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THE GAMEPLAN

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Abstract

I've always had an interest in games and Pacman is one of the oldest and most popular games in the world. Since its inception, Pacman has gone through many updates and changes, from 2D to 3D, with new gimmicks and power ups. I would like to make this particular game as I want to see if I'm able to recreate the feel of the original game while also updating it in certain areas and making it in my own image.

Doing this project, I hope to gain and improve skills that can be applied to future projects or my career. This project should give me a better understanding on how to use game engines when creating games. The research required and time that needs to be spent on the game means that I will improve on my understanding of coding and using game engines.

I've decided that I will start writing my code using the state design pattern, I have never used this pattern before so it should mean that I learn more about this design as well as comparing it to others to see if there is a more suitable pattern for this game.

AI is also something I will be focusing on and I want to make sure that the ghost AI functions as intended. By the end of this project my AI coding skills should improve as well as my understanding as to how they function.

What motivates me to complete this project to the best of my ability is that I've always wanted to make a game. Pacman has always been a game that finds its way onto one of my consoles or mobile phones. I feel as if I can make this game in my image and change some features of the game that I feel are outdated. Another reason is that I have tried before on multiple occasions to make a game on my own or with friends and I don't see the project through. This is what motivates me the most to complete this game.

Timeline

Term 1

1) History of Pacman – In order to make the game I need to look up the history of Pacman and how it was created, as well as how it has changed as time has gone by. Pacman has gone through many iterations and in order to create the game I need to understand it.

2) Game engine – I need to research a number of game engines and what they are capable of in order to find the best engine for Pacman. I need an engine that allows me to make both 2D and 3D games and has a number of features that would result in making the game easier.

3) Sprite sheets – Researching sprite sheets so that I can animate Pacman and the ghosts so that they move. Researching sprite sheets will mean that if I chose to, I can make Pacman in 2D and similar to the original.

4) World coordinate system – World coordinates allow distinct objects to interact with each other. This is important for me to research as I need the ghosts to know if they have hit Pacman, this will help me complete a core component of the game.

5) State design pattern – State design pattern is a method for creating my game. I can use a state design pattern to change the behaviour of the ghosts based on their state. This is one method of coding their behaviour and I need to research it in order to implement it correctly.

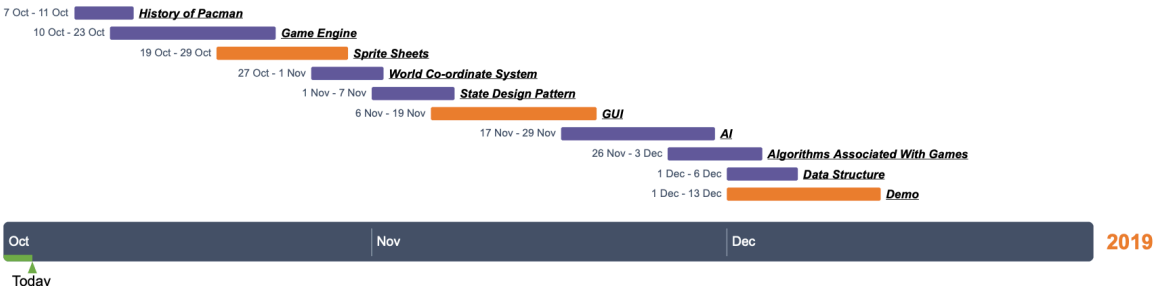
6) GUI – I need to create a basic GUI for my game. This needs research in order to make it as efficiently as possible as well as appealing and simple to use and navigate. Pacman is a relatively simply game so option menus should also reflect that.

7) AI – Research AI so that I can code the movement for the ghosts. They need to be able to decide what the best path is to the player as well as being able to react to the players input. They also need to be able to run from the player when they are vulnerable.

8) Algorithms associated with games – Look up the main algorithms used for creating games so I can implement them into mine. View the algorithms that made Pacman, see how I can change them to implement new features or make it more efficient

9) Demo - Demo showing object collision and animated movement. As well as state change and extra features such as the ghosts changing colour and flashing.

10) Data structure – Need to research this in order to answer the question is the maze a graph? If not what data structure?

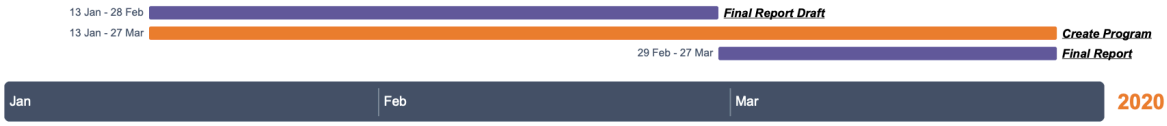


Term 2

1) Final report draft – Create a draft of my report that can be assessed allowing me to make improvements for my final report

2) Create program – Create my final game. This should be the finished definitive version that was created using my reports and programs.

3) Final Report – This is my final report. I will use the feedback given from the report draft to make sure that the final report is complete and meets the criteria.



Risk Assessment

The first risk that comes to mind and the one that is most likely to impact the project is my lack of knowledge or understanding of how to make this game. I've never used unity in much detail and my coding skills are not as well as others. Making this game may prove challenging and more time may be spent on learning how to use unity and make the game that it may derail my timeline created. If this does happen and I am not able to find time or rearrange my plan this would result in me not being able to complete my project. In order to make sure or lower the chances this doesn't happen I need to make sure I don't underestimate this project, follow the plan, and if I find that it may take longer than usual, I should change my plan accordingly and as early as possible.

Another risk is a lack of originality. Pacman is a relatively simple game and by making the game as close as to the original, the game won't be my own and I won't implement any of the features that I need to in order to meet the requirements for this project. During the project I need to show proof of concept by showing demos that I have made. This is not going to be easy as Pacman is a simple game so my demos need to include and show features that I want to add, making sure they show some of the examples that may have been listed in the template (for example 3D explosions). In order to reduce the chance of this happening I need to research more about the game and see if there are any gimmicks that have been added in the past and how successful or well received they are. This way I can find the best features that I can implement into my game as well as making sure I meet the criteria required for the project. By learning about the history of Pacman in my first week of this project starting, I am greatly lowering the chances of this happening.

Another risk is lack of planning. Although I have my timeline, if I'm not sure of how I'm going to implement all the programs I made and make sure they are all compatible and the final product works. I need to make sure that I have a clear plan throughout the project and that I don't change my mind or what I want the final project to be. The chances of this happening my be high as I tend to change design or ideas often in other projects made. If this does

happen, I need to make sure that I change any previous work before moving on to the next task to make sure I am not overwhelmed at the end.

Bibliography

The first source I have is the Pac-Man Wikipedia. This page is useful for multiple reasons. This page gave the history of the game, how it was made, who it was made by, its impact on pop culture among other things.

What I found most interesting however is the gameplay section. Here there is great detail about the way the game plays but most importantly, how the enemy's function. One thing I didn't know was that each ghost as a different name as well as different AI. One ghost will follow Pac-Man, where another will aim for a position in front of Pac-Man's mouth, one ghost tries to block Pac-Man, and finally one ghost is acts randomly.

I found this part extremely useful as it gives me a better idea of how the game functions as well as how the AI is coded, this means I can implement this same idea or change it if I see fit.
https://en.wikipedia.org/wiki/Pac-Man

The second source I have is the unity manual. This is available online and gives detailed descriptions of what you can do in Unity. The manual includes section that you can read to do with a specific topic. For example, there is a detailed section related to 2D games, this then splits into several smaller topics such as sprites or physics, this again splits into even smaller sections such as 2D joints or sprite masks.

This manual can and will help with my understanding using Unity when creating my Pac-Man game.

https://docs.unity3d.com/Manual/WhatsNew20192.html

The third source I have is a book by Robert Nystrom called "Game Programming Patterns". This book will be useful for learning the state design pattern. This also goes into great detail of other patterns which means if I feel as if the state pattern is not suitable for whatever reason I can compare it to other patterns to find the best option. This book also has more patterns such as optimization patterns which can be useful for this or a future project.

Game Programming Patterns – Robert Nystrom
(Website link to buy book https://gameprogrammingpatterns.com)

The fourth source I can use is a simple YouTube video showing how to make a simple 2D game in unity, this video is going to be helpful just for getting started and making sure I'm creating the game in the right order. This is to be used mostly as a guild line in case I get stuck or confused, as well as a method to learn new techniques in unity.

https://www.youtube.com/watch?v=on9nwbZngyw

The fifth source I may find useful is a book by Mario Zechner. The book title is "Beginning Android Games". The reason why I may find this useful is if I want to make the game on android or compatible with android (if I want to make it run on both platforms). Making the game on android will also mean I have to implement new controls among other new problems that wouldn't be on pc. This would prove challenging but also make the game my own. This book will only be used if when creating the game I find myself wanting more of a challenge.

Mario Zechner. Beginning Android Games. 2011 – Springer
(Website link to book https://link.springer.com/book/10.1007/978-1-4302-3043-4)