Great Instructor Races

“You will RACE but will you ACE???”© (N)\*everLasting

Technical Document   
(Homework No.3)

Project team: (N)\*everLasting

Instructor: Dr. Araz Yusubov

Submitted in partial fulfillment of the requirements of the CSCI 4836: Game Development Fundamentals course project

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| --- | --- |
| Version date | Version information |
| 18.11.2018 | Initial draft |
| 18.11.2018 | In this version, we have described the prototype that we have already done. |

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| Other documents in the package | |
| File name | Brief description of the document |
| Audio.zip | Section 3, promised audio files. |
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| --- | --- | --- |
| Team member | Contribution to this homework (NOT the project) | Estimated % |
| Ilyas Karimov | Contribution to 2,5 | 25% |
| Sevil Jafarli | Contribution to 3,5 | 25% |
| Aytan Alakbarova | Contribution to 4 | 25% |
| Ismayil Bagirov | Contribution to 5. | 25% |

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# Introduction

This is part of the Game Design Document for a hypothetical project <Game Project Name> submitted for partial fulfillment of the requirements of the Game Development Fundamentals course in the School of Information Technologies and Engineering at ADA University, Baku, Azerbaijan.

<The information concerning the technical aspects of the game should be placed in this part of the Game Design Document. The Technical Document is best achieved with consensus from the people responsible for the Visual, Programming, and Audio aspects. On this point you will start constructing the game prototype; so many things will have to be technically clearer. This part of the document is meant to be modular. This means that it is possible to have several Game Technical documents attached to the Game Design Document.>

**<This document must be submitted in original Microsoft© Word format.**

**DELETE each and every instructional paragraph between < and > everywhere in the document[[1]](#footnote-1) and REPLACE ALL of them with your text. Keep the main numbered sections, but feel free to add sub-sections if needed. All consequent homework assignments will be based on this document, so give it enough thought.>**

< While doing further planning and getting better understanding of the project you may need to make changes in the HOMEWORK 1/2 content, such as additions/modifications to the Game Play or to Definitions. In this case edits in the Homework 1/2 content should be visible by turning the TRACK CHANGES option on through Review→Track Changes menu. Remember that the version information on the title page should be updated.

**Bonus:** Get extra **5%** (x2) points for revising and SUBSTANTIALLY improving each of the Homework 1/2 content.

All Microsoft© Word documents should be submitted as separate files. Any additional files of other types e.g. diagram and charts will usually be inserted to this document as embedded images, but the source files e.g. Photoshop .psd files should also be submitted. In this case (of having multiple non-Word files) all of them should be submitted as part of a SINGLE .zip archive file.>

## System Requirements

While developing a game, for every game, developers write the game(codes) through the applications with any existent versions (such as Unity 2017.2.15f2, Xcode 9.0) by which the system requirements are automatically detected or manually chosen. The reason of this action is to achieve a better performance so that players will not experience any kinds of issues while playing. Since in newer version applications it can be made heavier games with novel features, the system requirements should be there to restrict players with old hardware and software. In our case, as developers, we did not restrict the users by our requirements, however, the applications which we have utilized have its own requirements and they are mentioned down below:

**For developments**

**OS**: Windows 7 SP1+, 8, 10, 64-bit versions only; macOS 10.11+

Server versions of Windows & OS X are not tested.

**CPU**: SSE2 instruction set support.

**GPU**: Graphics card with DX10 (shader model 4.0) capabilities.

The rest mostly depends on the complexity of your projects.

**Additional platform development requirements:**

* iOS: Mac computer running minimum macOS 10.12.6 and Xcode 9.0 or higher.
* Android: Android SDK and Java Development Kit (JDK); IL2CPP scripting backend requires Android NDK.
* Universal Windows Platform: Windows 10 (64-bit), Visual Studio 2015 with C++ Tools component or later and Windows 10 SDK

**For running Unity games**

Generally, content developed with Unity can run pretty much everywhere. How well it runs is dependent on the complexity of your project. More detailed requirements:

* Desktop:
  + OS: Windows 7 SP1+, macOS 10.11+, Ubuntu 12.04+, SteamOS+
  + Graphics card with DX10 (shader model 4.0) capabilities.
  + CPU: SSE2 instruction set support.
* iOS player requires iOS 8.0 or higher.
* Android: OS 4.1 or later; ARMv7 CPU with NEON support or Atom CPU; OpenGL ES 2.0 or later.
* WebGL: Any recent desktop version of Firefox, Chrome, Edge or Safari.
* Universal Windows Platform: Windows 10 and a graphics card with DX10 (shader model 4.0) capabilities (See **References** [1])

## Concerns and Alternatives

There is always a risk in every operation(surgery) in medicine, but the probability of the risk depends on the hardness of the surgery, and the same goes for the development of the games. We can categorize the hardness of our game as **average** and mention that we experienced some hardships while developing it.

**Technical Issues:**

The first problem was to develop/find the relevant models since Unity Community Store is so limited with several of them and the models which were planned to be in our game do not exist or are not free of charge (they are paid) and we are reluctant to pay. The second problem was that some of our developers have different versions of Unity, which also caused some internal problems (graphical problems) while running the game. Some of the assigned colors were demonstrated differently, the color white was mixed with black, green and white and we did not find the cause of it. The third problem was related to photoshop, we rate its performance as mediocre and mention that we experienced some freezes/crashes while using it in the process of image editing and transforming.

**Alternatives:**

The first concern was time management since we are senior students and have limited time with different schedules, consequently, meeting, discussing and agreeing upon one unique conclusion took oodles of time. The second was related to assigning the written codes to one unique workplace since we have many individuals working on the code. Writing them individually and merging it was also extra time. We may also belong this issue to our document-writing because in the beginning, one person (the leader) should assign the tasks to group members and in the end, took all different parts and merge them and ensure the consistency exists. The third was the cartoon-based pictures of our instructors. In order to achieve high quality, we should find the high-quality pictures of our instructors, so we can transform it to cartoons, nevertheless, with the help of internet we are still incapable of it and through the photoshop, we were unable to achieve that quality.

## Resources

* **Unity Personal 2018.2.16** (game engine)
* **GitHub Inc** (hosting service for version control)
* Photoshop CC 2016
* **C#** programing language (Visual Studio IDE)
* YouTube Unity tutorials
* Unity Store

# Visual Content

* **General**
  + File Size Restrictions
    - Max. 1024 x 1024 pixels
  + File Format Type
    - Images: .jpg & .png
  + File Quality Type
    - Compressed
  + Visual Scale
    - PC: 8 GB max
* **Player Elements**
  + Type of States:

Game consists of 4 main states such as Default, Reward, Damaged, Destroyed, and 6 sub states such as 1.R, 2.R, 3.R, 4.R, D.1, D.2. While game starts, the state will be Default state. When it hits the rewards, the state will switch to reward state and it has 4 sub states. For example, picking up **Gulmammad Mammadov** booster will switch the state to 1.R state. Picking **Araz Yusubov** booster will switch the state to 2.R state. Picking **Samir Rustamov** booster will switch the state to 3.R. Picking **Emin Alasgarov** booster will switch the state to 4.R. There are objects such as stones and Farid Ahmadov that will result the state respectively change to D.1 and D.2 which are the sub states of Damaged state. Finally, when a car crashes with other cars, the state will be Destroyed state.

* + Amount Animation Frames: max 30 fps
* **Heads Up Display (HUD)**

Type Icons

States

Font Type

* **Antagonistic Elements**
  + Type of States:

Game starts at Default state and antagonistic elements will be during the Default state.

* + Amount Animation Frames: max 30 fps
* **Global Elements**
  + Background/Texture/Tiles
    - Background: 16:9 (max 1920 x 1080 pixels)
    - Textures: 1024 x 1024 pixels.
    - Tiles: 1024 x1024 pixels.
  + Font Type: Arial

# Audio Content

* **General**
  + **File Size Restrictions:** Uncompressed,max size : 5 MB
  + **File Format Type:**  .wav, .mp3 files
  + **File Quality Type:** Stereo
* **Player Elements**
  + **Type of Sound f/x**

1. Starting (sound of car engine)
2. Picking up power-ups (4 types of power-ups: Araz Yusubov, Emin Alasgarov, Gulmammad Gulmammadov, Samir Rustamov)
3. Crashing into other cars
4. Reaching the finish
   * **Device Vibration**

No vibration will be added

* **Antagonistic Elements**
  + **Type of Sound f/x**

5. Hitting the freezer

6. Hitting the stone

* + **Device Vibration**

No vibration will be added

* **Global Elements**
  + **Ambient Music**

7. Background music

* **Splash Screens**
  + **Ambient Music**

No sound for the splash screen

* **Menus**
  + **Type of Sound f/x**

8. The same **selecting audio** will be applied to all options from menu bar:

●New Game

○ Easy

○ Medium

○ Hard

● Top-10

● Exit Game

● Back

*Note: the sound files are attached in the zip file* ***Audio.zip*** *and numbered analogically.*

# Programming Content

General

* + Requirements: Since we used Unity 2018.2.15. f1/2018.2.16, we also require other developers to run our games in these versions since in other versions we experienced color changes which were mentioned in **technical issues** part.
  + **File Size Restrictions**: We do not have any file restrictions. The prototype is 77mbs for now, some new features are going to be added.
  + **File Format Type**: For the coding parts, the extensions are **“.cs”** and **“.sln”.** Where .**cs** is source code written in C# language and **“.sln**” (solution) is the structure for organizing the projects.
  + **Specify Coding Conventions**: we used our knowledge from our experience with programming languages. The naming of functions/methods are related to its actions, the variable names are related to tangible and intangible assets. Surely, the function name starts in capital, while the variable names start in small.
  + **Language/Device Restrictions**: C#, the devices had no problems with the application and software/hardware issues. The code written ran smoothly.
  + **Screen Type (Small, Medium, Large):** it is considered to be Medium.
* **Player Elements**
  + Type of Event:
  + The Player car (left and right moves)
  + The boosters (Emin Alasgarov, Araz Yusubov, Samir Rustamov, Gulmammad Mammadov - no movements)
* **Antagonistic Elements**
  + Other Cars (they move)
  + The Obstacles: Farid Ahmadov and stones (No movements).
* **Global Elements**
  + Score, high score and time are anticipated to be global variables since they are supposed to be related to other classes too.
* **Splash Screens**
  + No Splash screens.
* **Menus**
  + New Game is the option to start the game.
  + Top10 Board is for the 10 top high scorers.
  + In the options, you can choose the level of the games and turn of audio.

## Code Structure

We have made 2 scenes in the game called **Game** and **Menu, Main** menu and in the scripts.zip other than **MainMenu.cs**, all the other classes are related to Game. Also see the class diagram and interaction matrix below:

**Bonus:**

**Interaction Matrix:**

***Note: A.Y(Araz Yusubov), E.A (****Emin Alasgarov),* ***S.R*** *(Samir Rustamov),* ***G.G*** *(Gulmammad Mammadov),* ***F.A*** *(Farid Ahmadov) are used as objects name and are shortened for convenience.*

* ***The Antagonistic Elements are represented in red color***
* ***The other objects are represented in green color***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Interaction Matrix | Player | A.Y | E.A | G.G | S.R | F.A | Stone |
| Player | X | The car turns into a bus no 77, the score of the player doubles | The car is encrypted and intangible by other cars, the player moves forward easily without crushing. | The cars around, except the player’s car, will be affected by the gravity rules and will move with a slow pace | The score of the player will increase by 5000-50000 overall | The player will freeze for 5 seconds and lose that amount of time. | Player loses the game when it crashes into stone |
| A.Y | The car turns into a bus no 77, the score of the player doubles | X | x | x | x | x | x |
| E.A | The car is encrypted and intangible by other cars, the player moves forward easily without crushing. | x | x | x | x | x | x |
| G.G | The cars around, except the player’s car, will be affected by the gravity rules and will move with a slow pace | x | x | x | x | x | x |
| S.R | The score of the player will increase by 5000-50000 overall | x | x | x | x | x | x |
| F.A | The player will freeze for 5 seconds and lose that amount of time. | x | x | x | x | x | x |
| Stone | Player loses the game when it crashes into stone | x | x | x | x | x | x |

# References

1. <https://unity3d.com/unity/system-requirements>

1. This template is based on the Unity Curricular Framework ©May 2015 Unity3d. [↑](#footnote-ref-1)