WSOA3004
Progress 1 Report

Devlan McKenzie - 1876492
Department of Electrical Engineering
Digital Arts Branch

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1 Introduction

This paper aims to serve as a research paper and will be looking at the topic of 2D platformers in the context of coding and technical implementation. This paper aims to provide some contextual background and enlightenment with regards to choices that will be made further down the line for both, myself and the reader of this paper. This is of particular importance as I am the programmer of group 9 and will thus be responsible for the implementation of the mechanics in the game and the assisted implementation of the 2D platformer in regards to assets. This also means that the code I produce will most likely be utilised in the final product for Assignment 3 in the context of WSOA3004. The code will most likely change over time and be adapted to the needs of the group and project as they arise, thus the code will go through many iterations and what is said here may change further down the line if a change is required.

2 Research Topics

This subsection will cover the topics that I have the intent to research, these are related to and viewed from a perspective of a programmer and thus will be from a technical implementation and coding context.

2.1 2D Platformer

Firstly the main and potentially biggest decision made thus far is that the game will be a platformer. To recreate a good platformer one must first understand what defines a platformer and how that affects the player and the experiences they are exposed too. This is all done in an effort to better understand what key aspects of a platformer are required and how to recreate them.

A platformer is defined as a sub-genre of video games and is often either a puzzle game or an action game. The main idea of a 2D platformer is that a player will control a character in game and guide this character through a series of platforms, hence the name platformer. These platforms can be elevated or grounded depending on the level design, the goal of the game is to collect specific items like coins or gems and either fight or avoid the enemies in the game. [1]

Now that a 2D platformer has been defined it is possible to gain some insight from the perspective of a programmer. It is clear that there is a need for a character controller with various movement

functionalities, these will be defined at a later stage, and in addition there may be a collection system which can vary from a basic coin pickup system to a more advanced collection system with unique items. The introduction of platforms that can be elevated in the air will require a more defined ground system so as to reset the jumping ability of the in game character. Furthermore there is mention of enemy characters which will interact with the player‘s character in some way. These interactions may vary in complexity and length and thus will need to be defined at a later stage in the development of this game.

In general there are 2 methods of displaying these types of games. There are pros and cons to both and they will be described below in more detail.

2.1.1 Front View

This subsection will be describing the mostly likely method to be implemented in our game; this is the Front View method which is also called the Front of the Scene Camera approach. In order to achieve this Front View the camera is placed at the front of the Unity Scene and faces the level with no angle and thus creates a flat image.

The benefit of this approach is that the player can only see as much of the scene as the camera covers, thus the player cannot see the whole scene and is gradually introduced to the game and its level. The camera will follow the player as they move and thus the character is able to explore more of the level at their own pace.

A technical implementation advantage of this approach is that procedural generation can be used to create an endless level or to create a unique level in the game. This can only be done because the player cannot see the entire scene and believes that they are exploring a premade level, while this may be the case it is not restricted in this sense.

If the game utilises a loot system in the sense of coins or specific items such as health potions, then the idea of procedural loot placement will allow for variation in the level or levels. These items will encourage the player to explore the levels and reward this behaviour.

The cons of using this method include the use of procedural generation which may be complex and require a larger amount of programming where a well-constructed level may out perform this procedural generation. In this way it is likely that the levels will be premade and well thought out such that the benefit of procedural generation may fall away.

2.2 Top-Down View

This subsection will be discussing the other method of displaying the game which is the Top Down view method. This method utilises a camera being placed in the ceiling‘s position and makes the player view the game from above.

This will create a flat image as well however it will be from above and while this is a reasonable method to approach the game, it will most likely not be utilized as the games looked at for inspiration which will be discussed at a later stage did not implement such a method.

The cons to using this method of implementation are the following the level may need to be completely designed and implemented prior to game-play which will increase the overhead of the game. Furthermore this method is more time consuming in the sense of level design then level implementation while procedural generation will be faster and allow for sooner prototyping.

If the system utilizes a loot system the relative complexity of level design will be impacted as the player can now move in all directions and thus the level must be designed to be vertical and horizontal. This increases the design overhead and will also impact the design of art and code.

These affects must all be considered when deciding on a method to utilize when prototyping the game in the early stages of development.

2.3 Game Controls

The Unity engine can support multiple platforms and thus has the ability to support many forms of interaction. The game will however be played on a Windows machine and thus will be using the traditional input device on that platform which in this case is a keyboard and mouse.

This decision was made early on and while this does limit the Freedom of Control in the game, the idea here is to rapidly produce a prototype so that play testing maybe implemented early on and often. Should the need arise for further Freedom of Control it can be implemented at a later stage.

This from a programmer's point of view alleviates some of the initial scripting load and allows for faster implementation of code for a single platform and single control method. This alleviation will allow for the further and better development of the core mechanics of the platformer be it puzzle or action based. This in turn will create a better finale product for submission and logically is the better option at this stage.

3 Inspirational Games

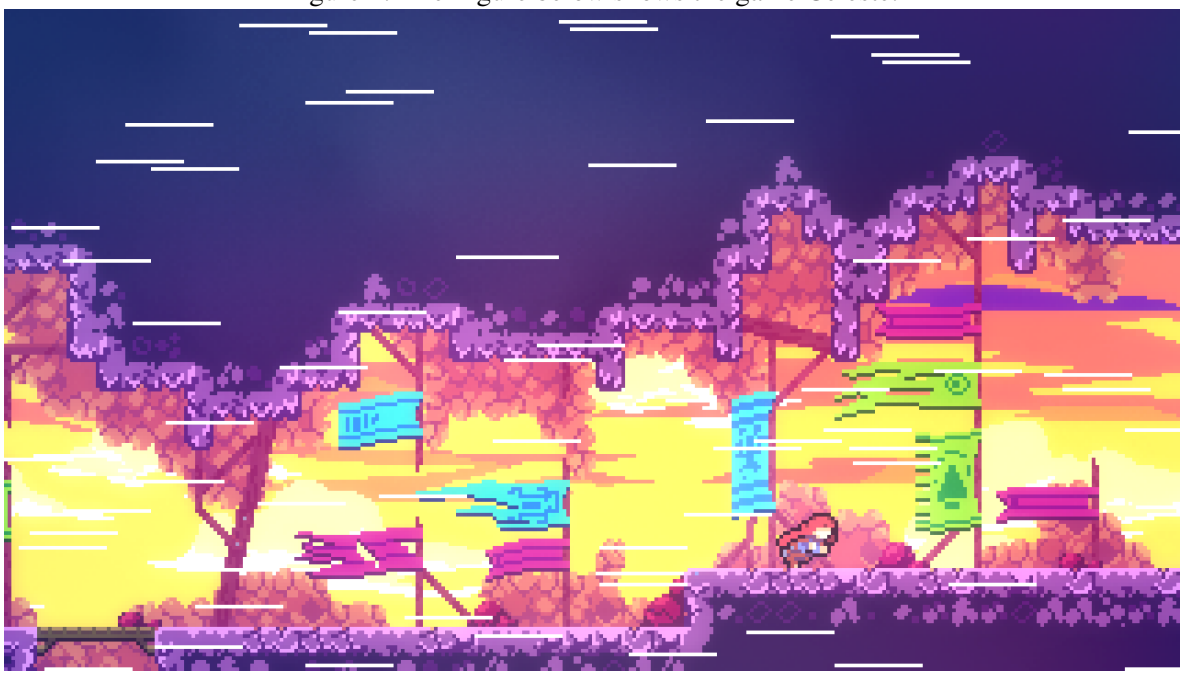
The game scope was now limited to 2D platformer games featuring puzzle or action based game play. The team looked towards games like Celeste, Fez, Limbo, Magicite, The Floor is Jelly and VVVVVV. These games provided sources of inspiration and these will be looked at individually below.

The games that the team drew particular inspiration from and planned to use to create the final game idea were Celeste, Fez and Limbo. The unique components from each were found to be attractive and are the reason for the interest in the games as the team hopes to implement these components in the final product in some way.

3.1 Celeste

This game features brilliant pixel art and is a single player narrative driven adventure game. This game is a 2D platformer which features journey and adventure as the main game goal. The team was interested in the way the game presented the adventure and encouraged the player to explore. This aspect is the component of the game that the team wishes to recreate and implement in their own 2D platformer game.

Figure 1: The Figure below shows the game Celeste.



From the above image it is possible from a programmer's point of view to derive that this game was likely implemented using a 2D character controller which features movement in the horizontal direction as well as some form of jumping and perhaps dashing. The level itself appears to be made with tile sets and a system which can implement them. This is an appealing feature as it will allow rapid level design and asset implementation, in addition the level creation can be explained basically to a designer and they can implement the level as they wish. This will overall increase work flow and team coercion.

This will allow the illustrator to create and potentially implement their own art assets in a scene. This will allow a parallel workflow to exist and increase all party members' freedom in terms of workflow as others will not necessarily be halted when they take slightly longer to implement assets. This is particularly important now as COVID 19 has negatively impacted party members and people across the world.

3.2 Fez

The game Fez is part 2D and part 3D however the team looked at it for its puzzle solving aspect. This aspect is typical in the platform genre and there is again a sense of story as the game is about this 2D character whom receives a fez which reveals that his 2D world is only one side of a 3D world, this character then gets to explore this new world.

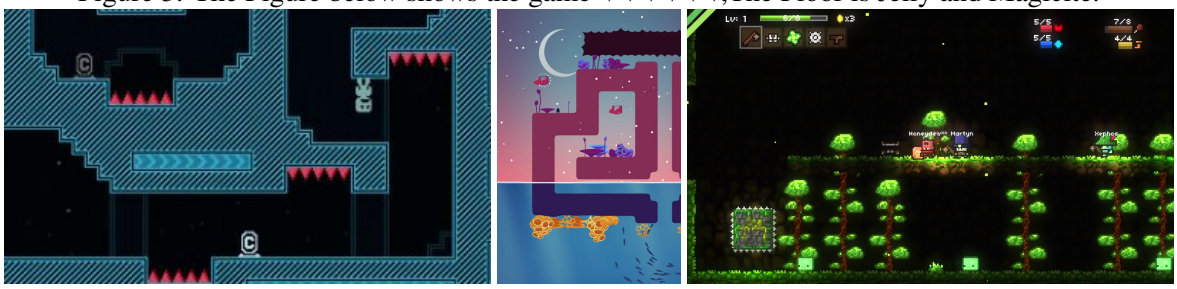
Figure 2: The Figure below shows the game Fez.

The sense of exploration and puzzle solving within this game was of particular interest to the team. The team wished to recreate these senses in our own game and thus wished to understand how they were implemented better so as to implement it ourselves.

The image above again shows that a 2D character controller will need to be implemented to recreate that level of movement, if one only looks at the 2D perspective of Fez as our team did. This level can also be recreated using a tile map. This game carries the same benefits as before, this being the parallel workflow and work implementation.

The team started to lean towards games of this type such as VVVVVV,The Floor is Jelly and Magicite. The images below show the same typical level layout and all lead to the confirmation of the 2D character controller and tile sets usage.

Figure 3: The Figure below shows the game VVVVVV,The Floor is Jelly and Magicite.



3.3 Limbo

The team decided to look at a different type of game from the rest that still met the 2D platformer genre and thus came across Limbo. The team members lean towards horror games and thus wanted to look into this game for its dark and eerie atmosphere.

This was of particular interest and the team wanted to recreate a similar atmosphere in our game. Limbo thus became an inspiration for the team and will be looked to in the future. The game Limbo features a story in which a boy is uncertain of his sister's fate which leads to him entering Limbo. This confirmed that it's typical for a story to be portrayed by the game and the team wanted to integrate this into the game as well.

Figure 4: The Figure below shows the game Limbo.

The image above clearly shows the kind of darkness that is portrayed in Limbo and how the use of silhouettes was used in the game. The team took interest in this and wishes to implement it in the game as well. This was a massive decision mainly driven by the personal interest in horror games found among some team members, this decision leads to the art being produced being of a black and

white color scheme however some color will be used in the game to keep players interested and to prevent the game being monotone.

4 Team Decisions and How they Impact My Role

This section will be discussing the decisions made by the team based on the content discussed above. These decisions will have a direct impact on my role and the work required from me.

Based off of the above research, the team is implementing a 2D platformer. This platformer will feature puzzle solving and exploration. The sense of a journey and the creation of an eerie atmosphere are also team goals.

The above research made it clear that a 2D character controller was going to be essential and would be implemented regardless of the team's vision of the game. This controller would need to feature horizontal and vertical movement of some kind be it jumping or being able to walk in all four directions. The game would also feature Tile sets and thus I would be required to set up or actually utilize the Tile Set system within Unity for level design.

The team's decision on a puzzle game means that I will likely have to code unique scripts for each puzzle unless they are generic puzzles. This can be done through script and trigger events of varying complexity which will be determined at a later stage of development.

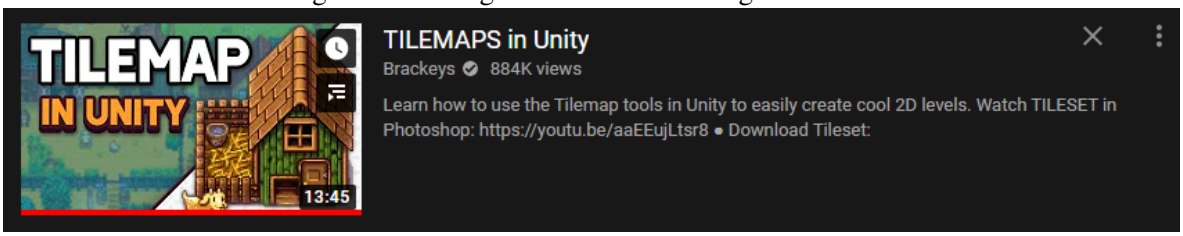
5 Additional Personal Research to Implement the Above

The above made it clear that I had to research more on the implementation of Tile Sets, 2D Character Controllers and potential atmosphere creation.

The method used for this part of the research was a bit more practical than the prior research as I would be implementing practical work and thus I turned towards YouTube and other sources of practical hands on content.

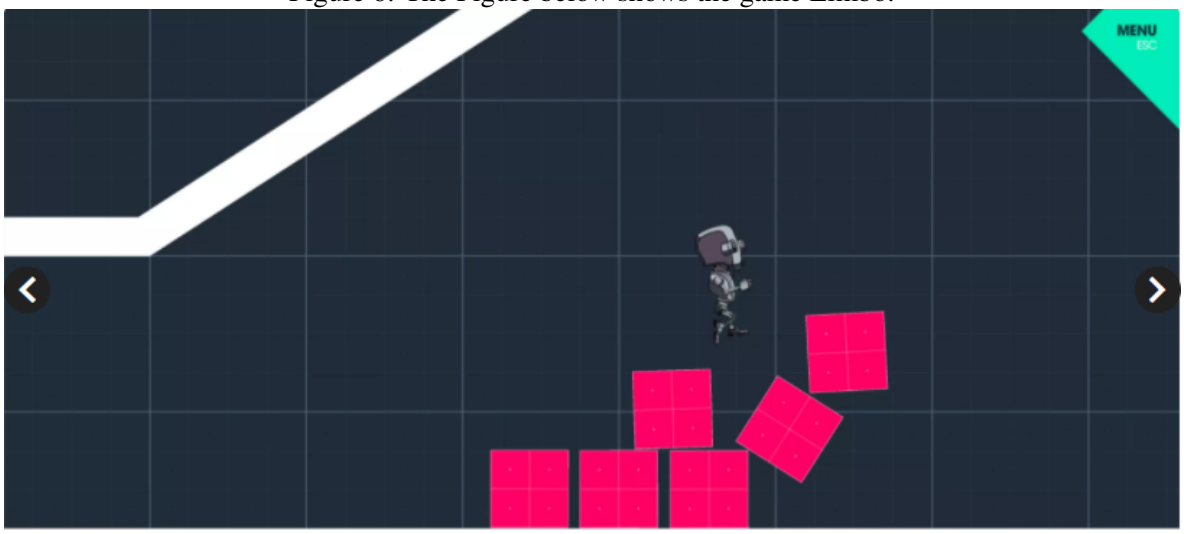
The tile sets I have looked into prior to this assignment and thus I have a general idea of the limitations and implementation, nevertheless I decided to review tile sets. I turned towards a YouTube channel called Brackeys; this channel makes great content and turned towards in general across the entire student body. The particular video I used to review the content will be shown in an image and a link will be provided.The Link is Here

Figure 5: The Figure below shows the game Limbo.



The 2D Character Controller was researched via practical download and use of the Standard Assets Unity package. This package is free and can be used in any version of Unity for free and is found Here

Figure 6: The Figure below shows the game Limbo.



This package featured a 2D platformer scene with a fully coded and implemented 2D Character Controller. I studied this and determined it to be easily achievable for a single input system. The length and complexity of the code required would also be reduced drastically as most of the Unity code was making use of multiple scripts so as to be use able by many platforms.

6 Conclusion

In conclusion this research paper has helped to define the core ideas that the team wished to recreate and implement in our game. Our game is taking core ideas from Limbo and Fez mainly with the wish to recreate experiences from other similar games such as exploration and storytelling.

The game will be implemented using Tile Sets and Unity Scripts to achieve level design and interactivity. This will be implemented correctly using guides from various sources described above and work will commence upon the handing in of this paper in that regard.

References

[1] T. Bhosale, S. Kulkarni, and S. N. Patankar, "2d platformer game in unity engine," *International Research Journal of Engineering and Technology (IRJET)*, vol. 5, no. 4, pp. 3021–3024, 2018.