

# Deimos

## Book of Specifications

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# Chapter 1

## *Introduction*

In order to shape the notions learned during the first year at EPITA and to discover new ones, we need to carry out a project for the end of the second semester. This project will present itself as a video game which will gather the knowledge of our project group composed of Loupou (Louis-Paul DAREAU), Manou Manouel (Manuel HUEZ), Uranus (Erenus DERMANCI) and Cyrilou (Cyril CHEMLA). It will also help us be initiated in working as a group, meaning mutual help and listening, but also deepening our technique in computer science. We will be in confrontation with problems that can manifest themselves in our future professions, and will learn to solve these problems.

The only restrictions we are dealt with about the type of our project is the language in which it will be coded (Caml or C#). It then seemed obvious to us, in agreement with the whole group, to direct ourselves towards a video game coded in the C# programming language which is more adapted to our goals. As for the type of game, we wanted to distinguish ourselves from the rest of the groups by carrying it out in 3D. The 3D aspect of our game will not only help us distinguish ourselves, but prove itself a challenge, and reward us with more experience in the end.

Our first idea was to turn ourselves towards an Amnesia-like horror game, but we quickly noticed that such a game would be very (too) linear and wouldn't permit ourselves to push the limits of our game as we would have wanted. An FPS (First-Person Shooter) seemed more logical to us, more complete and especially more adapted to the project, without having to completely leave the horror aspect out of it, by integrating it in the general feel and environment of the game. Our game is aimed completely towards multi-player. This will permit us to push the gameplay to its paroxysm by adding more features in it, that will be disclosed later in the book of specifications, during the game's description.

## Chapter 2

### *Project's origin*

#### 2.1 Group's origin

The Deimos team has been assembled quite a while ago, during the month of September 2013, at the beginning of the year. All four of us live in the University Residence right next to the school, and so we had the chance to get to know each other quickly, and realised we have characteristics that match and somewhat cumulate.

However, we also realised we had very different skills and talents that sometimes find their common point, which is advantageous. Conveniently, our roles were consequently pre-defined, because we had different levels and experiences in programming. This has proven to be interesting, and it surely helped newbies learn faster. For example, Cyril, who had no prior experience in coding, was encouraged and motivated by the other three of us to research personally and initiate himself.

#### 2.2 Origin of the idea

All of us agreed for a video game instead of other types of software. This was not only because we were all die-hard gamers, but a game project would use lots of resources and all the components of a modern-day computer, and so the amount of experience we would get would be more important. This is due to the fact that video games are not easy to code, require and help with mathematics (Matrix projection and so on...), physics (Physics Engine), they use different multimedias, require 3D modeling etc... Moreover, we would earn a global grasp in computer science and algorithmics.

In the end, we wanted to make a game that would be played and enjoyed not only by us but any other person who sought to have fun. The challenge was to come up with an idea that could render the game as close as possible to an ideal amount of fun, whilst staying in a realistic field of view. We wanted to insert a bit of 'us' in it, but also a bit of other games we love to play, and think are interesting.

Right from the beginning, we knew we had to go with 3D. It represented more work for us, of course, but more reward in the end, and more experience to harvest. That's why we invested and committed ourselves to it.

The very first idea we had, was to make a First-Person Survival Horror Mind-bender game in 3D (imagine it as an Amnesia-like Antichamber game). The name "Deimos" derived from here. It is actually is the name of a moon, etymologically coming from ancient Greece. The word means 'Terror'.

We quickly realised that it would be too linear, and that's when we shifted towards a better, more ambitious idea. We never left the First-Person point of view, but got rid of the 'Survival' and 'Mind-bender' aspects of the game, and lessened the 'Horror', because it required an insane amount of visual work and resources, but kept it.

However, we added the multiplayer feature, and based the game on it. This would be a game played with friends. So we added the 'Shooter' aspect, and got ourselves an oldschool competitive multiplayer FPS (First-Person Shooter), that had a hint of thrilling horror in its environment and gameplay.

## 2.3 Task distribution

As mentioned earlier, our differences in skills and talents helped us in a lot of ways. One of these ways was to distribute tasks intuitively and without any problems. We wanted to bring out the best we had in each one of us, whilst still maintaining common grasp over the project. The results are quite satisfactory.

Manou will be handling the Core Game Engine (Collisions, Lighting, 3D Display, Specular Map, Core Mechanics) and the Website (Presentation, Account management, Achievements, Connection).

Uranus will, first of all, work on Game Design (Environment Desing, Dynamics and Mechanics Design, ...) and Gameplay Mechanics (User Controls, Player Movements, Player Actions and Interactions, Player States).

Loupou will work the multiplayer aspect of the game (Server Programming, Synchronisation through the Server, Connection to the Server, Authentication).

Cyrilou will handle sounds (Sound Engine, Sounds and their Implementation) but also visuals (Textures, Maps) and all that is user interface (Game Menu, In-Game Menu, HUD, Text Display, ...), and its implementation.

## Chapter 3

### *Project*

#### 3.1 Definition of Deimos

Deimos, as mentioned, is a competitive multiplayer FPS with thriller-like environment. However, when described like that, it sounds generic and superficial. Here is the thorough explanation of what we plan to do:

There will be a server, connecting clients. Each client will have to create their own account through the site, and log in to Deimos via the game client. The game consists of a single map. This map will be big of size, containing various environments such as narrow dark corridors and vast rooms that are badly lit, platforming rooms, and more. This will provide different gameplay dynamics, rendering the game less repetitive.

There will be any number of players on the server from a single person, to a maximum number of people which will be determined later in the 'config' files of the server. These people will be in constant battle with each other, according to their will, resembling the gamemode "Free-for-All". At this point, we consider that it will be the only and constant gamemode, but we might consider implementing different gamemodes, such as "Team Free-for-All", etc...

The gameplay consists of fast-paced movement and the aim to eliminate as many opposing players as possible with your weapon. The weapon, which is a gun, has variant characteristics depending on the specialisation/class you wish to choose. The classes will have different properties, meaning they will all have their weaknesses and strengths.

An important element, is the mystery weapon. This special weapon will spawn every now and then in a secret and variant location in the map. The person who finds it will hold it until they die. The functionality of this weapon is essential to the game: it grants the wielder the ability to transport themselves, and the opponent of their choosing (at which they need to aim when they are using the weapon) to a random mini-game area that is otherwise inaccessible. These mini-games will be various and focused on one vs. one player combat, and extreme amounts of fun and adrenaline. Such as a cowboy duel, or being hunted by an invisible man, or having abnormal speed properties whilst trying to kill each other, or perhaps a weird Pacman game.

The overall and general feel of the game will be eerie, and will recall oldschool games of the sort (Quake, Half-Life).

## **3.2 Which tools? Methods? Techniques?**

We have since the beginning chosen the C# programming language for Deimos, and will use Microsoft Visual Studio (2012) as our main Integrated Development Environment, using XNA as our game's main Framework.

We will need a properly running server for the multiplayer aspect of our video game, that will be written in whatever language (it is a necessity). Our website will host our latest news and updates, and perhaps player profiles with statistics and achievements.

In relation to our game engine, specifically for the lighting, we've chosen to use the Phong Shading Technique, so that our models would be properly lit, with great specular light as well as realistic gradient on the diffuse light.

We've also chosen to use the deferred rendering technique so that many instances of lighting could run at the same time without any problems in our map. In fact, calculations needed will be highly decreased, thus optimising our code compared to Multi-Pass Processing. This will also render us able to create shadows using the Shadow Map technique if we find it interesting in our game. At this point, implementation of shadows hasn't been considered, but it can be in the future.

We will consequently be trying to use the latest available rendering techniques to be sure that the functionalities and features we want to have can



be properly added. In order to accomplish such a task, a content processor could be very helpful for the shaders, and we might consider that as well.

As for the collisions (because they are crucial to a 3D Game), we will be trying to implement a vertex to vertex collision detection. However, this requires a lot of resources so we need to optimise it with a few tests: like a bounding box or bounding sphere collision detection. This way, if the two first collision detections return true, we won't need to use it.

### 3.3 Priorities, costs, time, ...

We've set our priorities a while ago. The foremost element we need to have is of course the 3D Game Engine, without which nothing else can work. After completing or at least laying the grounds of the engine, we will turn ourselves to Gameplay and its Mechanics, so that we can have a first idea of what the game will feel like and adjust it to our liking. Following the gameplay, integrating the multiplayer aspects with the server is crucial and should be properly done as soon in the project as possible. After all that, it will surely be time to integrate our map developed by Cyrilou in order to get to sculpting and refining our video game, and start testing it. All the rest will be added afterwards or during the whole development, gradually and in a non-prioritised way.

There is no doubt as to whether the project will consume a lot of our time or not. It will consume most of it, but we are more than motivated.

As for costs, we need:

- At least twenty euros (20€) per month for the server
- The fee to print business cards
- The cost of DVD writing and their covers
- The cost of flyers, etc ...

## Chapter 4

### *Planning*

#### 4.1 Presentation 1

For the first presentation, we are planning to have the core game engine more or less completed and our map more or less created even if not completely. An initial HUD, and an initial gameplay, which will let us have a view of what the game will resemble in the end, and let us test. The server development will be started. Lastly, our website will be started with a blog so that we can add development logs

	Cyrilou	Loupou	Manou	Uranus	Total
Game Engine	-	-	X	-	70%
Gameplay Mechanics	-	-	-	X	70%
Website	-	-	X	-	40%
Server	-	X	-	-	60%
Multiplayer	-	X	-	-	0%
Visuals and Sounds	X	-	-	-	25%

## 4.2 Presentation 2

Our game is beginning to adopt its shape, the game engine is completed, so that we can focus entirely on the multiplayer aspect, the map should be finished and working (except maybe for some details). Mini-game map development will be started and developed gradually. Our website is much more developed, and the server programming should be finished by now.

	Cyrilou	Loupou	Manou	Uranus	Total
Game Engine	-	-	X	-	90%
Gameplay Mechanics	-	-	-	X	90%
Website	-	X	X	-	70%
Server	-	X	-	-	100%
Multiplayer	-	X	-	-	75%
Visuals and Sounds	X	-	-	-	75%

## 4.3 Final presentation

Our game should by now be ready for production. The synchronisation between the player and the server should be finished. Player accounts should be integrated, where we can see their statistics. Multiplayer aspect complete and ready to be played. Gameplay dynamics complete and provides equality.

	Cyrilou	Loupou	Manou	Uranus	Total
Game Engine	-	-	X	-	100%
Gameplay Mechanics	-	-	-	X	100%
Website	-	X	X	-	100%
Server	-	X	-	-	100%
Multiplayer	-	X	-	-	100%
Visuals and Sounds	X	-	-	-	100%

## Chapter 5

### *Conclusion*

Since the very beginning of our project, which we have started early on, we have evolved... Evolved as a group, meaning that we've learned to use our knowledge together and share it, in order to, in the end, succeed in completing everything, one by one. But evolved also as students discovering a new aspect of programming we've never studied before for the most of us, and grasping numerous new notions and methods.

The beginning of the project was seemingly challenging, especially given our differences in coding experience at the time, between Manou, veteran of programming and Cyrilou the little noob! Despite that fact, task distribution was easily and equally done, and granted us an essential role in the project.

The book of specifications also let us define the limits of our work and realistically aim the essential points of the project, also defining the project itself.