Unity3D Game Development – CarRacer

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Contents

About Unity

Abstract Creating a 3D game engine is not a trivial task as gamers often demand for high quality output with top notch performance in games [1]. Unity nowadays is one of the best game engine because you have two option to create a 2D or 3D game using Unity. 3D gaming more popular because of the quality and good graphic which make very attractive for the users to enjoy the games, this is happening because of good technology and good gaming engines, the gaming engines allow the developer to create good 3d features, good interfaces and the engines also allow the users to manage the scenes of the games. Unity asset store gives free asset to the developer to add in their game if they which to do so. Some of the gaming engine allow the users to learn different languages while some allow the users to game play. We will be talking about the future of 3d gaming engine how it has a gap for the market, local object and also about the Network.

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Chapter 1

Introduction

Nowadays games have become parts of our daily lives, children and adult both play games in their own spare time. Some users can spend long time on their phone playing games while only play games on their spear times. I found out that in 2013, gamers spent 6.3 hours a week playing video games. That up from 5.6 hours in 2012, which was up from 5.1 hours in 2011 [**?**]. As a result of this I am going to create a 3d car game in unity3d for my final year project, I came up with this idea because I often see people on their mobile phones either texting or play game, cause of this I decided to create 3d Car game to help the user to past time or either take time off work. I decided to undertake this project because I wanted to learn a new software engine and a new language, I also want to keep up with the technology and try some new technology because of this it was important for me to be organising so I can perform tasks more efficiently, its helps me find information and items faster without wasting time. This project is one of the most or I should say important project because I would learn new software and Langue that I have not learns before also this would give the user something to do when he/she is bored or travelling. Most people like play 3d games because of the graphics of the games is much better than the one in 2d game.

Goal and Objectives My project is basic on 3d car game which will aloud the user to dodge objects on its way. The main objective is to have different levels as possible, in order for the user to play a new level the user would have to win the first by collecting 10 coins before he/she can play the next level. The challenge is that the car will win point each time it collides with coins, once the user collects 10 points he/she would be able to process to the next level. I intend to get the score work before I can process to getting the database working also hope to put in a search bar for the user to put in his/her name if they got a highest score and will also display the top five

highest score and name of the users.

Scope My project is going to have different Levels, Level1 and Level2.

Level1 Level1 is going to allow the player to dodge objects on its way and also let the user to collect coins as the user race and this coins with give the user 100 points every time he/she collect the coins. In order for the users to race in Level2 they would have to win Level1. This level will have a selection that would show the user points he/she have. This score would be display on a database to showing users who has the heights points this will only be display if the user got a highest score.

Level2 This Level is going to have a lock that would only open when the user wins Level1. It will also have a score selection to show how many point the user has as he/she is play the game.

Technology Review In this selection I am going to tell you all about the technology I use to create my project and why I use the technology.

System Design In this selection I am going to talk about how different components came to gather to fit my game and how best it works.

System Evaluation I'm going to talk about how robust my game is working and what changes I would do it if I was to do it again.

Chapter 2

Methodology

Agile Agile is a common name for a number of different software process models. Even though different models share the same idea, the best way to developing software is though incremental development and delivery. However, the things they have in common are set of principles which are: -

- **Meeting:-** When I met with my supervisor he to me to add coins, score and then once I have that done I should add a database so that it will store the score in my database. Also told me to have different levels and put a lock on the levels so that the user would have to win levels before he/she can processed to the next Level.

- **Incremental delivery:-** My supervisor specifies what requirements are to be included so I had to go over and make sure I have this in my project.

- **People, not Process:-** It was important that I develop my own way of working, instead of blindly following what the process specifies.

- **Embrace change:-** I designed my game in such a way that I can change things in the game if need be, I can also do and update on the game.

- **Maintain simplicity:-** I kept my game simple folders and code simple.

Straight:-

- I was strong on communicating with my supervisor.

- I was good at looking for code or video that could help me with my project.

- I was able to change the codes that I found online to suit my project.

Weaknesses:-

- I could not get some of the code to work for the game.

- I was not able to accomplish my goals and also to put my game in the market.

Motivated:-

- I could not get some of the code to work for the game.

- I was not able to accomplish my goals and also to put my game in the market.

Testing:- I decided to test the game using PC, android and windows phone. In order to test the game I needed to first download visual studio after doing that I also download a SDK once I finish doing that I made sure it was working and then I went to unity3d, I click file, build setting and I selected Pc, Mac and Linux Standalone in Platform. For Target Platform I selected windows and I click build and run button and i hard to wait for it to load after it finish loading it will bring up the testing screen that allow you to text your game. The game was successful in the testing.

Chapter 3

Technology Review

Game engine is a software framework designed for the creation and development of games. Users uses this software framework to create consoles, mobile and computer games. 3D means three-dimensional, e.g. something that has Width, height and depth (length). Our physical environment is three-dimensional and we move around in 3D every day. In 1958 Dr. Willy Higginbotham created the first video game which was Tennis for two, it was a simple tennis game now that we look at it. Similar game was created in 1970's video game which was call pong. The first computer game Space war was developed in 1962 by Stephen Russell A.O. this games made way for many other games and which make way for game engines like Unity, 4A engine, Cube etc [1]. Before game engine where created games where games where written as singular entities e.g. game for Atari 2600 was designed from bottom up to make optimal use of display hardware [2]. Quake engine is the game engine developed, in 1996 it was developed by ID Software to power their video game Quake [6]. With the advent of feature rich smartphone platforms such as Android and iOS, people can now enjoy a wide variety of applications on the go [3]. 3D gaming is getting popular because of the graphics in different devices such as follow: - PCs, Play Stations (PS), X-box and also handheld devices as you can see the images below. 3D streaming has a rendered frame buffers for video encoding, its can captures and encodes the game audio. 3D gaming system is now both for homes and enterprise public environments, like hotels, Internet cafes, and senior housing complexes this is being use in order to attract customers to their businesses, it's happening nowadays because of variety low cost network devices. However as reference [4] smart phones have sensors that allow them to use touch screen not like before where users need joystick, mouse, keyboard etc. As refer to [3] I believe that smart phone battery lifetime doesn't last long because smart phones need faster CPUs and interfaces support by higher bandwidth this

are needed for 3D which make the battery very slow. the only way for the users to save battery when playing game is to put their phone on sleep mode also this will not affect the quality of the game and also if the game state is not important.

3.1 The Future 3D Game Engine

As refer to incorporate parallel processing algorithms into 3D engine[5]As refer to today gamers are using configuration, multiprocessor computer is an emerging technology trend in the industry, must of the research that has been done is now been attemp. The 3D engine that was develop uses multiprocessing to divide work among multiple processes and to also substance processes to manage data. They also demonstrate how processing operate between each other under different circumstance. 3D game engine is the core technology that drives games. 3D engine takes the geometry data of 3D objects in a game and show it on the display device which is a monitor. As refer to[1] Scene object culling is a process to discard objects that the viewer cannot see, whereas level-of-detail (LOD) control cuts down the insignificant details of objects with respect to the distance from the viewer.

3.2 Graphical User Interface (GUI)

Graphical user interface is a set of simple interface libraries to ensure the programs perception and mode of operation this is the same in all platforms. Widget are managed as objects in 3D scene, this can support complex rendering effects and realize [1].

3.3 Scene Manager

Scene Manager is responsible for organizing the objects in the virtual environment and providing efficient access or update interface. In the running system, Scene Manager is divided into two sub-modules which are Server and Client, referred to as SS and SC.

3.4 Local Object

Exist only in service Client, they usually effect in client such as particle effects, ground vegetation, shells and so on.

3.5 Network

Network packages the winsock2 is a programming interface that support program that handles input/output requests for internet applications in windows operating system. BSD Socket is a programming interface (API) is a set of standard function calls that can be used in an application. Those interface are application layer based on TCP/IP[6].

3.6 Design Issues in 3D Engine

Scene graph design is one of the most important 3d feature because it has direct implication to the overall usability of the 3d engine. Is define the way a scene can be develop by the programmers. A good scene should allow the developer to focus on the contents of the scene like objects and arrangement within the scenes so that they can be thinking of a way to present it and forgot about the quality of controlling the rendering pipelines. This programme will work with the 3d engine through the application programming interface of the scene graphy[7].

3.7 Some 3D Gaming Engine Language

Some of the 3d engine have different languages such as CSharp, JavaScript, Action Script 3, C++, OpenGL etc.[8] This 3d engine allow the user to learn a language so that it will be easy for them to use the engine or if the users already know the language the game engine is using then it will make it easy for he/she while some 3d game engine does not need to know a line of code or know advance programming here are some of the engines that allow the users to create a gameplay by not using coding Game Marker, Adventure Game Studio, RPG Maker etc. The following games engines are the engines you need to know a language or learn about it are Unreal Gaming Engine, Stencyl Gaming Engine, and Unity Gaming Engine etc.

3.8 CSharp

The following code below is what i use to creat my Play and Exit button: [9]

```
{CSharp}
<this>
  public class menuScript : MonoBehaviour {
```

```
public Canvas QuitMenu;
public Button startText;
public Button exitText;

void Start () {

QuitMenu = QuitMenu.GetComponent<Canvas> ();
startText = startText.GetComponent<Button> ();
exitText = exitText.GetComponent<Button> ();
QuitMenu.enabled = false;
}

public void ExitPress()
{
QuitMenu.enabled = true;
startText.enabled = false;
exitText.enabled = false;
}

public void NoPress()
{
QuitMenu.enabled = false;
startText.enabled = true;
exitText.enabled = true;
}

public void StartLevel()
{
//Application.LoadLevel ("Level1");
SceneManager.LoadScene("Level2");

}

public void ExitGame()
{
Application.Quit ();
}

}
</looks>
```

```
</this>
```

Chapter 4

System Design

up.PNG

Figure 1: Start up

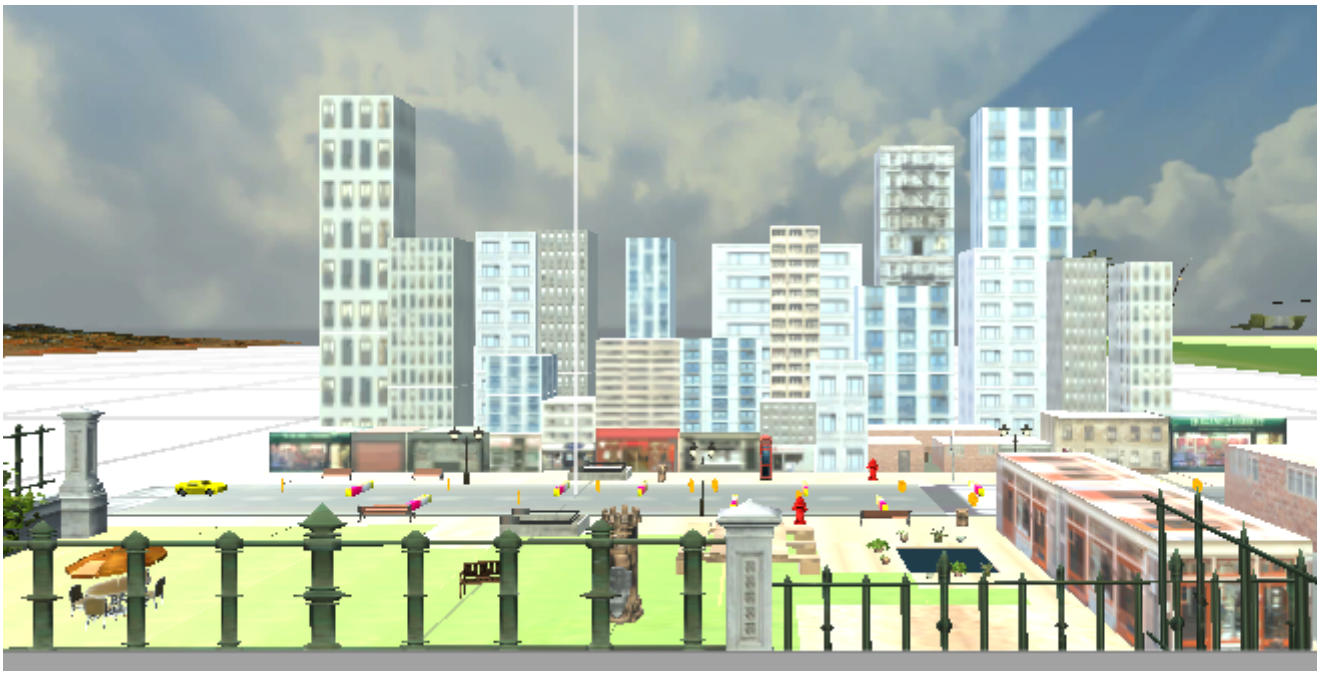

Figure 1: The city of the game

Option.PNG

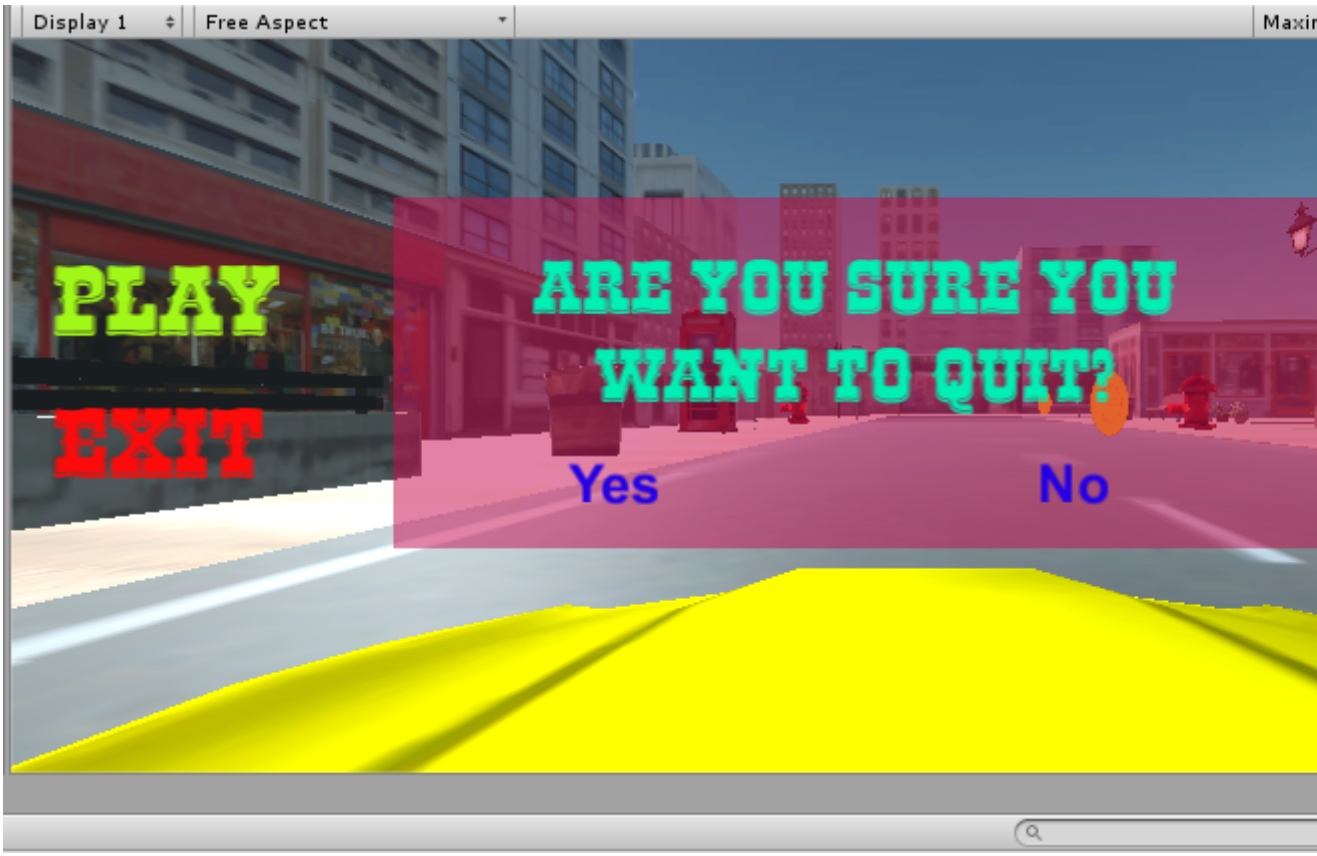

Figure 2: Exit: This give the user Yes or No option to quit the game or continue to play the game.

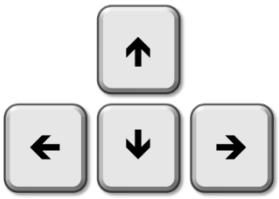

Figure 3: Arrow Keys: This allow the user to move the car forward, right, left and back.

Figure 4: Keys: The user can use the following W, A, S, D to move the car forward, right and left on their mobile.

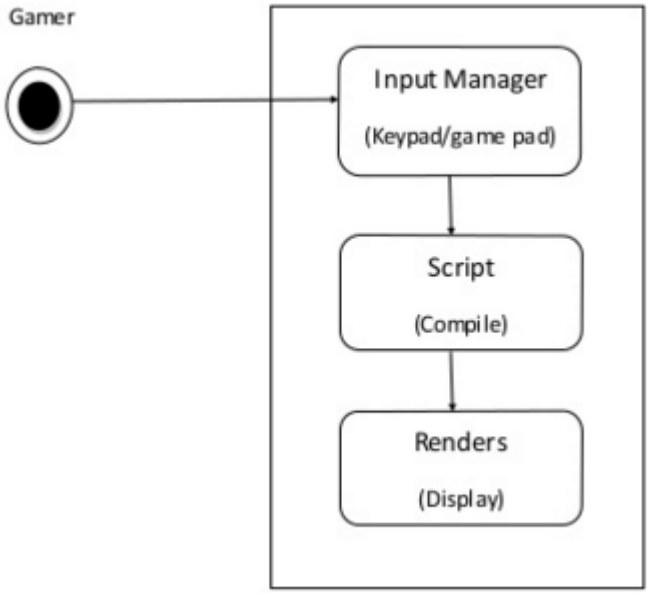

Diagram.PNG

Figure 5: RMI Diagram

As show in the picture above, I design my game in a way that it would make it easy for the user to use and understand it. I decide to put in a PLAY

button and EXIT button so that when the user click the PLAY button it would allow the user to start the game. If the user decides to click EXIT button it would bring up a message box asking the user if he/she is sure they want to exit and it give the user an option to click yes or no I choices to put this option because in my game sometimes you can accidently click on the EXIT button without know this will aloud you to go back to the game. In my game I store my game score to a database, I use my SQLite Manager to create my database table which allow me to store my score and this would allow the user to add his/she names to the database if they got a high score. In order for the user to go to the next level they would have to win the first level and if they fail to do so they wouldn't be about to go to the next level.

4.1 Scoring

The user will be scores on how many coins he/she collects and if the user collect 10 coin, it will take then to the next level.

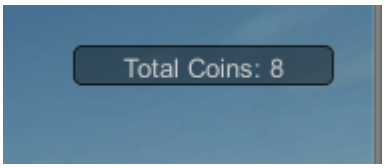

Figure 5: Score: This the scoreboard in the game.

```
{Cshape}
<this>
public class CoinController : MonoBehaviour {

public static int coinCount = 0;

void OnGUI()
{
string coinText = "Total Coins: " + coinCount;
GUI.Box(new Rect(Screen.width - 150, 20, 130, 20),coinText);
}
}

</looks>
</this>
```

Figure 6: This is the code i use to creat my scoreboard.

[9]

4.2 Control

The car start moving when you press the Arrow key, Up Arrow Key move the car forward, Back Arrow Key move the car backward and the Right and Left Arrow Key move the car right and left, if it's on the mobile it uses W, A, S, D to move the car.

Chapter 5

System Evaluation

I created my game in a way that it's easy to understand and it's robust. I believe my game is robust because the user can play it without any problem. I create my game in a way the user will have an option either to press play or exit, if the user decides to press the play button it would take them to start of the game so they can start to play the game and if the user decides to click the Exit button they would get an option which would ask them if they are sure they want to quit and they get a Yes or No. In my game I put coins so that the using can collect and each time they collect it they get points. For the user to unlock the next level they would have to collect 10 points. I can choose to put my game in different platform such as: - windows store, android, ISO, PlayStation 3, PlayStation 4, Xbox one, PlayStation vita and WebGL those are some of the platform that I can put the game on.

- Prove that your software is robust. How? Testing etc.
- Use performance benchmarks (space and time) if algorithmic.
- Measure the outcomes / outputs of your system / software against the objectives from the Introduction.
- Highlight any limitations or opportuni-ties in your approach or technologies used.

Chapter 6

Conclusion

Nowadays games are becoming a big part of our life, children and adult both play games in their own spare time. Most of the people either play games on their mobile phone or console. This allow developer to create games to all platform, I choose unity because it allow the developer to create their games to all platform which make it easy for developer to upload their game to the market place. Unity gives users an option in langue such as JavaScript(JS) or CSharp, I believe this is a great option because they can pick the langue they know or either pick a langue and learn it. Unity also allow developer to user both langue which is good. Unity help developer by giving the free asset and also give help them with codes on their asset store. I believe there are games out there to help user to learn either is English or maths this allow them to do it in their spare. My game will allow user to play in their spare or against friends which they would try to beat each other highest score this would make the game comparative and fun to play because they would have to win the first level in order to play the next level and also they would want their name to be in the top five highest score. The user would have to dodge object in his path and at the same time they have to collect coins. What I have learn when doing project is that a successful project is when people come together and communicate often.

- communicate frequently with good will.
- get others directly involved.
- have good automated regression test and also produce goods early.

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