CPT306 Individual Project
Coursework Assignment Specification

2021/22 Semester 2
Bachelor Degree – Year 4

Module Code	Module Leaders	Module Title
CPT306	**Hai-Ning Liang** **Nan Xiang**	**Principles of Computer Games Design**

Coursework Assignment Number: **3 of 3**

Method of Working: **Individual**

Coursework Title: **Creating a 3D Game**

Percentage (%) Weighting: **45% of the overall module marks**

Date and time of publication: **10:00 am on Friday, 22 April, Week 9**

Date and time for submission: **11:59 pm on Sunday, 29 May, Week 14**

General Instructions

1. One copy of this assignment should be handed via the module **Learning Mall** page at http://learningmall.xjtlu.edu.cn no later than the time and date shown above, unless an extension has been authorized by the module leader.

2. Before submission, each student must complete module coursework submission form obtainable from the module **Learning Mall** page. This assignment is being marked by student name and id, please ensure that you complete the correct coursework submission form.

3. Format of the coursework assignment submission:
   A **ZIP** file submitted via the **Learning Mall** module page containing the deliverables outlined in the "**What to Submit**" section of the coursework assignment specification.

4. Use of unfair means:
   You are reminded of the University's Code of Practice on the Use of Unfair Means and that the work you submit for assignment should contain no section copied in whole or in part from any other source unless where explicitly acknowledged by means of proper citation.

5. Late penalties:
   For work submitted late the penalty is loss of **5%** marks per day. Work that is **5** or more days late will automatically be graded as **FAIL**, and no re-submission will be allowed.

The story so far…

When the player wakes up, the player realizes s/he is not at home, but in a vast environment being hunted, by the most vicious creatures he could imagine. There're also mysterious bases in the environment, it can give the player superpower but can also transform into creatures. How long can the player survive?

Scenario (12 points)

The visual of the creatures and environment are up for decision of the group (see Figure 1 and Figure 2 for suggestions of examples of possible concepts of environment and creatures, respectively).

Figure 1: Concept of environments for survival game.

Figure 2: Concept of creature.

The whole environment should have:

- At least 3 scalable hills, they are at least 5 units tall;
- At least 2500 units of plains, with no dimension smaller than 50 units (see Figure 3);
- At least 10 immovable objects (e.g., tress, tombstones, boxes);
- All the characters must be clearly visible, especially if your game environment is in a dark style (see Figure 4);
- Barriers impeding the player from seeing the end of the terrain (see Figure 4).
- At least 30 Interactable objects: at least 10 bonus items and 20 bases (discussed in Gameplay section);

- A dangerous area such as a polluted pool, radiation zone, high temperature area. The size of this area should not exceed a quarter of the whole environment. The player will lose health points if s/he walks into the dangerous area (discussed in Gameplay section).

Figure 3: Minimum size of plain area.

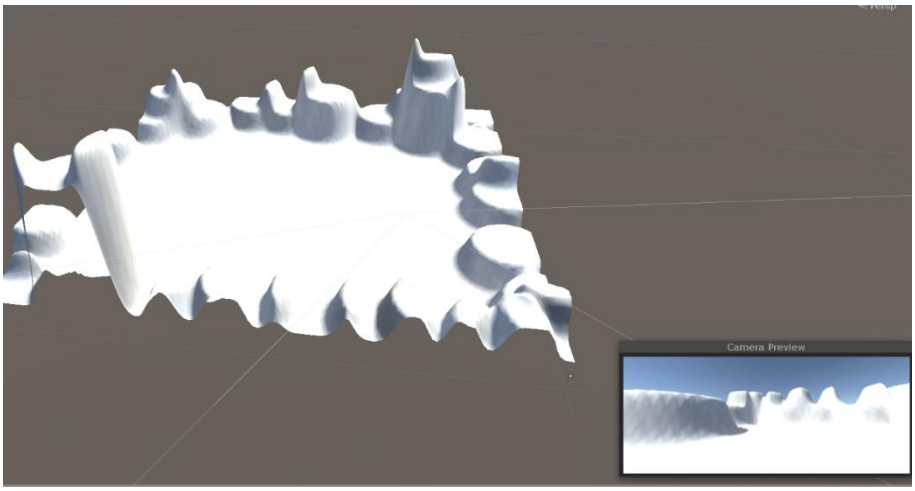

Figure 4: Example of Mountainous barrier.

Gameplay (35 points)

This is an endless survival kind of game, which means that the player will lose the game at some point. S/he is just fighting the inevitable. It is a 3D top down game. The camera follows the player with unchanged distance and angle. Figure 5 provides two examples.

Figure 5: Two examples of 3D top down games.

There must be 4 kinds of objects in the game:

1. The player;
2. The bonus items;
3. The creatures; and
4. The bases.

The objects must be distributed across the space (for an example see Figure 6), their amounts are to be decided by the designer as long as following these rules:

1. The player must be able to walk in any direction with a pre-determined speed (up to 7.0f), and s/he can run by doubling his speed but consuming his/her stamina points (SP). While running, the player loss 10 SP per second, and a full SP (100) can allow 10 seconds running. While

walking, the player would restore 20 SP per second till a full SP. The player should have 100 health points (HP), each time the player is reached s/he loses 20 HP. If the player is in the dangerous area, s/he loses 1HP every 2 seconds. HP and SP should be displayed in Heads-Up Display (introduce this later). There must be only one player in the game.

2. The bonus item must be floating slightly above ground in a position that allows for the player to obtain it. The bonus must be clearly distinguishable from all other objects and must spin slowly around its axis. The bonus items are allowed to have different meshes, as long as they all obey the previous rules. The bonus disappears as soon as it is touched by the player. It should respawn after 1 minute of collected and respawn at a random place in the plain. There must be at least 10 bonus items.

3. The bases must present some kind of visible change when touched by the player (e.g., black box → red box). The bases would give the player a superpower for 10 seconds once touched by the player. The superpower can be, for example, invincible status, overspeed status (3 times of walking speed), damage mitigation (-10 HP if reached by the creatures), etc. Please design at least one, at most three types of superpowers. The superpowers should also be visible and distinguishable on player's body (e.g., shining body). The contact should be enough to trigger the transformation without the need of button/key confirmation. The creatures would seek for touched bases. Once a creature touched a base, a new creature would generate (see next point). A new base should spawn 2 minutes after a base becomes a creature. The new base is generated randomly in the plain. There must be at least 20 bases.

4. The creatures should increase its speed with time, starting slower than the player until being just as fast as him/her (running speed). When a creature touches a base, its speed is decreased in 10%. Every time a latent creature appears it starts with half the speed of the creature who created it. There must be only one initial creature. All the creatures are attracted to the touched bases. All creatures must go after the player at all times, except if attracted by a base. In other words, compared to the player, bases are preferred by the creatures.

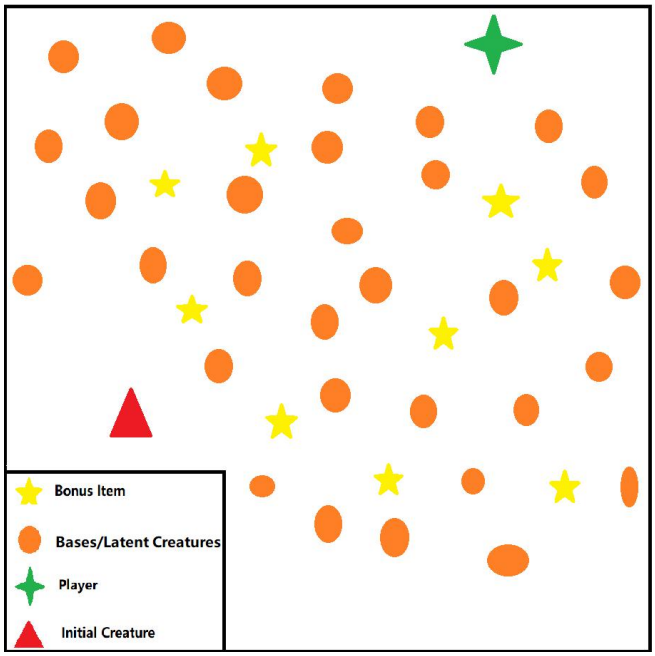

Figure 6: An example of an initial state (Aerial view).

Implementation

You have been asked to write your own code to implement the game using Unity and C#. The programming logic and environment for the game should be created by you. You are allowed to use native tools from unity such as terrain and physics (see https://docs.unity3d.com/Manual/UnityManual.html for allowed items) and aesthetical packages (that is, items that are only used to create the visuals) such as Mobile Tree Package (see Figure 7). No logic package from the asset store or other similar sources should be used including but not exclusively – FSM, A*pathfinder, Camera Transitions, fully developed environments or most part of a fully developed environment, or any other tool and libraries that help with the code. Further, your implementation should follow the specification detailed below.

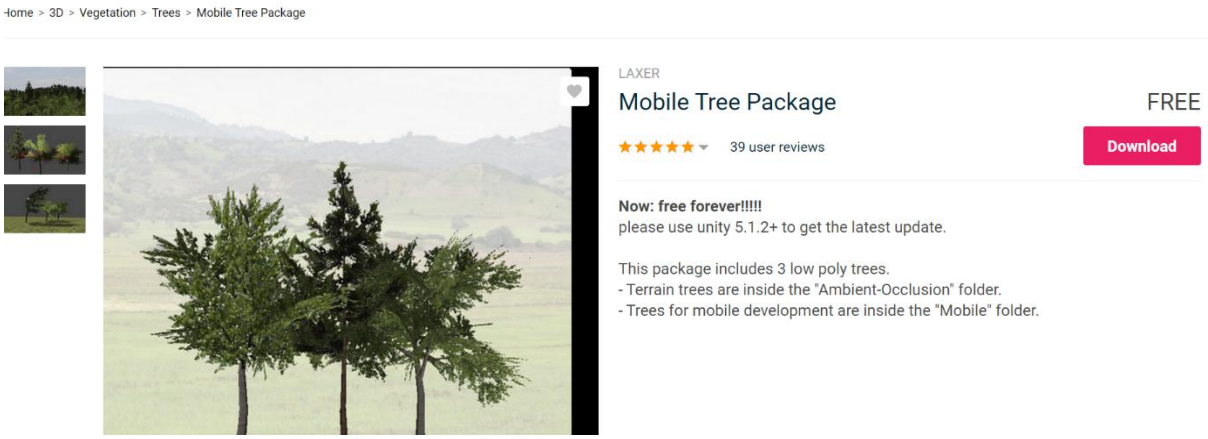

Figure 7: Example of allowed Aesthetical Package

Controls (5 points)

The user/player should be able to play the game using the following keyboard and mouse controls:

Control	Function
Left-mouse click	Interact with the menu
D	Move *"Player"* towards the right side
A	Move *"Player"* towards the left side
W	Move *"Player"* forwards
S	Move *"Player"* backwards
Shift	Run
Spacebar	Pause the entire game and awake the menu

Table 1: Specification of Player Control.

Heads-up display (HUD) and Scoring (20 points)

There is one heads-up display (HUD) area to be implemented in this game, at the top in which on the left side we will have two bars—red one represents HP and green one represents SP, and in the center, we will have the current score and on the right the number of existing enemies.

The scoring for the game is done by increasing the score by 1 for each 10 seconds, having it double after every 1 minute. Each collected bonus would give 10 scores, each touched base would give 5 scores.

Notification Messages and Menu (8 points)

The lose messages should be displayed as a pop-up display message while freezing the entire game. There is a button to return to the menu. Two different messages should be implemented.

Reason	Message Descriptions
To Lose – by getting a score no more than 50	[Insert Name of Creature]: don't think you fought brave enough. (Red Text) You get [Insert Score] this time. (Black Text)
To Lose – by getting a score over 50	[Insert Name of Creature]: we admired your futile efforts. (Golden Text) You get [Insert Score] this time. (Black Text)

Your game should have a menu. It should appear when first open the game and when the game is paused. It should at least include: a 'Play button to start a new game, a 'Resume' button to resume the paused game (only clickable if the game has started), a 'Guide' button to introduce the story and controls, an 'About' button to introduce the developer, and a 'Quit' button to close the game. Other elements that a menu might include are described in the following section.

Settings and Gave Save (15 points)

A 'Setting' button should allow the players to:

- Adjust the size of the game window: involves at least three options; note that, the game should be able to run properly in any of the window sizes.
- Adjust the sound effects: switch on/off the sound effects, and adjust the volume.

Game saves: a 'Save' button in the menu to save the current game locally, and a 'Restore' button to restore the saved game—the basic requirement is to have one save, that is, saving a new game would cover the old one. If your game can store and read multiple saves, you will get the remaining marks.

Self-Reflection Report (5 points)

This report is to help you recall the design and development experiences from this assignment. It is not intended to be lengthy—the maximum of this report is 1 page. It should at least include the following two parts:

- A reflection about what you have learned, what difficulties you have faced, what kinds of design or development issues you have faced while making this game. You can also discuss about the design elements that you failed to implement, why you failed, and how you can address them next time.
- A discussion about legal, social, ethical, and professional issues that might associate with your game. In addition, you can discuss how to prevent these issues.

What to Submit

Your **ZIP** file should include these files:

- Submission form (.pdf). The submission form should be properly completed with your signature. It is available on **Learning Mall**. Submission form with incorrect information certainly will affect your marks, so carefully complete the submission form. The submission form should be properly named as mentioned below.

- The entire Unity project (folder).

- Executable file of your game (.exe). Please build your game and include all the related built files in the submitted ZIP file. Note that, the target platform should be **Windows**.

- Game specification (.doc). This document should indicate which version of Unity, the setup you used to develop the game, and the setup for playing the game. If you have any special issues about the game, you can also write down here. Please make this document concise.

- Self-Reflection Report (.pdf).

Please make sure all the required files can be opened and run properly on a **Windows** computer. Please use your **First Name**, **Last Name** and **Student Number** to name above mentioned files and the **ZIP** file—for example **Haining_Liang_999999** will be the name of the files module leader would be submitting, with 999999 being as his student number. Any submissions with improper or incomplete file names certainly will affect your marks, so carefully name your files.

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