Computer Project File
SUP–2022

PEnuts
First Presentation Report
By CAPZ

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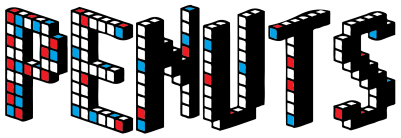

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Introduction

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 First Presentation Report will present you in details the progress carried out since the submission of the book of specifications. 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 (progression & done & to do).

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.

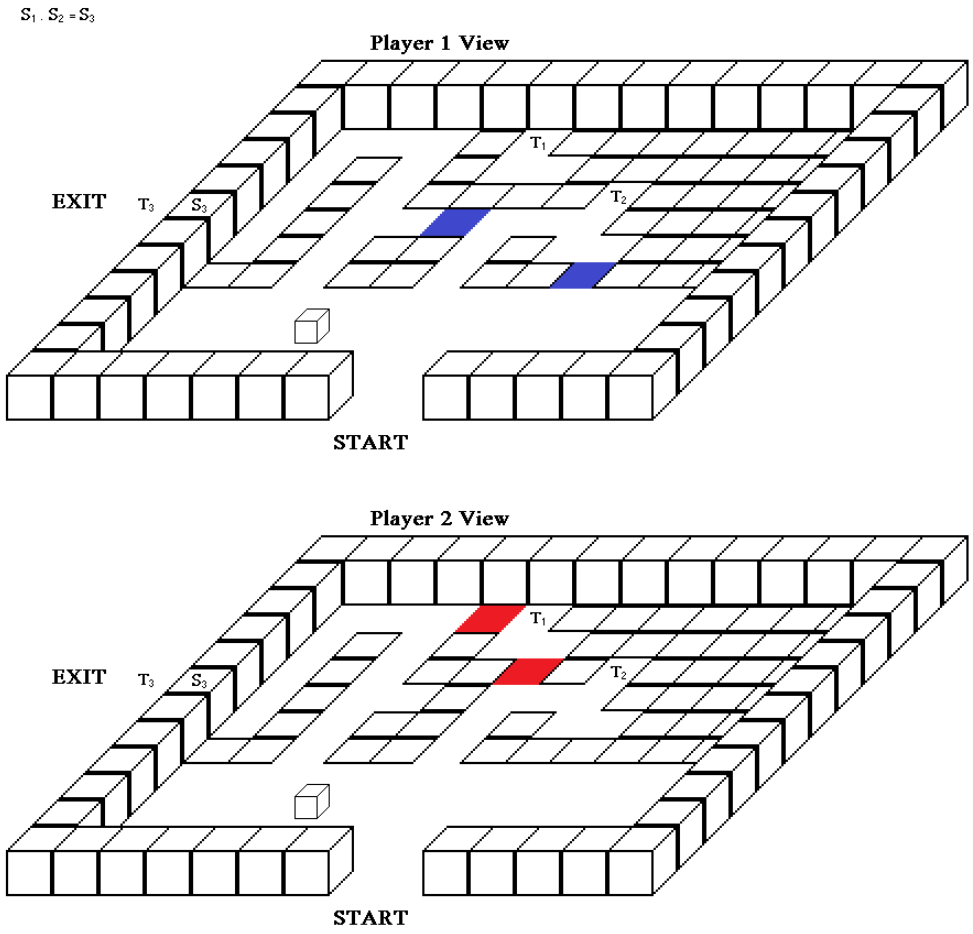

This is a block tile, a player cannot cross nor step on it.

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. Each player will be able to move in four directions and to jump.

Researches :

Ziane already had knowledges in Unity, so implementing the movement part was not difficult for us. As our game is implemented in a cubic world, we adapted the movements by putting only four possible directions to our player.

Done :

- Four directions movements
  - [left/right]-key : rotation y-Axe of $\pm$ 90 °
  - [up/down]-key : moving [forward/backward]
- A jump is implemented, but we will see if we keep it or not (changing the game-play)

To do for the next presentation:

This part of the game won't have to change for the time. We will change it only if needed for a better experience (fluidity of movements, and so on). We will also see if a jump is useful in our game as an element of game-play.

Remarks :

There are many references to the game-play. Indeed, for the next presentation a big part of the work will be done to improve the players' experience, puzzles and appearance of the game.

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."

Researches :

Block movement : Those researches were made by Cloé. The aim was to create a movable block on the map. As the movements of our player, it also had to be adapted to a cubic world. Hence, there were two step for the implementation, the collisions implementations and the alignment of the block with the grid.

Shots : Those researches were made by Ziane. He implemented a little "gun" for our player, allowing him to fire some little bullets. The implementation of this feature will be useful if we want to add to game-play elements.

Triggers : Those researches were made by Alexandre. He created some prefabs for triggers. This is a key element for our game-play so we had to do it fast. More information about those triggers will be find on the next pages.

Done :

- The possibility to fire little bullets is also implemented, as the jump, we will adapt it with the game-play
- The player is also able to move a block all around the map
- A prefab for simple Triggers is implemented

To do for the next presentation:

- Cooperation's actions as the ping - if useful & good for the game-play
- Other Interactions with objects (adding some puzzle opportunities)

As in the precedent part, there is many references to game-play & experience of the player, meaning we will have some work to do on that aspect of our game.

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."

Researches :

Those researches were done by Alexandre. Even if Mechanic didn't appear as a complicated part, many questions had to be reasked on how to implement signals. The simple difference between only having a single boolean for each signal or having an Integer made a big difference on how signals were implemented. Indeed, this part took some time to have a good result.

Explanation of the Signal System :

The signal system basically consist of a script that handle a Dictionary of String / Integer values (the Signal Handler), each String is the key or the "signal name", each time a source set the signal to True, one is added to the Integer value of the corresponding signal name, each time a source set the signal to False, one is subtracted to the Integer value of the corresponding signal name. The minimum Integer value is 0, when a Door or some other object tries to access the signal, a boolean is returned, True when the Integer value associated with the signal name is over 0, False otherwise.

Done :

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

To do for the next presentation :

- Add more Gates for Signal Manipulation
- Make Signal easier to implement

Remarks :

This part is one of the big keys for our project, so it could not be neglect.

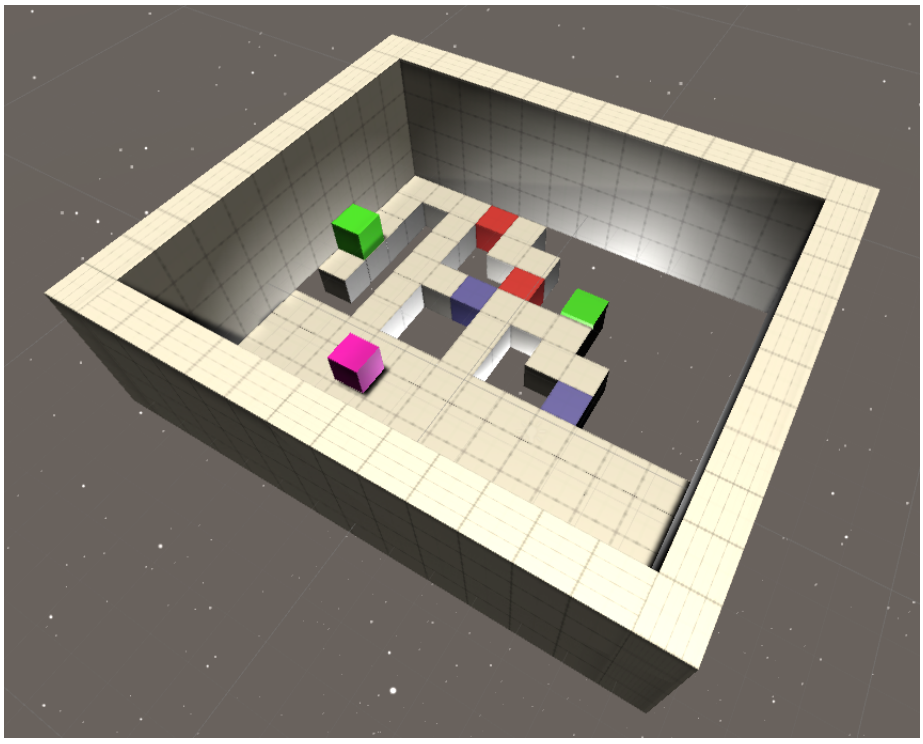
2.1.4 Camera and Lighting

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.



2.1.5 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."

Researches :

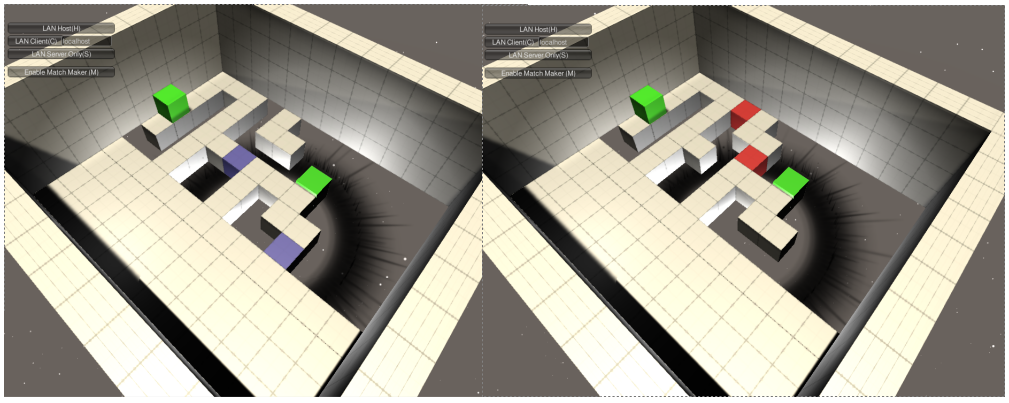
This part was done by Ziane. Researches were done to find exactly how we should do this implementation. The choice of loading the map with the good colors at the beginning was kept. Indeed, thanks to a quick menu, the player can choose his color, and the map & prefabs will be load consequently. For this, a short script was done were you just need to change the inputed prefabs to change the scene seen by the player by using [gameObject.SetActive].

Done :

- A quick menu was done for the selection of the color seen by the player
- When the player chooses a color it loads the map with the good features.

Remarks :

As it is, we do not need to change anything of this part for the time.



2.1.6 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.

2.1.7 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."

For the time, only mind-scratches were created. Indeed, as we did not have the prefabs of our different objects (blocks / triggers / and so on) the creation of levels was not a priority. Now that we have prefabs of our main objects, the implementation of a level will be much easier.

For this part of the project we will also try to create a map-generator able to parse a list for example to a map. For the time there is only few researches on this part as it is in progress.

2.1.8 Multi-player

As the aim of our project is to create a game based on the players complementarity, this part had to be done really fast.

Researches :

As it was planned, this part took time to implement. This was not the easiest part but it had to be done as fast as possible to be able to create the rest of our game without conflicts. Indeed, lot of objects are based on the multi-player implementation.

To create the multi-player interface, we used the Network manager HUD to manage players and objects. We also used the network identity (network ID) on each object needing to move in the network.

For the time only the local version is available. To be able to play on two different computer we will need to create a Unity sever. We already did researches on this subject, it just take time and was not a priority for the time.

Remarks :

The big step of this part was done. It was big and had to be done in one time. Now that it is finished, we can concentrate on other part and just adapt this part if needed at the same time.

2.1.9 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."

For now, the menu is only a screen where the player can choose wether he wants to play or quit. To implement this option, we used the Scenemanager.Loadscene function, that is appealed thanks to a button in unity.

For the next presentations those menu will evolve adapting to our design. It will also give the players access to options which give a way better experience.

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.

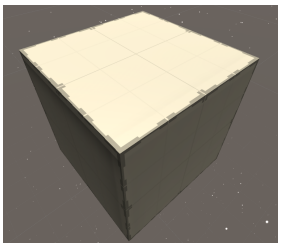
2.2.2 Graphics

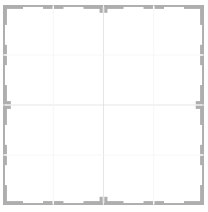
Book of Specification : "The implementation of particles, polish assets and better appearance will be in this part. As the color codes, better the graphics appearance are better the comprehension and the experience of the player will be."

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.





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 this first presentation.

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 : `https://pierrick-made.github.io/PEnut_website/`

- 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
  - History
  - Members
  - Planning
  - A Logbook (presenting for example the problems encountered)
- Links for downloads :
  - The Game
  - Reports
  - Other things used for the project (musics, pictures, videos,...)

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."

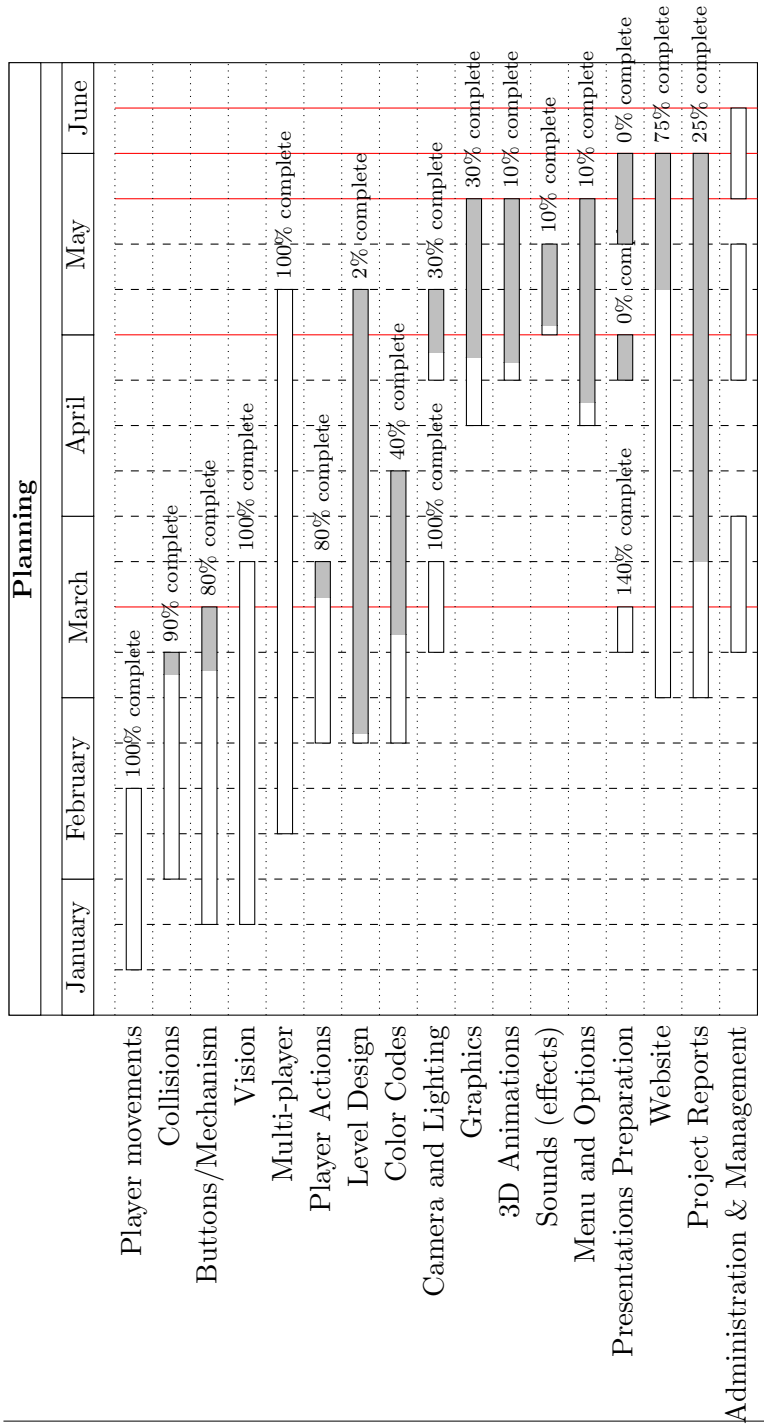
As it it for now, the only thing that would be financed would be the domain name for our website.

2.3.3 Resources aspect

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

- Unity (game engine)
- Overleaf (LaTex editor)
- MonoDevelop, Rider or VIM (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 First Presentation Report gave many informations about our project, PEnuts. 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 first presentation.

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

J.K. Simmons
Portal 2