hit by it) can activate different mix effect that change, in benefits or not, the player stats.

Every player starts with only standard (normal) drug-ammo. Assuming (or being hit by) a special drug-ammo activates stats effect and a timer: at the end of the timer, the stats return to their original value.

All the players have to choose their characters: otherwise the battle cannot start.

After the selection the battle starts in 5 seconds.

Every battle lasts **10 minutes**.

At the beginning every player is spawned in different spawning points in the map according to team membership. Medkits and drugs-ammos are spawned in different spawning points.

Shooting with special drugs-ammos can activate mix effects in the target player, also assuming drugs-ammos can activate different mix on the player who assumes this.

The player wants to activate bonus effect for herself and her team mates, she also wants to activate malus effect on enemies. Every activated effects activates a **timer**. The effects, depending on the type, **lasts for a brief period**. In order to activate mix effects the player has to cooperate with her team mates shooting **together** against the same targeted enemy. **Because of**

brief timer mix effect the player has to shoot many times with drugs-ammos with her ally in cooperation.

The player can pick medkits in the map to heal, can look for cover behind obstacles or even flee.

During the battle medkits and drug-ammos are respawned according to timers.

The player can always shot with standard ammos.

If the player dies and the battle isn't yet finished, she will respawn in her initial spawning position after 5 seconds.

The winning condition of the battle is gain more points than other teams. Points are gain killing an enemy or repeatedly shot an enemy.

In order to gain more points, the player has to shoot to the enemy and helps her team mates.

After 10 minutes the battle will end and the scoreboard is shown with player personal points and team points with the highlighted winners (player and teams).

We don't save player personal progress (her rank) or account, after the battle ends the player is suppose to be a new player and there's no need to login with Steam.

We don't have in game shop and special item or skin characters to purchased.

12.2 Controls

Controls have been implemented as described in 5.4 paragraph except for the dodge button: we don't have implemented it. We report them here:

- WASD to move around
- Mouse to aim
- Left Click to shoot the equipped shot (pill)
 - the player can shoot singles shots or multiple shots by holding the mouse button
- Scroll Wheel scroll through the inventor (the auto equipped pill is the first pill in the inventory)
- Right Click to assume the selected pill
- Tab to show leaderboard in game

12.3 Modes and other features

Every player can create a lobby (or choose if exists) but for starting the game at least one lobby with two teams is necessary. A lobby is composed by two teams.

Every teams has from 2 to 4 players. Team color can be red or blue.

The player can choose her name.

Battle doesn't start until all the players that enter in the lobby have said to be "Ready".

After team and lobby choice the player can choose her characters from 4 different available.

The player can see in character page choose what character her teammates have chosen.

All the players has to choose one character otherwise **the battle cannot start**.

Battle will start in 5 seconds.

Every character in game shows a colored circle according to the team color under the feet.

12.4 Game Characters

We implemented all the four representative characters. We don't have implemented the plus 8 characters supposed to be in the shop after the game launch. So we have implemented: the **hypochondriac** (the standard class), the **schizophrenic** (the damage dealer class), the **bodybuilder** (the tank class), the **coffee-junkie** (the scout class). We don't have implemented: the bipolar, the university student, the alcoholic, the crossfit man, the smoker, the ancient smoker, the disco man, the alternative guy. We have modelled them as figure in the following image. Every class family is described by different values stats same as described in 5.6.1 paragraph: life points, fire rate, basic damage attack, defence, speed.



Fig 81: Pharmageddon characters models.

Stats for the 4 class family (tanks, scout, damage dealer and standard) are the same as described in *PCs Technical Card* in 5.6.3 paragraph.

Personal character history has been described also in 5.6.3 paragraph *PCs Technical Card* and are shown in the character selection page.

We also designed and modelled four gun for the four main characters as shown in figure 82.

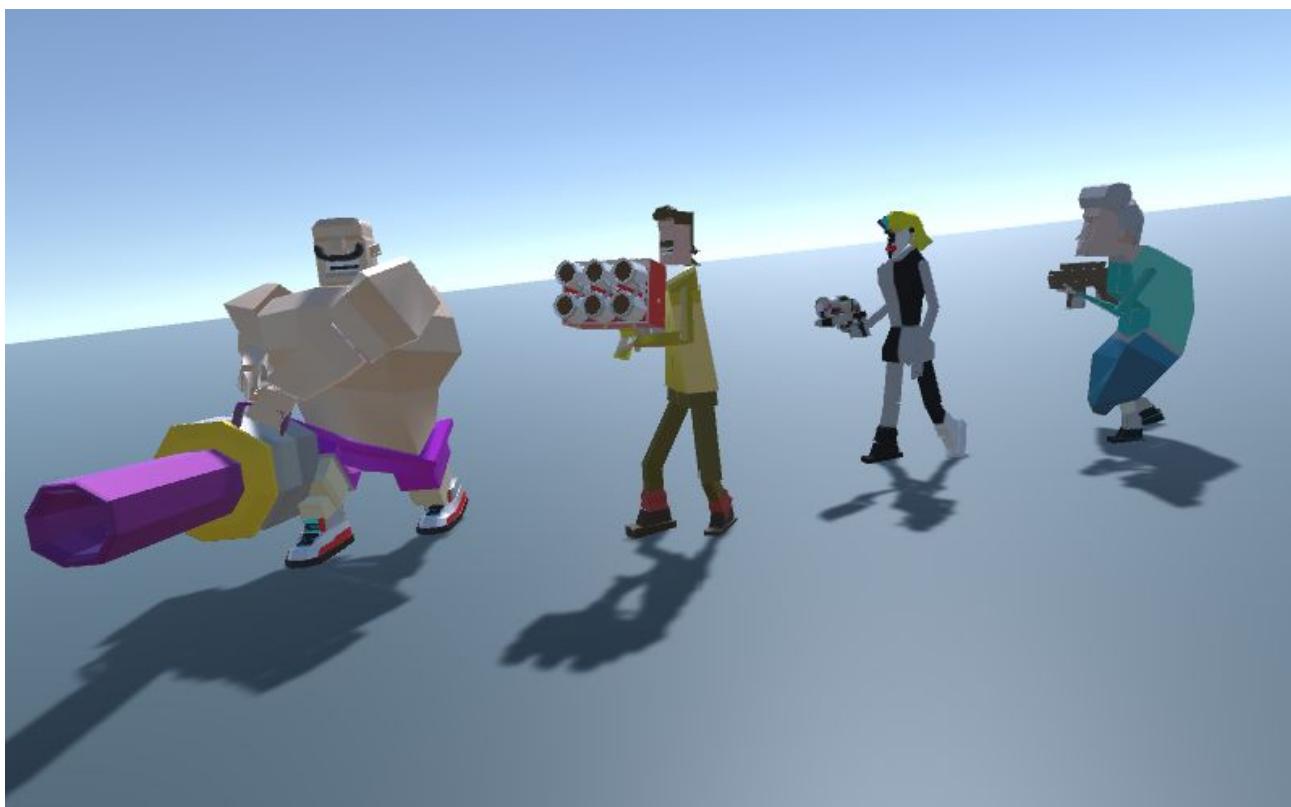


Fig 82: Pharmageddon characters guns models.

12.5 Ammunitions: drug-ammos

We implemented the four special drug-ammos for the four implemented character:
coffee for the coffee-junkie, **tic toc placebo** for the standard, **steroids** for the bodybuilder,
benzodiazepine for the schizophrenic plus **standard pills** and **medikit**.



Fig 83: Pharmageddon drug-ammos and item models.

We have implemented all the drug-ammos mechanics and their stats (damage and effect combinations) described in 5.7 paragraph plus 5.8.3 for the medkits.

12.6 Rules

Our core mechanic is mixing different drug-ammos to achieve different mixture combination. We have focus on this mechanic and fully implemented. So all that has been described in details in paragraph 5.8 *Rules* has been implemented (except for 5.8.6 paragraph winning condition that have been replace and describe in the follow paragraph).

12.7 Scoreboard

We have changed some factor in the points rules showed in paragraph 5.8.6.

The initial formula was:

Points per hit = $10 \times N \times K$

We have deleted the K factor and maintained the N factor, where N is the number of consecutive shots on the same opponent. Plus we have maintained the +100 points if the player can kill other opponents.

12.8 Interfaces

To manage lobby and team creation we have deeply modified and override *Network Lobby from Unity Essentials*.

Our new interfaces are shown in next figures.

12.8.1 Initial Page

With the “Play and Host” button the player can choose to become the dedicated server and create a lobby.

With the “Join” button the player can choose to join an existing lobby, if it doesn’t exist the player has to wait or can return in the Initial Page.

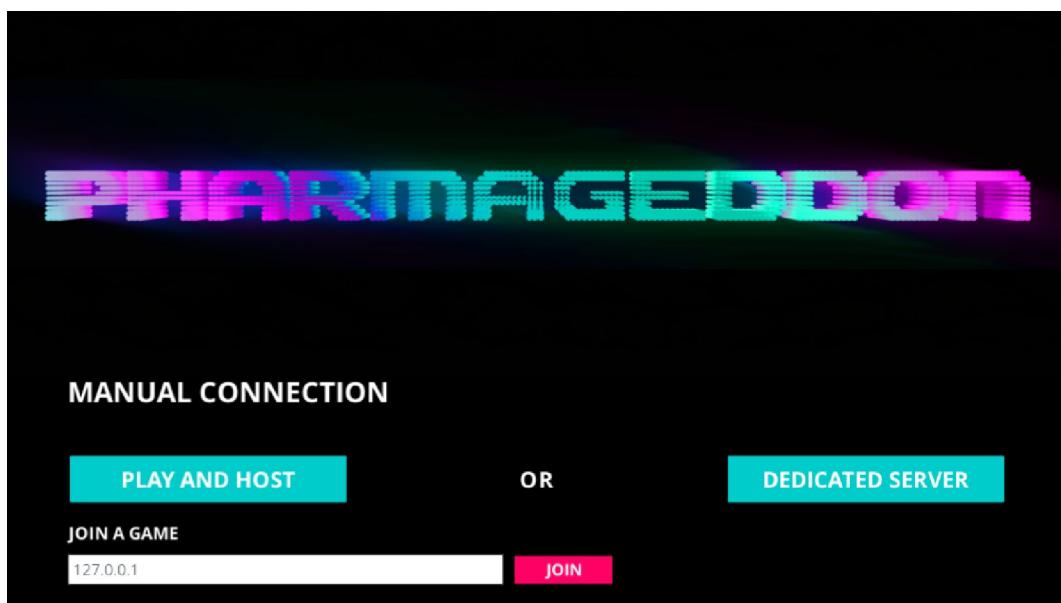


Fig 84: Pharmageddon initial page.

12.8.2 Lobby creation and Team selection

The player can choose her name and see other players names. The lobby is only one.

The player can choose between two teams (Blue team and Red team).

With the “Back” button the player can return to the Initial Page.



Fig 85: Pharmageddon Lobby and Team creation.

12.8.3 Character Selection

In this section the player can chose her character, views character's stats, background history, other teammates characters selection and names.

With the “Continue” button the player enters in the “Waiting” status for other players to be ready, after that battle will start in 5 seconds.



Fig 86: Pharmageddon Character selection.

12.8.4 In game scene

Fig 87 shows a in game scene without map and showing HUD. Note that if the mixer is not active slots are not shown.

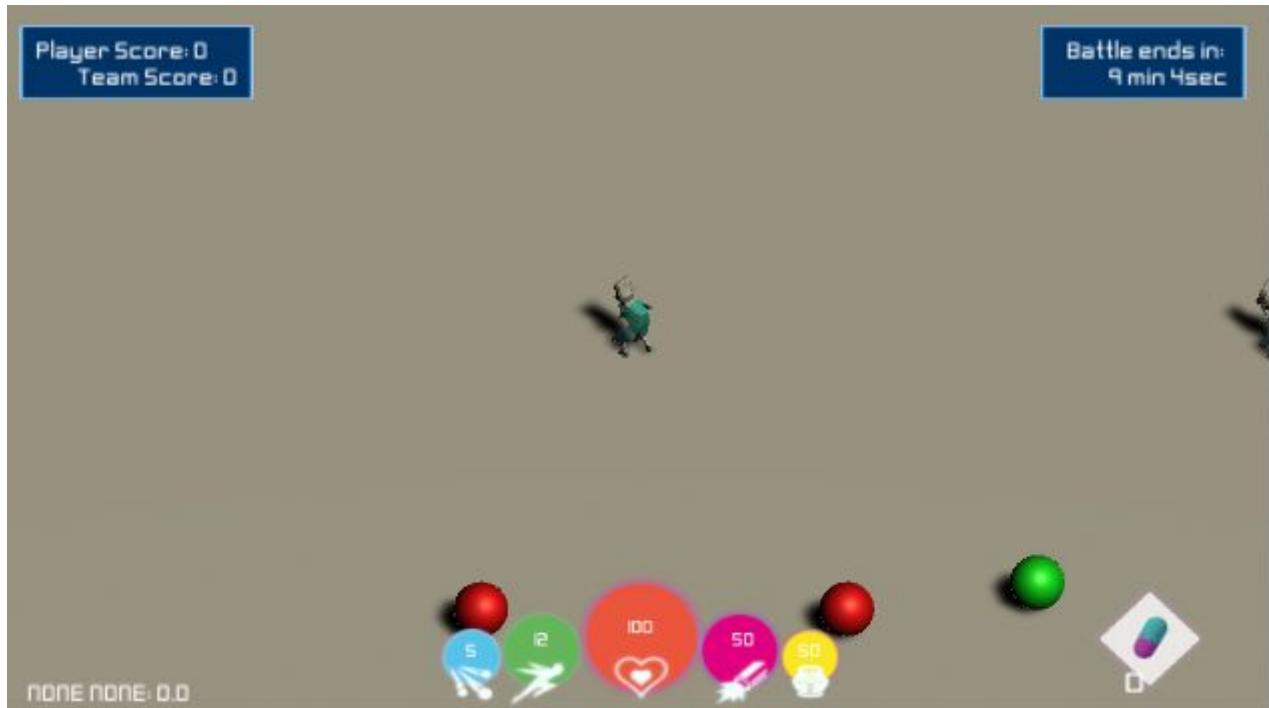


Fig 87: Pharmageddon in game scene (without map).

12.8.5 Scoreboard

Scoreboard shows players and teams current score. It is available during all the battle pressing the Tab button. If the battle is end a “Return to Lobby” button is shown and it is possible to return to the Initial Page.

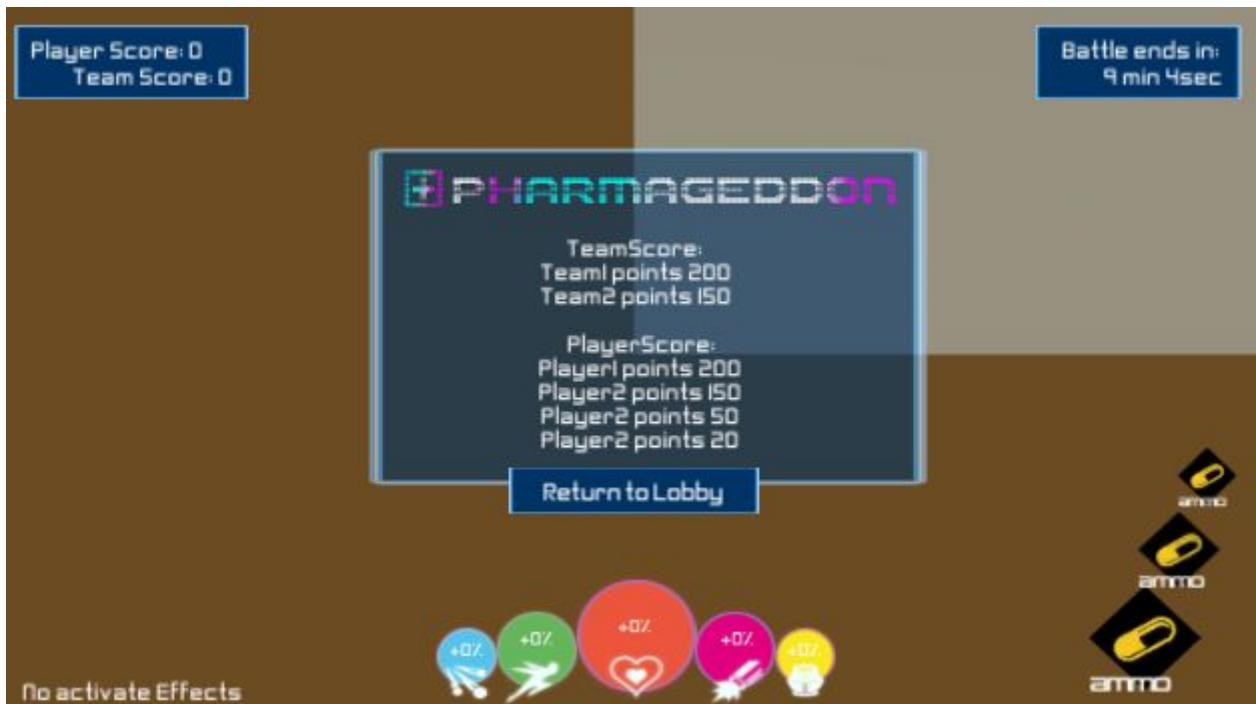


Fig 88: Pharmageddon in game scene (without map).

Our gameplay flowchart has been modified and reported in the next figure.

Game battle flowchart shown and described in 5.3 paragraph has been fully implemented due to core mechanics implementations.

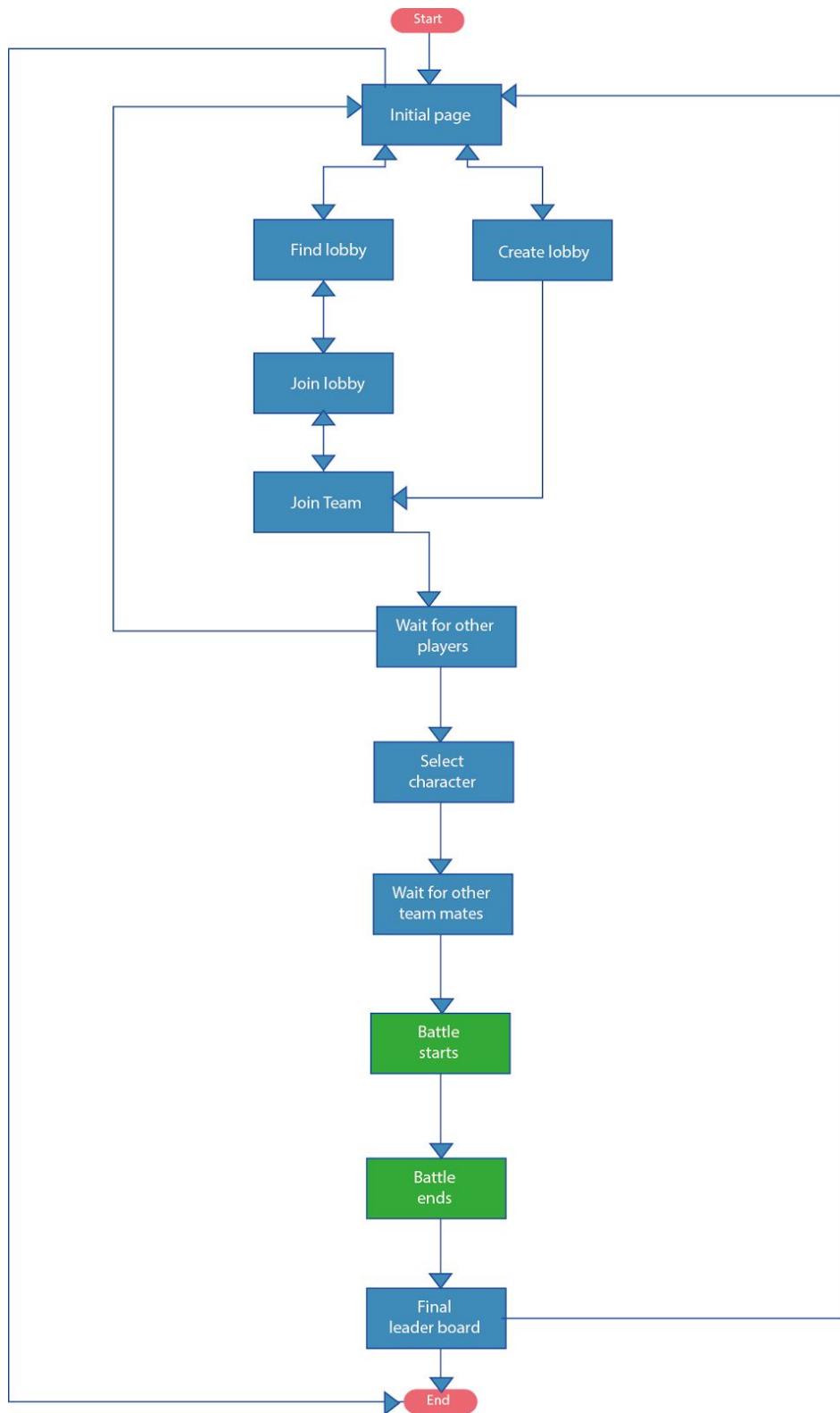


Fig 89: Pharmageddon FlowChart.

12.9 Hud

We have implemented all the HUD as described in paragraph 7.

We have made some changes. Hud has been proved to be better smaller.

We have produced icons for every shot (visible in the inventory), mixer slot is now free from behind icon, the two slots are visible when a mix is active. We report in figure 88 our HUD:



Fig 90: Pharmageddon HUD.

12.10 The Game World

We have implemented one map, the **urban night map** (shown in figure 93 without props).

We have modelled the pharmacy, the neon buildings and populate it with urban props.

It's not possible in the map to use stairs, repair under a curtain or destroy props.



Fig 91: Pharmageddon Pharmacy.

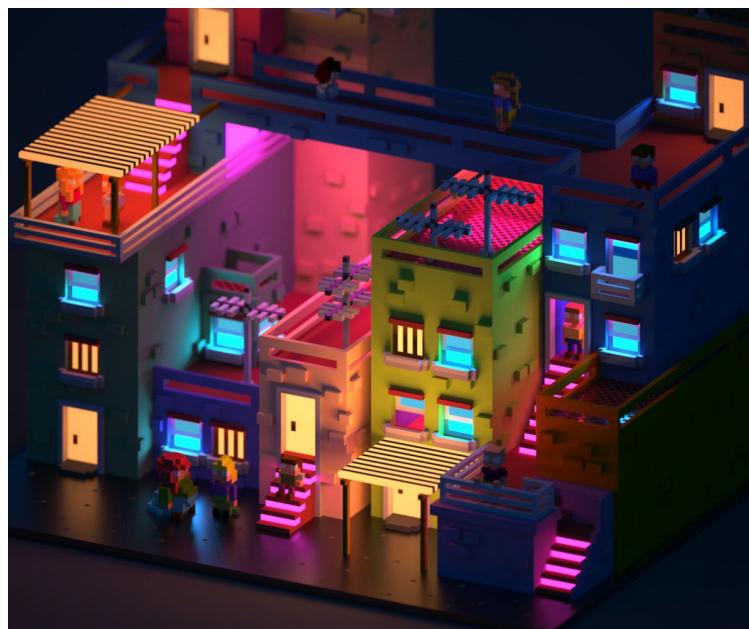


Fig 92: Pharmageddon Buildings.

12.11 Spawning points

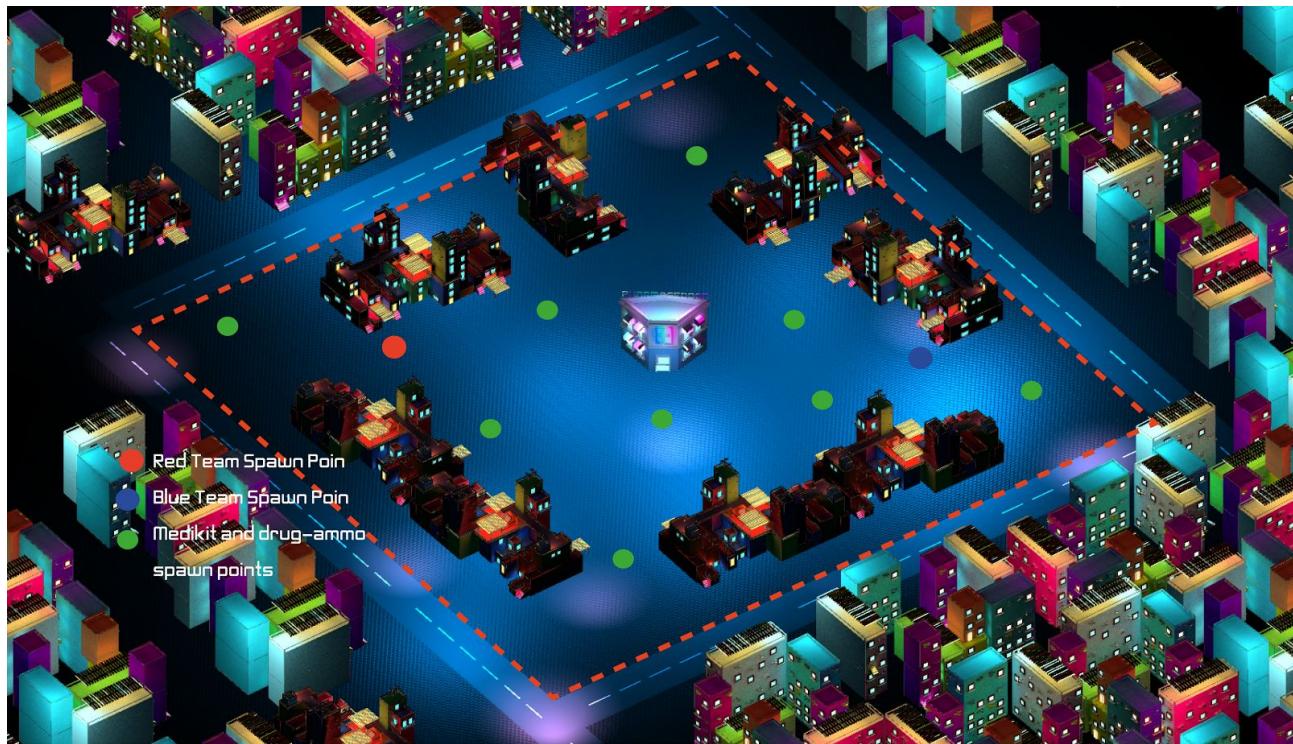


Fig 93: Pharmageddon Spawning points and map without props.

Spawning points logic has been implemented has described in 9.3.2 paragraph with some changes due to different map and teams counts. Team members spawn in red point (for the red team) and blue point (for the blue team).

There are several (about 10) spawn points in the map. Randomly both for medkits and special drug-ammos, every 30 seconds, if empty, spawn new item(as described in 9.3.2 paragraph).

12.12 Media List

12.12.1 3D models

We modelled characters, map, ammos, medikit, buildings, plus we have taken some models and graphical assets from unity asset store, in particular, we have used:

- urban props pack by Karboosx.
- some particle Inferno vfx by Mirza Beig.
- some cars from Stylized Simple Cartoon City by Area730.

All these assets are free.

12.12.2 Animations

Animation that have been made: **walking**.

All the characters have been rigged.

12.12.3 Particle effect

We have used **two different kind of particle effect**. When a benefit effect is activated a green particle effect is shown, otherwise a red particle effect is shown.

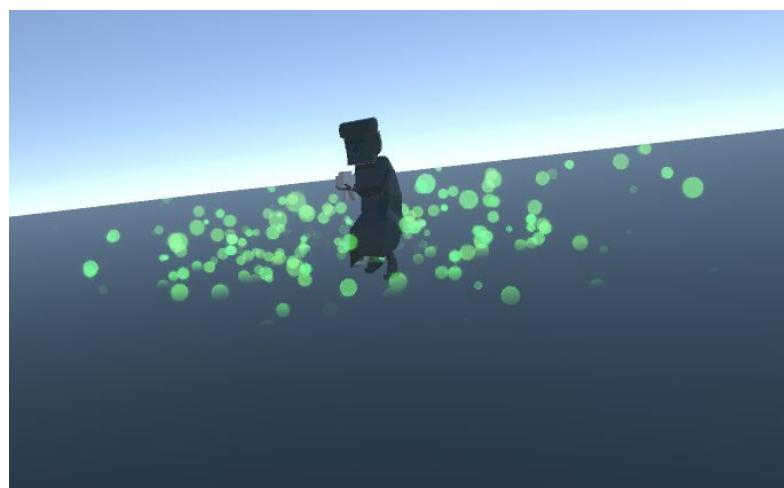
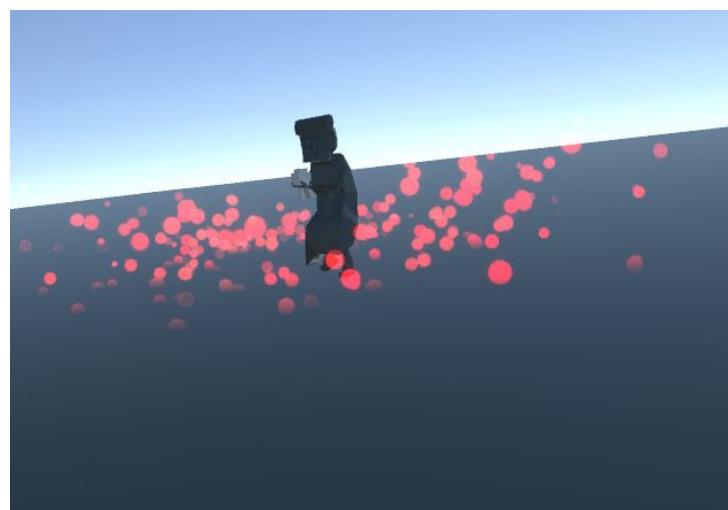


Fig 94-95: Positive and negative effect particle effect.

12.12.4 Sound and music

We use two music, one for the game battle (“Press start” by MDK) and one for the lobby, team

and character choice (“Super ultra” by MDK)⁴. They are played in loop. Plus we use a “Shot” sound.

⁴ Artist licensing term can be found here <http://www.morgandavidking.com/licensing/>