Computer Project File
SUP–2022

PEnuts
Second Presentation Report
By CAPZ

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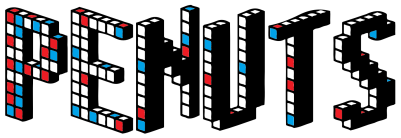


Contents

Introduction

This year, as freshman students in Epita we have to do a six months computer project in groups of four. This project allows us to put into practice all knowledge acquired in lectures, tutorials and practicals but also to improve personal skills, which we have acquired for the chosen project, but which cannot be put into practice during course.

Our group is named CAPZ and we are working on a multi-player game. This game is PEnuts and his main concept is to evolve in a puzzle game with complementarity between players. The complementarity will mainly be based on different vision and possibles actions of each player. Indeed, even in a same room, players will not be able to see the same things or to interact with the same objects. As a puzzle game, the goal of our players will be to resolve enigmas to have access to next levels or rooms. This way, as they cannot evolve in solo, they will improve their ability to communicate and solve puzzle together.

The concept and ideas of the project do not come from a particular game. In fact, many aspects of the game already exist, but we did not want to be based on a specific game. We wanted to find a new game-play involving multi player cooperation and communication. Around this root, we developed the concept of complementarity and different visions of the environment. Which we finally chose to implement in a puzzle-game.

This Second Presentation Report will present you in details the progress carried out since our first presentation. A first section will remind detailed information about the concept of the game. Then, a second section will give an overview of the progression and organization. In other words, there will be the distribution of the tasks and their progression over time. Finally a third section will give details about each task. This last section will try answer to those questions :

- What was here before (how was it at the First presentation) ?
- What was done for this presentation ?
- How was it done ? (Researches and technical details...) ?
- What will we done for the next presentation ?

1 The Concept of the project

As explained in the introduction, the main concept of our game is a complementarity and communication between two peoples to resolve a puzzle.

To give a better view of what the game could look like, here is an example. In this example, we can see the vision of the level by each player.

Here are the details to be able to understand the sketches of the next page.


This block is movable, by being pushed by a player, a player cannot step on nor can he cross the tile the block is on.

This is a trigger bounded to the signal 2, the signal 2 is active (true) as long as a player or a movable block is on top, otherwise the signal 2 is inactive (false).


This is a void tile, a player cannot cross nor step on it.

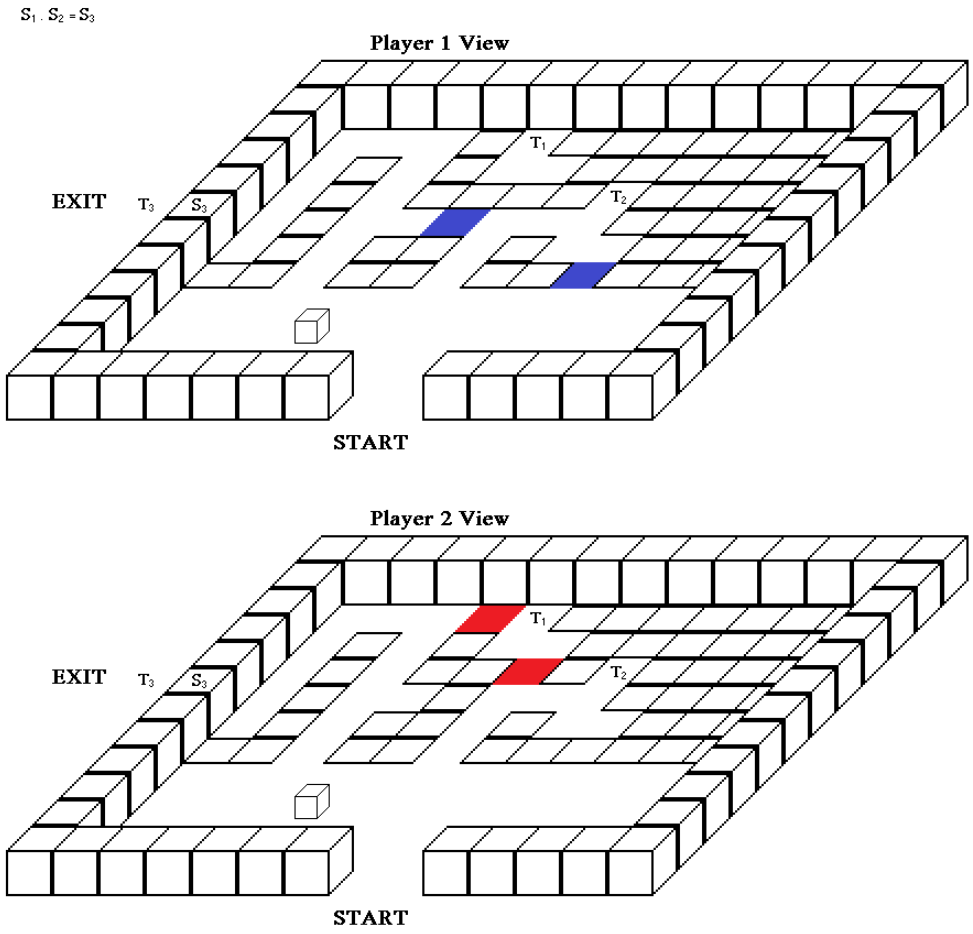

This is a block tile, a player cannot cross nor step on it.

This block tile is bounded to a signal. If the signal 3 is active (true) the block disapear and act as a standard floor tile. If the signal is inactive (false) the block act as a standard block tile.

This is a simple logic operation, here the signal 3 is active (true) if and only if both signal 1 and 2 are active (true).

The colors here represent tiles which are only seen as a standard floor tile by the player seeing the color, for the other player, it acts as an obstacle (either a block tile or a void tile).

In this case the player 2 sees the blue tiles as void tiles, however the player 1 sees them as blue floor tiles.



In order to give a better idea of what will be our game, we decided to answer the main questions that can be asked for a Video Game.

What is the main concept or specification of our game ?

We want to create a puzzle game mainly played in a cooperative way by two players. Then, the specification will be the complementarity between the different visions and actions of players.

What is the goal of the players? How can they win ?

The Ultimate goal of the players is obviously to end the game by finishing all rooms. At lower scale, the goal of players is to finish a room to evolve in the game.
But for us, a simple goal and the important goal of this game is the satisfaction to resolve a puzzle with a partner by communicating.

How can they lose ?

There will be some objects able to kill players (a hole, a trap, an enemy). But as it is a puzzle game, players are "losing" if they do not manage to solve a room.

In which environment players will evolve ? What will be the type of the map?

They will mainly evolve in rooms containing simple mechanism objects and obstacles. This will be a cubic environment with very simple details.

What will be their possibles actions or movements ?

Players will be able to communicate with each other by using signal and voice. They will be allowed to interact with some objects. Finally, they are able to do simple movements, as walking.

2 Parts of the project

To be able to keep a project organized and be able to respect deadlines, the tasks division can not be neglect. Therefore, this section will present in details the different tasks of our project, their distribution and their progression.

Tasks	**Member in charge**	**His substitute**
Player movements	Ziane	Alexandre
Player Actions	Alexandre	Ziane
Buttons/Mechanism	Alexandre	Pierrick
Camera and Lighting	Ziane	Pierrick
Vision (what the player see)	Ziane	Pierrick
Collisions	Alexandre	Cloé
Color Codes	Pierrick	Cloé
Graphics	Cloé	Ziane
3D Animations	Alexandre	Pierrick
Level Design	Cloé	All
Sounds (effects)	Ziane	Pierrick
Website	Pierrick	Cloé
Administration	Pierrick	Cloé
Multi-player	Alexandre	Cloé
Network	Pierrick	Alexandre
Menu and Options	Cloé	Pierrick

Table 1: Task distribution

2.1 Programming

2.1.1 Players' Movements

In this part, the movements of the player will be implemented. Hence, the aim of this part is to link the researches on game mechanics and the game experience we want to something pleasant for the player.

Done at the First Presentation :

- Four directions movements
  - [left/right]-key : rotation y-Axe of $\pm$ 90 °
  - [up/down]-key : moving [forward/backward]
- A jump is implemented.

Progression done for this Second Presentation :

Researches : There were researches to discover how to implement a controller settings. Indeed the goal would be to allow the player to choose his own movements/actions' keys. Also, the aim of this would be to let the player play with another device than the keyboard (for example a joystick or any compatible device).

To do for the next presentation:

For the next presentation we will see to finish the control settings which could be a great feature for the player. Also, we can't forget that this means a saving of user preferences.

For the time the movements aren't bad, but are difficult to understand at the beginning. Hence, there will be some testing work to do. We will try to release our game as soon as possible to let people test it and give us feedbacks.

Remarks :

This part is mainly to improve the player experience. Hence our goal is to let people try our game. Except the controller's settings, the work will not be hard for us as it mainly need other user's feedbacks to evolve.

2.1.2 Players' Actions

Book Of Specification : "As it is a cooperation game, one of the main action that a player can do is to signal/point/ping something on the map. This will be useful to communicate with the other player. The player will also be allowed to interact with some objects. For example, he can push (or grab) a cube, he can also press a button."

Done :

- Shots : Player is able to shoot tagging bullets to tag the enemies now implemented, the other one can only see and kill them with his own bullets when they are tagged. This feature have not been completely finish, indeed, we encountered an issue with the tagging script. But we understood where the problem was so it will be fixed soon.

- Movable Blocks : This block script have been really improved to avoid bugs with it. Indeed, at the first presentation the blocks was blocked at some place due to issued colliders. Now when the player touch the block, the block is "flying" as if the player was grabbing it, then when the player stand back the block goes back to a normal rigid body.

- Laser : A laser prefab was added as a button system (described in the Mechanics section)

To do for the next presentation:

- Communication signals : Cooperation's actions as the ping will maybe be implemented if it appear to be useful & good for the game-play. We are really thinking about it, at it could really help the players to communicate, but it would really change the level of difficulty.

- Other Interactions with objects (adding some puzzle opportunities). Indeed, as we are creating levels, we will maybe create new signals mechanics.

This part is mainly linked with the game-play we want to do, and the puzzle opportunities we want to add. Indeed, the implementation of new things in this part will be done with the level Design (which can be seen below).

2.1.3 Buttons & Mechanism

Book Of Specification : "In this section we will configure and implement the different interactions of buttons (or switch) with the map."

Done at the First Presentation:

- Signal Handler Class / Pressure Plate / Doors / AND Gate / Box Movement

Progression Done :

- A NOT gate was added
- Signals were optimized
- One Way Signal (laser): The pressure plate wasn't really intuitive for the laser's mechanic, the goal was to lock the pressure plate once it was pressed, but since the player would expect it to come back up, it could often lead to misunderstandings of the puzzle. By introducing a new feature, the player can better understand the puzzle. The laser is basically a pressure plate that stays locked in the same position when it's triggered.
- Order buttons signal : We did a system that handled the order buttons were triggered, so we could use this as an enigma in some level. It is a brand new system. We had the signals before but we didn't used them at all for this, instead, an array was used; each button is at its position in the line of buttons. A counter to check at wich position in the array we are. Each time a button is triggered, The signal handler check if its the right button by verifying if the button at place i (the counter) in the button array is the same than the button that was just triggered. If it is, we add one to the counter. Else, we do nothing. When the counter is at the same number as the number of element in the array, the door is destroyed. It is working so for the next presentation we don't have to touch it.

Remarks :

As it was explained just before, we this part will really evolve linked to the game-play & the type of puzzle mechanics that we want to use. This part is really hard in term of thinking, indeed we have to search for new mechanisms but linked to our actual game-play.

2.1.4 Enemies & AI

At the beginning we didn't thought that adding enemies could be a good idea. We were saying that it would completely change our way of playing. But indeed, it was necessary to change a bit our way of playing. Without enemies the player could stay without moving while he was solving the level.

Progression Done :

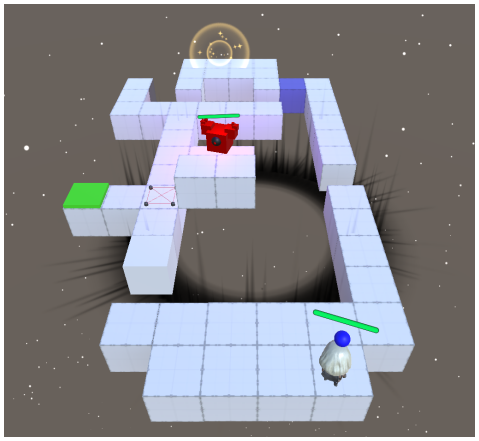
Enemies use a control script utilizing a NavMesh to move around the map. The monster detect a player once the later enters the detection radius, it will chase the player accross the map. If it gets close enough the player takes damage. When traking a player a small animation appear on the enemy, to alert the player that he is in danger. One player is able to tag the monster with his gun where the other one is able to see and kill it only once it has been tagged.

What we have to do for the next presentation :

Finally our enemy is really working as we want for now, so we do not have to change anything. It was created in a way to facilitate the modification of any variable to be able to change it due to the game-play expected.

Remarks :

Enemies can be really hard to work with in level desing to keep the level interesting, without putting them in as if they don't belong here. Hence, there will be a work to do to integrate them well.



2.1.5 Camera and Lighting

Book Of Specification : "There will be two view for each player. Each player will have access to a third person view and a quick overview of the map."

Finally, we taught that only a third person view at the top would be better. Hence, for the time we did not have any problem to implement this view. As the camera do not need to move, there was not many researches in this part.

The aim of this point of view for the camera is to give the player an easy overview of the map and facilitate the identification of the environment.

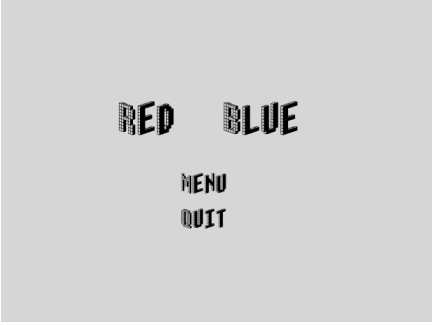
The Lighting part is mainly for a most pleasant aspect. Hence, this part will evolve during the creation of the game. If the camera need to change due to the lighting it will not be difficult, but for the time we want to keep this third person view.

2.1.6 Vision

Book Of Specification : "Specific to our project, it will be the part where the differentiation between the two players in term of vision appears."

Progression Done :

A quick menu was done at the first presentation. Now the Menu is complete and linked to the other menu of the game. When the player chooses a color it loads the map with the good features. He can also go back to the Menu or exit the game. For the time we do not think that we will need to change anything.



2.1.7 Collisions

Book Of Specification : "Collisions are the interactions between the player and his environment (object, holes, and so on). In function of an object characteristics, the player will interact differently with it."

Here, a big part of collisions were created at the same time of objects themselves (thanks to Colliders and rigidBody). So the researches were made directly for the creation itself.

A kill zone was created to detect a fall of something. Hence, when something will fall, it will be detected. At the time there is a little issue with it, but it will be soon fixed.

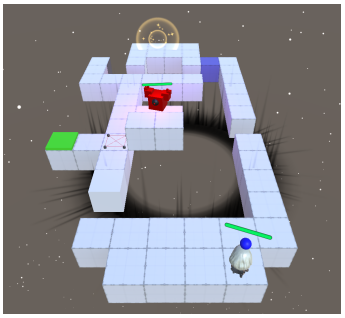
2.1.8 Level Design

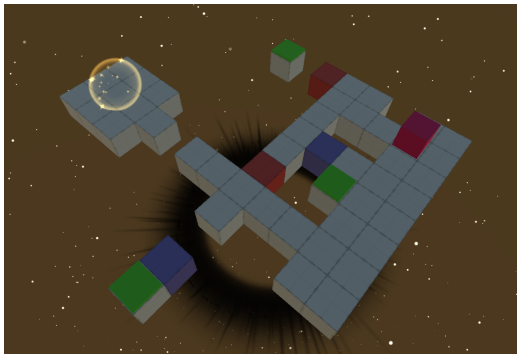
Book Of Specification : "This part will be a major part of our project. It will be in this section that we will consider the creation of new type of puzzle, using mechanisms, visions and in fact the complementarity of the players."

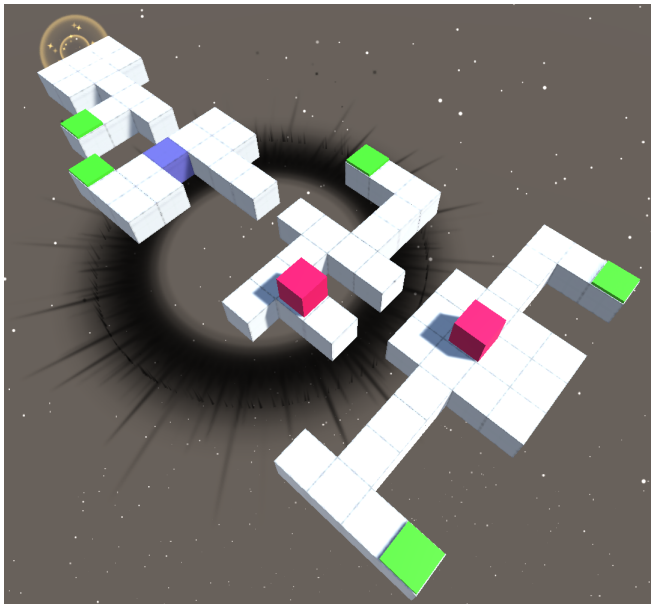
We implemented 4 different levels, which play with the different aspects of the game. A level plays with the mechanics of enemies where one player has to position itself to tag the enemy to allow the other player to kill it. Another works by tricking the player by presenting him many different possibilities to solve the puzzle in appearance even though only one solution will work. A puzzle require the players to come back in precedent parts of itslef to allow them to progress. The last puzzle plays with the mechanics of the button combination where a player has to show the order in which to press the buttons to the other one.

We would like to have a more consistant way to handle our maps instead of using unity's scene creator, since it often leads to inconsitencies mainly in the coordinates of the different blocks, which we don't want to micromanage. The idea is to make a map loader which would generate a scene from a json file, the different mechanics and signals would be stored in different fields, in lists, and the block data (their coordinates) would be stored as either a data string or a list (the reasoning behind the data string would be to iterate over it and to create the blocks without really having to parse it, leading to easier manipulations, like a punctured tape program in old machines).

Alexandre is currently working on a JSON parser for the map loader, the reason we choosed not to use a library for it is that we need some features for the manipulation of the JSON which wouldn't be included in a classical library, and since we did a JSON parser in a TP class, we are reusing it. The goal is to have it finished for the final presentation.





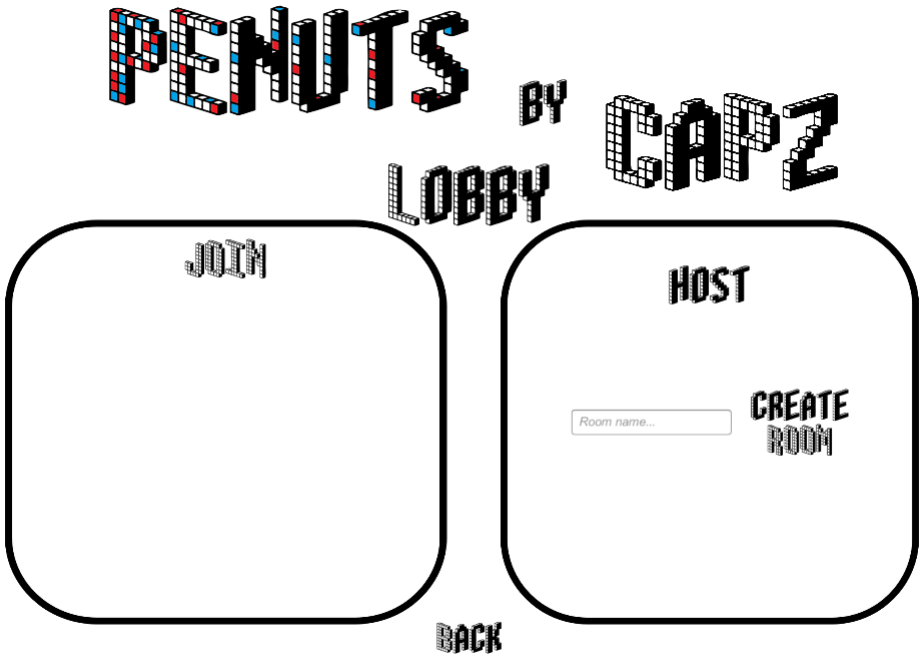


2.1.9 Multi-player

As the aim of our project is to create a game based on the players complementarity, hence, this part have been done really fast for the first presentation.

We did not touch the base of the Multi-player implementation but we had to go along with each time we were implementing something new (as we had to linked it to the network manager). Hence this part continue to have researches done to avoid bugs.

For example the creation of a lobbyMenu which allow the player to create or join a room with anyone had to use the function of the NetworkManager.



2.1.10 Menu & Options

Book of Specification : "In this part we will implement different options and interfaces to help and give some configurations to the user. Indeed, if the player can change the controls, add a joystick, mute the sounds effects, and so on, he will have a better experience of the game."

Progression done for this Second Presentation :

At the First Presentation, the menu were only a screen where the player could choose whether he wanted to play or quit. For this Second Presentation a great work was done. Indeed, working menu were created adapted to our design and linked to the Multi-player's settings.

Researches : Many videos and resources were used for this part. Indeed, we had to understand clearly how the multi-player settings were working, how the quality & resolution were controlled and so on.

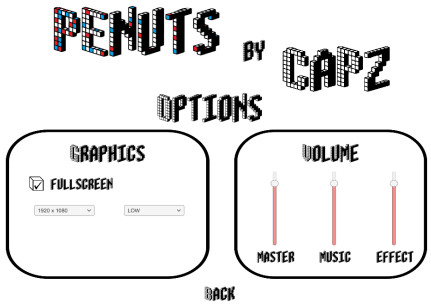
Done :

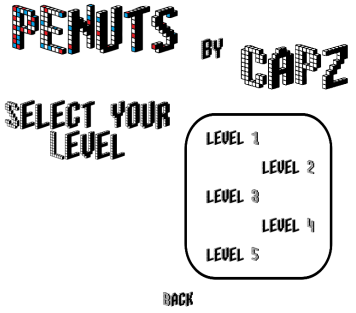
- Different working menu scenes adapted to our design. It include :
  - A Main Menu (Play / Settings / Credits / Quit) buttons
  - Play : It links to a lobby scene were the player can host or join a game. Many researches were done about it to create working scripts linking the NetworkManager to our buttons. Indeed, to be able to do that, we had to find good functions and variable for each details in the documentation.
  - Settings : This page allow the player to control the graphics of the game (quality, resolution & fullscreen). It also allow him to control the Music/Sound Volume. Again, those features were implemented with basics UI of unity (Button / Dropdown / Toggle) linked with scripts to control game settings.
  - Credits : It's just a link to our website and our names.
  - Quit : As the Credits' page, this is not difficult, it just allow the player to quit the game.
- Design : We did it using images & TextMeshPro with a font corresponding to our game (cubic font). Also the rest of this menu was align to this design to give a pleasant experience.

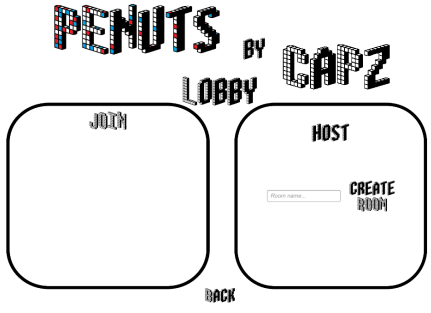
What will be implemented for the Last Presentation :

- A Level Selection Menu allowing the players to select which level they want to play. And also which colors/role they want to have.
- A Control Settings Menu which could let the player configure his control keys linked to his actions.

You can see below the different pages of this menu.







2.2 Design

2.2.1 Color Codes

Book of Specification : "We will need to do some choices to put good color codes in the game. Indeed, those colors will help players see something and will give informations. Those informations can be on the type of object, on the possible interactions, and so on. Hence this part can not be neglect to give a pleasant experience to players."

For the time the colors of the visible/hidden blocks are just Blue/Red changing with the player's color. We will see later linked to the design and to the game-play if we should change them or not. For the other objects like triggers, doors and so on, we did not choose any specified color. The main point will be to find colors which make the player understand everything or at least the type of the object.

2.2.2 Graphics

Book of Specification : "The implementation of particles, polish assets and better appearance will be in this part. As the color codes, better the graphics appearance are better the comprehension and the experience of the player will be."

Finally not as expected, in this first game presentation we already made some design.

For the character we found an asset which corresponds to our expectation in term of style. We will maybe change it, but for the time it is already nice and give a better aspect to the game.

We also found a good material for our blocks & added particles to make the game more attractive and pleasant.

The graphics will be finish later in the game creation as it wasn't possible to do them when there weren't any game. We began to search for new graphics, and we created a nice design for the menu.

2.2.3 Sounds Effects

Book of Specification : "This part, neglect in much projects, can in fact gives a real immersion to players. Hence, we will try to adapt sound effects and musics to the environment to give a more pleasant time."

For the time only a music was added in the background, but the researches for this was not the goal for those first & second presentations.

2.2.4 3D Animations

Book of Specification : "As the Graphics part, animations of players and fluidity of movements can only give a better aspect to the game and the environment."

For the time, except the asset of the character, nothing was done for the animations, as the aim was to first make a functional game.

For the next presentation that would be great to start some animations. But it will mainly be a little feature more than an element of game-play, so it is normal to prior other parts for the time.

2.3 Management

2.3.1 Website

Book of Specification : "As the project will grow, we will have to do the same with a website."

Website URL : `penuts.fr`

- Home (link to other pages)
- Contact page (to be able to contact us)
- Contribution (Page to give ideas about the project's pages or game)
- A project presentation
  - CAPZ (presentation of our group)
  - History (of this project)
  - Progression
- Links for downloads :
  - The Game (allowing to choose the OS wanted for the download)
  - Reports (to show our reports & documents)
  - Other things used for the project (musics, pictures, videos,...)

Remarks :

The main work for our website was done, from now we only have to update it while our project evolves. Indeed, the main structure was done (including html/css/bootstrap/php) we only have to update the content of it. For its creation we used a bootstrap and css template to understand how it was working then we updated it linked to our expectations. Understanding how web coding was working was interesting. Indeed, we could discover all of those language by using them and create new features in our website (contact page / menu / buttons / links...). By publishing it we also had the opportunity to understand how the page referencing of google was working. Indeed, some work was done to reference our website, allowing "google's robot" to find better tags or descriptions. At the same time we bought a domain name for two years helping users finding our project page.

2.3.2 Economic aspect

Book of Specifications : "This project is a nonprofit game. We will not earn any money on this creation. The aim of this project is mainly a contribution of knowledge.
To finance this project we will not need money, except maybe for networks and severs."

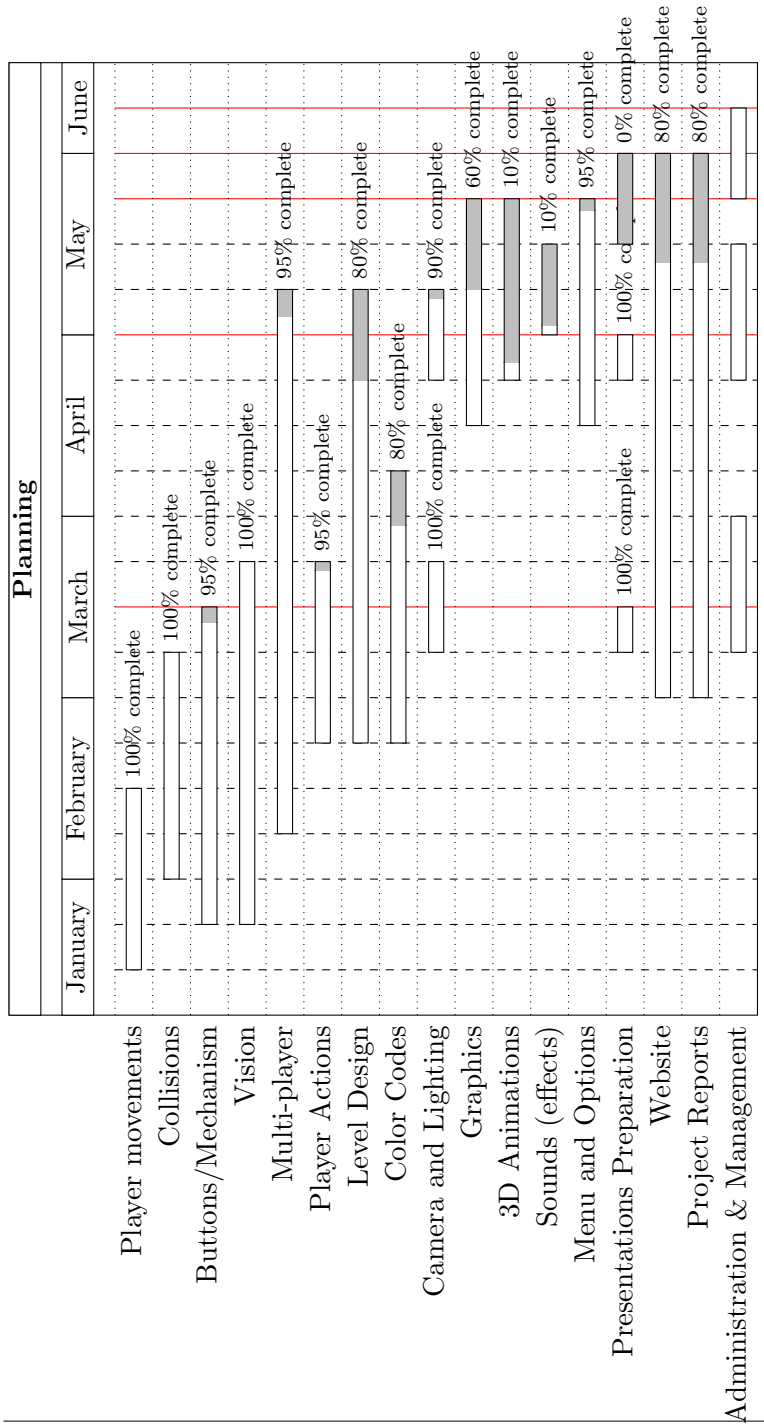
Finally we decided to bought a domain name for two years (2euro by person). Indeed, as explained in the website part, a nice domain name allow the users to find our page. But we also took into account that we might also want to share our website, and to do so it was easier to have a short domain name.

2.3.3 Resources aspect

For this project we use mainly free and open-sources software as :

- Unity (game engine)
- Overleaf (LaTex editor)
- MonoDevelop, Rider or VisualStudio (C# editor)
- Blender (3D animation and creation)
- Brackets (CSS and HTML Editors)
- GitHub (Coding organization & host for the website)
- GitHub Desktop / Kraken (GitHub interface)
- Audacity (Sounds editor)
- Internet (For documentations and everything else)

2.4 Progression



Conclusion

This Second Presentation Report gave many informations about our project, PEnuts. It was mainly here to show the progression done since the first presentation. We saw the main concept of the game : A Multi-player involving complementarity puzzle game. Then we saw its specification : players will have a different vision of the environment and different possible interactions. Furthermore, we showed what have been done for now and what had to be done for the next presentations. All in all this report is here to give a detailed vision of our project just before our last presentation.

" Science isn't about WHY,
it's about WHY NOT! "

J.K. Simmons
Portal 2