Nýr: The Last Stand

Report: Second Defense

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Contents

1 Introduction

1.1 Planning for the current defense

Tasks	Passed defense	Current defense	Last defense
Saves	20%	50%	100%
Character	75%	100%	100%
Items	30%	75%	100%
UI	30%	80%	100%
World / Map	35%	85%	100%
AI	40%	70%	100%
Multiplayer	50%	80%	100%
Website	30%	80%	100%

1.2 Last defense's follow-up

This second period of development of Nýr: the last stand has been more productive than the first one. Indeed for this defense we didn't have to discover the tools which streamlined our work. We were a bit more at ease to work on this project therefore the progression is more substantial than at the first defense. As usual we generally kept a good group cohesion even though there were ups and downs but after all what is a group without some disagreements. This report will describe all the progression made since the last defense and will tease the final version. The group's members will also talk about their feelings about this second part of our amazing journey.

2 Project current progress

2.1 Individual tasks

2.1.1 Saves - Anita

So far the saves are going way slower than expected. However it doesn't impact the project because for now it is not necessary to the game. We realized that the saves are really dependent of other parts that's why it can hardly go at the same rhythm than the rest of the project.

What has been done:

The script done for the last defense didn't work out well when implemented. As for the next three tries, it didn't go any better. It was then necessary to rethink our way of doing the saves. The method used was not optimal with a multi-player game. That's why we are back to square one for this part some research are being done but to be honest this part is giving me a hard time. We talked about it and decided that some saves are not needed to the game we want to end up with. We might end up by not saving the player's position so the player will re-spawn in Vargfell each time he reconnects. What we really need to save is the level, the health and the equipment of the player every time he disconnects.

What remains to be done:

Since the saves took another turn there was not really much to do for the defense. We planned to have the save of the player's position at least and try to save the health and the level of the player if it was implemented in time. So this is what remains to be done minus the player's position part.

What will be done for the next defense:

For the next defense the players' progression will be saved and we will start to work on the inventory's saving if the save of the progression goes well.

A little feedback:

This task has been the most difficult one for me because I tried so many things that didn't work out as expected so it was hard to stay motivated. I had to frequently alternate with the map part to avoid being constantly disappointed. I'm confident that I will find a solution in the near future and not finding a solution on the first try taught me to not give up and keep digging until I succeed.

2.1.2 Map - Anita

As explained in the previous report I was on time on what I planned for the last defense. I had the main map as planned, namely *"Vargfell"*, minus some details

like fire effect and NPC's. As for the random generation I started working on it and think about how I'll proceed to generate random levels. Thus, for this defense I had to finish up the details on *Vargfell* (fire effect, NPC's and some fix in the NavMesh), do the tutorial island as explained in the last report and finally I also planned to start the random generating to at least have each basic component of an island that spawns randomly.

What has been done:

- Vargfell:
  - Fire effect:

    In the first defense's report I had some ambitious project for the fire effect. Indeed, I wanted to create a flame shader to have a realistic effect but I was actually too ambitious. In the first report I explain that the flame shader might take me a lot of time because I still needed to do some research in order to install the right packages. It turned out that installing the right package involved converting the project into HDRP template instead of 3D which I did. However, it didn't work out because the HDRP template is very costful and my computer couldn't handle it. That's why I couldn't do the shader, my unity editor crashing every now and then made my work conditions really uncomfortable. Since I lost a lot of time on trying to convert the project I decided to go on with the fire effect included in the assets package we bought (i.e "Polygone Viking" which actually looked really good with the map since it has a low-poly aesthetic).

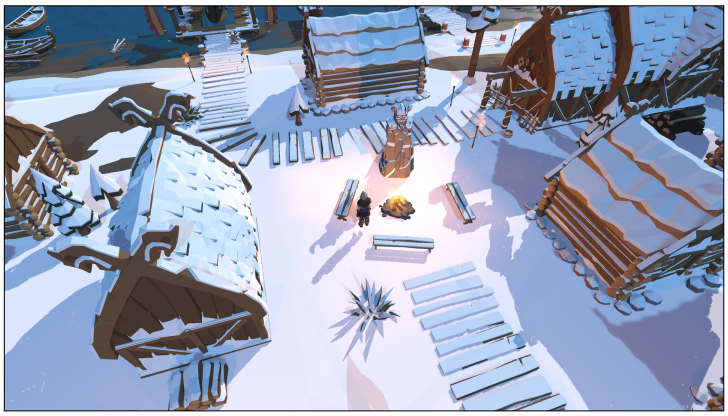

Figure 1: Fire effects example in *Vargfell*

  - Fix on the NavMesh:

For the first defense I explained that I used a NavMesh map to define which component on the map are walkable or not. Soon after the defense we realized that the player couldn't go until the edge of the docks and he could walk on the water. So I had to fix this for the second defense, the player can now look at the horizon peacefully without drowning.

Figure 2: The view from the edge of the docks

– NPC's:

The non-playable characters (NPC) are necessary to make the game more alive. For the NPC's we planned to do some with whom we can interact with and maybe as a bonus if we have time some wonder AI. Thus for this defense we started to work on the ones who are made to interact. We have three of them: a boat keeper and two shopkeepers. They are respectively named Nora, Bob and Karl although those names are temporary because Bob is not really credible as a Viking. Bob and Karl will be done for the next defense. Nora is the NPC that will allow the players to explore other islands. As the boat keeper Nora will send them to undiscovered lands or a training island depending on the players' desire. For now we can access the "tutorial island" by right clicking on her, there is no dialogue yet. Bob and Karl will sell food and drink to the players so they can restore their health. The players will also need to craft some equipment and no one do that better than Bob and Karl! Those three NPC's are already one Vargfell with a simple idle animation. We can also interact with Nora to go on the "tutorial Island" by right cliking on her. The dialogues and talking animations are expected for the next defense.

Figure 3: NPC Nora

- Tutorial Island:

  The tutorial island is the map that has been used to define the steps of the random generation. It is also here to have a second map while the random generation is not implemented in the game. Since it's a first template to help create the random generation we kept it simple. It is not meant to be really detailed like Vargfell. Therefore the island is only composed of a plain village and simplistic environment.

Figure 4: Screenshot of the Tutorial Island

- Village:

  The village is compounded of houses and a campfire. The houses are surrounded of small props like weapons, barrels or carts to animate the map a little bit. Then the same fire effect as in Vargfell was used in order to lit the campfire and a point light has also been added so that the lightning looks realistic. The assets used for this island are from "The Adventure Pack" and "Simple sky".

- Environment:

  The island is surrounded of mountains and the village is located near a forest. The terrain is flat to make the random generation easier and to use the polybrush. In the random generation the trees will be spawned randomly but here the forest was made with the polybrush. The skydome comes from the "Simple sky pack". The sky and the light imitates the dusk.

- NavMesh:

  As for Vargfell the tutorial Island possess a NavMesh so the the player can only walk on the ground and doesn't walk through the different elements of the map. He will not be able to go beyond the mountains.

- Random Generation:
  - Hierarchy:

In order to do the generation I had to prioritize the steps. The big elements such as the shape of the island had to come first, the forest and the village come next and at the very end we will take care of the details such as little rocks, flower etc...

- Prefabs:

  Doing the prefabs to spawn is the longest part so I decided to only do some "test" prefabs and do the script at first. So for now we only have one island shape, three forest and a village. It was essential for this defense to concentrate on making everything work to spawn at least one island. The forests are composed of a hundred trees spawned at a specific position but with a different tree each time. The village uses the same process. Finally the global shape spawns one of the three forest with the village.

- Process:
  The method used here consists of placing empty game objects in a scene to "mark" the position where the prefabs will be spawned. The script chooses a random prefabs from a list that we define and spawn it at the position of the empty game object it is attached to. We can also destroy the island by clicking on "escape" (this key might change or be replaced by a trigger for the implementation). I also added another script to randomize the sky color by changing the texture's offset at each new generation.

What remains to be done:

The map is a bit ahead of the schedule the NPC are almost done, the tutorial island is done and the level generation is a bit more advanced than I hoped. There was nothing that I needed for this defense that hasn't been done although since I added the functionality to change the sky color I would have liked to have the lights adjust to the time of the day. But since it was only planned for the next defense it was not necessary.

What will be done for the next defense:

- Vargfell:
  - Non-Playable characters (NPC):

    For the non-playable characters we expect to have the dialogue system for each intractable characters. For the boat keeper the players will be able to choose between going on the tutorial island to train

or a random island to explore. As for the shopkeepers they will allow the players to buy food and drinks to restore their health and also craft some equipment.

- Procedural generating:
  - Prefabs:

    By the next defense I will add some prefabs to have more diversified islands to got to. I will try to add as many as I can so that the game doesn't get boring and the possibilities are numerous. But this will be the last thing done because every features vital to the game have to be added successfully first.

  - Lights:

    The lights have to match the sky color so they need to change accordingly to the sky that is randomly generated. If the sky color corresponds to dawn the lightning will be less intense than is it is daytime.

  - Implementation:

    Finally the generated islands have to be implemented correctly. The player should be able to spawn on the island when choosing this option with the boat keeper (see NPC paragraph above). He will also need to go on an other island when he finishes one.

A little feedback:

As for the last defense doing the map is the part that I enjoy the most doing. Now that it is not only resumed to placing prefabs on a scene it is even more interesting, I'm really happy we chose to do randomly generated islands. The NPC's also add a challenge since it is a bit related to other parts like UI for the dialogue. I'm quite satisfied of what I've done so far, I learned lots of things and I can't wait to go further on this journey. If I finished everything that I've planned for the next defense I might keep adding bonus features and more prefabs to randomize the generation to the maximum.

2.1.3 Player - Maxime

Player is a part which was already well-advanced and needed to be finished early, so what has been done for this defense is just a matter of details and polishing. For the remainder, the Player part encloses everything linked to the player movement, player behavior in the world, player's inventory, and player's

combat for instance.

What has been done:

- Player's movement:

  This mechanic received a few tweaks, mostly fixes and polishing. Before those fixes, the player would eventually bump into enemies, and would never stop in front of an enemy. Instead, the player run indefinitely, desperately trying to literally enter the enemy, which was not possible because of the box colliders. What I did to correct that was simply to change some settings in our navigation mesh agent, for the player but also for the enemy. On the current version, players and enemies stopped when they're close enough from each other without looking wrong.

- Player's combat:

  Player's combat was probably the most important feature to be added onto the player for this defense. I started working on it really early, and managed to get something right quickly. Basically, when a player right-clicks on an enemy, which is tagged as an interactable object, the Player runs to it and when close enough, it starts dealing damage to it. Damage are based on the Damage modifiers, which are explained in the Stats part. But when close enough, the enemy also deals damage to our player, and again, taken damage are calculated based on the Defense and Health modifiers. And when one of them health reaches zero, it triggers a death animation and makes it impossible for the player to move. He can also clicks on a RESPAWN button which allows him to be respawned and go fight again. What I also added was the combat's animation to avoid having a game looking like nothing. On the current version of our game, the player swings his arm two times, striking without pity the enemy. And just for the game to look better, I also added an axe in the player's hand.

Figure 5: Ted, wielding his axe

What remains to be done:

- Player's behavior:

  I thought I will have time to implement this but I also need to add behavior when the player chooses to leave the game, by adding a PAUSE menu (linked to the UI part), but also a way to send the user back to the main menu.

What will be done for the next defense:

- Player's combat:

  Since the player's combat is done, what remains to be done is only some polishing. For instance, I plan on adding more animations to have more diverse and cinematic-looking fights.

A little feedback:

During this period, the Player part felt pretty empty, I thought I did not had that much to do but I was mistaking.

2.1.4 UI - Maxime

What has been done:

- New menu: The new menu was the main feature in the UI part for this defense. The third menu looks a lot cleaner, and professional. When you first launch the game, you have a quick animation displaying the logo of our game done only in Unity.

Figure 6: The logo animation on the main menu.

For this menu, I wanted to go for a less cartoon style, and I was aiming for a more serious style. The logo was also changed to look better, and again, more professional.

Figure 7: The main menu.

What I also added for this defense was the Settings menu. That's a feature common to every game in the market, and we had to have one. What you can do in this menu is basically change the game's resolution to better fit your game, toggle fullscreen or not, change graphics' quality (you can chose from Low, Medium, High and Ultra), and finally change game's volume.

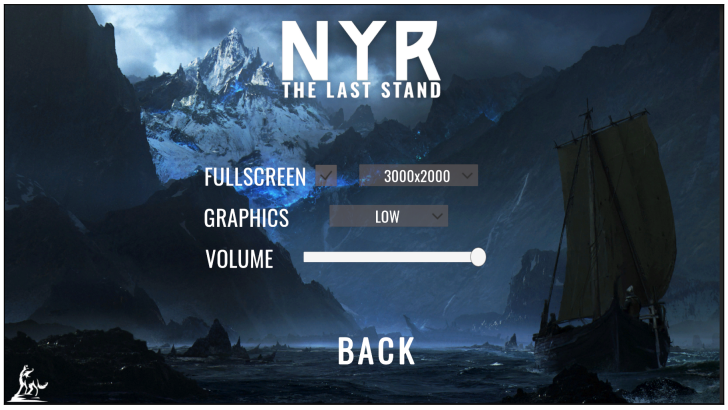

Figure 8: The Settings menu where you can change the settings explained above.

Finally, I reworked the Play menu to fit the new look of our menu.

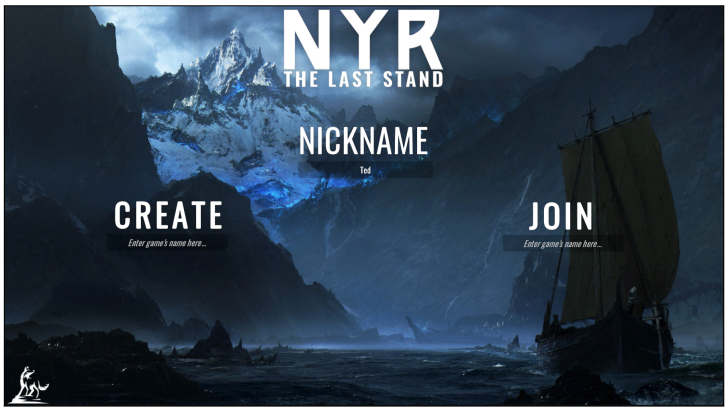

Figure 9: The Play menu.

- Healthbar: Now that the game includes Statistics, my job was to be able to visually represent those values. I started by taking inspiration from one of my favorite games for the healthbar.

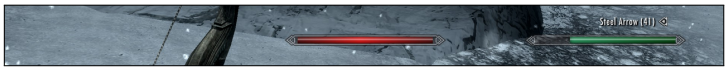

Figure 10: A screenshot from the The Elder Scrolls V: Skyrim's GUI from Bethesda Studios.

With that idea in mind, I came really fast with a design that exactly fits the game's spirit. A simple healthbar, displayed at the bottom of the screen, which is updated everytime a player takes damage.

Figure 11: Ted, and the healthbar at the bottom.

- Loading Screen: Because we added a new scene to our game, I also had to manage how to transition between Vargfell, our main village, and this whole new map. Just like the very first defense, I came up with a simple but efficient loading screen, telling the player to "PRESS ANY KEY" if loading is done.

Figure 12: The loading screen between Vargfell and the Tutorial Island.

What remains to be done:

Everything went as planned, so nothing remains to be done to be on time.

What will be done for the next defense:

- Chat: Since the game is a multiplayer game, I want to implement chat so that players will be able to communicate, but the chat will also prints news and events about what's going in the game like "PlayerX left the game", "PlayerY joined the game", etc.
- Levelling: To make the levelling more visual just like in any other games, I will implement effects and visual signals to tell the player that he leveled up.
- Pause Menu: A crucial GUI part which is absolutely needed for the next defense is a pause menu, where the player can chose to leave the game, see the current player's list, and modify his settings.

A little feedback:
As always, doing the GUI is really enjoyable. It's a lot of visual work, and that's really what I like in this part. I had no troubles making my ideas come true, and making Nyr's interface a better place to be.

2.1.5 Items - Liam

What has been done:

- Fixing various bugs:

First of all, we fixed some issues with our scripts concerning picking up items. There were some conflicts when the player stored an item in his inventory.
There was no problem with the statistics of equipment parts, so we kept on working with a solid code base.

- Statistics:

The most important part of the work made on statistics is the levelling system. The player can reach a maximum level of 10. To level up, he has to gather up experience points. So, the work done on levelling an be devised into two main points: The level system and what happens when the payer reaches the next level.
To create a level system that could work with a UI we had to design a code that calculates, every time the player gathers experience, how much experience is needed to skip onto the next level. In fact, reaching level 2 from level 1 doesn't take the same amount of experience as reaching level 6 from level. So, the algorithm also takes this into account, that's why it works indexed on the current level of the player. Once the player has gathered enough experience, he can reach the next level.
But, there's one main issue we faced: What would happen if a player only needs 10 experience to reach the next level and gathers an experience orb of 100? To fix this issue, we had to adapt the algorithm so that at the next level, the payer keeps the extra 90 experience that we wouldn't want to disappear into the abyss but normalize it.

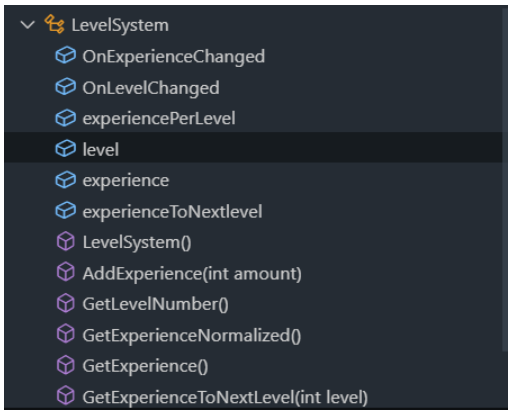

Figure 13: Screenshot of the architecture followed by the code concerning levelling

Next up is the part where the player gets to the next level. We promised in the last defence to make stats evolve according to level and we delivered. Whenever the player gets to the next level, it's amounts of health grow of a certain amount depending on the level he reached. The player will go from 100 to 120 health when he gets to level 2. But he will go from 300 to 400 when he reaches level 40.

- Chests:

Chests are an essential part of RPG games. They allow the player to get stuffs that will improve its statistics. From the basis we wanted to implement a chest system into Nyr. It should have been a system where players can store and select items into the chest but we decided that It the chest should only be open once, and the stuff will drop at random position around the player that interacted with the chest.

We decided to get into that direction to make sure there we no conflict with multiplayer and networking. It could have cause trouble whenever two player got access to inventory at the same time.

What hasn't been done as planned:

The objectives were followed and achieved before the deadline I was even able to do more. The only thing with what I could've done but not done in time is giving the items a proper appearance once they appear on the map.

What will be done for the next defense:

It is planned to add different sorts of player class from which you can choose at the beginning of the game. They will give you a different way of acting around the world. I also plan on making multiple unique chests with multiple unique items in it. Theses chests will be scattered around the map at strategic places.

A little feedback:

I really enjoy the challenge of working on scripts and see the results into a video game. It really feels pleasant when it works. But sometimes theorizing a system can take a lot of time until you find the correct formula. Working on chests was very challenging because I had to think of what I would like it to do at any time. Yet, I finally reached my objectives.

2.1.6 Network - Liam

In the previous report we said that we would implement a lobby system where player can access a room trough a server browser. We failed to do that due to the limitations fixed by Photon.

Even tough we faced this problem; we have improved the multiplayer experience in Nyr. Every three out of four times, the camera of one of the players was fixated on another's character from another player. This was due to some errors we had made in the player Prefab that spawns whenever a player connects. It happened when two players would join in a short span of time. The bug Is now corrected and networking is flowing and pleasant for the player, thus making the experience even better.

2.1.7 AI - Mathieu

What has been done:

- Added the statistics for the enemy
- Added the leveling
- Added the fight behavior and interaction with the player's statistics
- Added animations for the fight
- Implemented the death of the enemy destruction of the object

What will be done for the next defense:

- Add a health bar
- Create different classes of enemies
- Create a Boss

A little feedback:

We have done the hardest part on the AI, as we now have a solid bases with plenty of scripts. The only thing that remains to be done now is to create other classes of enemies by duplicating the object, adding an other model, and finally modifying the scripts so it has a different behavior in the way it fights or detect the players. We didn't fix an objective yet for the bosses (how they look, how much damages they give, how they attack and so on...) but we will figure this out. I am feeling much more at ease using unity now. I understand how the scripting part works. I started working on this part late compared to the planning as we faced difficulties in the organisation. However i implemented everything i said i would, except for the multiple classes of enemies but it isn't a problem as it is easy to do from now. Finally i want to explain briefly how the

combat system works : there are two ways of implementing combat for the AI : the first one is to have the same scripts for the player and the AI. However this method isn't interesting when it comes to implement levels for the enemy side, indeed as i didn't imagine the level and statistic system for the AI like Maxime and Liam designed it for the player, I duplicated the scripts for the player and created my own methods and variables management for the enemy. This way is longer to implement but it will make the task easier for the following work on the AI. Finally, there is not much to say on the animation part, it is just a system with Boolean variables used to know when the animations should play. As a choice I made the enemy disappear once the death animation played.

Figure 14: Screenshot from a fight

2.1.8 Website - Mathieu

What has been done since last defense:

- The hosting of the pages on GitHub.
- Updated the information on the game.
- Screenshots updated

What will be done for the next defense:

- Add the link to download the game
- Add the link to download the lite version of the game
- Add the link to download the final report
- Update the information and screenshots on the site for the final version

A little feedback:

You can now visit our website at the following address: `https://mathieu-cs.github.io/nyr_the_last_stand/`. The hosting took more time than i thought, as the asset i chose isn't supported by GitHub. Therefore i had to skirt this problem by defining the theme i chose as a "remote theme" in Jekyll. This little tweak allows one to host a website with any theme. However, by installing the plugins required for this, i lost the graphic work i did on the website as the files were updated when i downloaded the plugins. I'm still satisfied with the way it looks and this made me realise that i am not a great graphics designer because the base theme looks better than what i previously did. I just adjusted the size of the navigation bar, because it looked to small to me. Also i updated the information on the website with the progress of the team. This hosting part allowed me to understand few things about the way Git works. I had to read the documentation of GitHub pages to solve my hosting problems and the i am feeling better using git now, as i understand what a repository really is, the way branches and commands work and so on... There is not much to say more, this was a pretty short part but i am happy that it works fine.

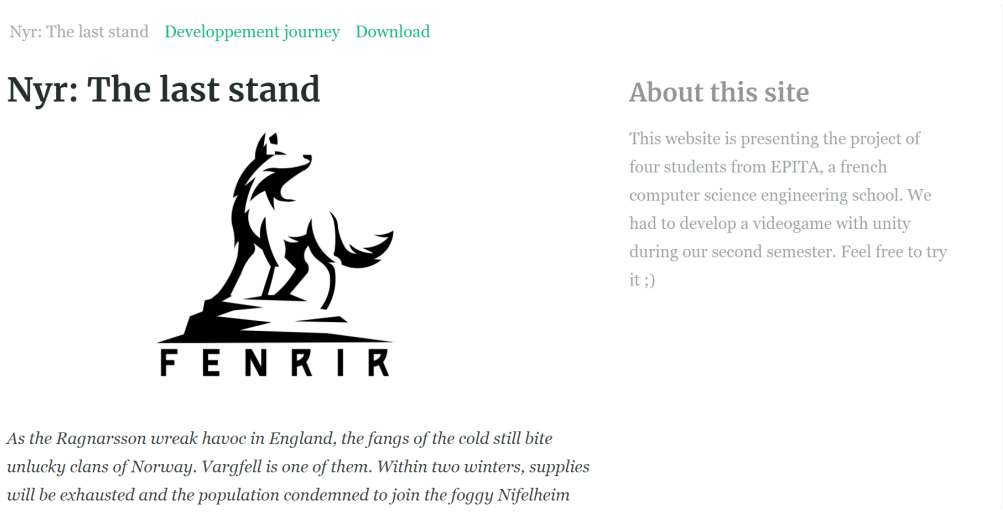

Figure 15: Screenshot from the website

3 Expected progress for the last defense

3.1 Expectations by parts

- ***Saves:***
  The saves will have to be implemented by the last defense. We should keep track of the player's progression so that his stats are the same when he quits and comes back to the game.

- ***Map:***
  The NPC Nora presented in the report will be upgraded by adding a dialogue system and two other NPC's will be added. As for the level generation it will be implemented in the game and randomize to the maximum.

- ***Player:***
  What needs to be done is a bit of polishing for the combat animations to make them more realistic. What is also planned is the behavior for when the player decides to leave the game.

- ***UI:***
  A multiplayer chat which will let players talk to each other, but also tells them about important events in the game. A pause menu is also in the works, and more visual effects for combat and levelling too.

- ***Multiplayer:***
  If we manage to rework our networking system, we would like to implement that lobby browser we failed to make work. The rest is just making sure everything is correctly instantiated.

- ***Items:***
  For the last defense, i plan on making unique classes of characters that specialize themselves on certain attributes.I will also make sure XP brings more depth to the game. It's objective isn't to make easier but more challenging.

- ***AI:***
  For the last defense, we will have three or four classes of enemies with different behaviors. We will also have a boss (a bigger enemy harder to kill).

- ***Website:***
  The information on the website will be completed and we will have a download link for the game, the light version of the game and the final report.

3.2 Planning for the last defense

Tasks	Passed defense	Current defense	Last defense
Saves	20%	50%	100%
Character	75%	100%	100%
Items	30%	75%	100%
UI	30%	80%	100%
World / Map	35%	85%	100%
AI	40%	70%	100%
Multiplayer	50%	80%	100%
Website	30%	80%	100%

4 Conclusion

We are on time for almost every part of the project. We advance as a team and we believe we will finish the game on time for the last defense. The network part is already done, and for most of the other sections, the hardest part is behind us. We are ready for the last part of the race and we will go to the end. Thank you for reading this report.

List of Figures