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Advanced Computer Lab Winter 2021

Final project: Apex Legends

Due: 11:59 pm January 3th 2022



1 Guidelines

This project should be done in groups of minimum 5 and maximum 7 students. We will use the Bold letter "X" to refer to the number of team members throughout this document. You can share ideas, consult the manual, and search online. However, all work done in this project must be done by the team members and the team members only. All team members should work on this project equally and no work should be done by anyone outside the team. Individual evaluations **WILL** be conducted at the end in order to verify that. kindly **submit your team** via the following link by maximum **Thursday 16th December** <https://forms.gle/ddnXMrrFVpnfGchq5> All external assets used (including those from unity asset store) must be credited in the credits section of the main menu.

Use Unity and C# to create this project. Once you are done, build the project into a .exe and compress the whole folder in a zip file. The zip file should be named in the following format StudioName_Project (Ex: UniSoft_Project). Upload the zip file to your own google drive and provide us with the shareable link ("can edit" enabled) when you are submitting. Use the following link to submit your .zip file: <https://forms.gle/pcVR2iQoFVtEq4G88>

2 Description

Apex Legends is a first person shooter (FPS) game. Before the match, players form into two- or three-player squads, and select from pre-designed characters with distinctive abilities, known as "Legends". The game has two gameplay modes. In "Battle Royale", up to 20 three-person squads or 30 two-person duos land on an island and search for weapons and supplies before attempting to defeat all other players in combat. The available play area on the island shrinks over time, forcing players to keep moving or else find themselves outside the play area which can be fatal. The final team alive wins the round. In "Arenas", players form into three-player squads and fight against another squad in a 3v3 team deathmatch over a series of rounds to determine the winner of the match. Teams win when their team has at least 3 points and is 2 points ahead. This description is a simplified version of the game. If you are unfamiliar with the game, you can check out the entire gameplay by following these links:

- <https://www.youtube.com/embed/DVL0ldgkQDw>
- <https://youtube.com/clip/UgkxVMsmsbeGPsS-M7z0Gr0aC5HtdiQe8e4y>
- https://youtube.com/clip/Ugkxc0q9kvcIZIz89Qx1XJ1f8i_w_jYRmxTR
- https://youtube.com/clip/Ugkxacg60qUuoWT_IxURpWa0fqILX-i0q92B

Note: The entire gameplay of the game from the first level until the boss is defeated should take 5 to 10 minutes.

3 Rules of Play

3.1 Player

1. A player is controlled in a **1st person** perspective.
2. A player can move using the movement buttons.
3. A player can move faster by pressing the sprint button while pressing the movement buttons.
4. A player can jump using the jump button.
5. A player can toggle between standing and crouching by pressing the crouch button.
6. A player **CAN NOT** sprint while crouched. Pressing the sprint button while crouched automatically un-crouches the player (**stands up**).
7. A player initially has **100 health** points, which is the **maximum**.
8. Initially, a player **is not equipped** with any weapon.
9. A player can pick up primary/secondary weapons.
10. A player can hold up to one primary weapon and up to one secondary weapon.
11. When a player picks up a primary weapon, the player drops the currently equipped primary weapon, then he/she picks up the newly equipped primary weapon.

12. When a player picks up a secondary weapon, the player drops the currently equipped secondary weapon, then he/she picks up the newly equipped secondary weapon.
13. When a player picks up a primary weapon while holding a secondary weapon, the picked up primary weapon gets stored without being swapped with the currently secondary weapon and **vice versa**.
14. A player can use the fire button to fire their currently equipped weapon as long as it currently contains ammunition (Ammo).
15. Some weapons require holding the fire button, while others require a single press. Kindly, refer to section 5 for more details.
16. A player's ammunition is initially empty.
17. A player can pick up primary/secondary weapon ammunition from the ground.
18. A player can carry maximum **150** amount of primary weapon ammunition as well as maximum **5** amount of secondary weapon ammunition.
19. Whenever a player picks up a primary ammunition, the respective stored type increases by an amount of 50, (**if and only if**) the amount currently stored is below the respective amount.
20. Whenever a player picks up a secondary ammunition, the respective stored type increases by an amount of 2, (**if and only if**) the amount currently stored is below the respective amount.
21. A player can refill their currently equipped primary weapon from the stored primary ammunition weapon.
22. A player can refill their currently equipped secondary weapon from the stored secondary ammunition weapon.
23. The player keeps track of the number of enemies shot by (him/her).
24. The maximum value the **special-ability meter** can have is **100**.
25. The special-ability meter starts off empty.
26. The special-ability meter **increases** by a **rate of 5 special-ability points per second**. The regeneration **stops once it reaches the maximum amount** of special-ability.
27. A player can perform their **special-ability** by pressing the "special-ability" button **if and only if** their special-ability meter **is full (reaches 100)** and the special-ability **is not already deployed**.
28. After performing the **special-ability**, its meter should be **reset to zero**.
29. Whenever the player gets hit, he/she loses an amount of health points based on the weapon used to attack him/her.
30. A player can pick up health packs from the ground and thus, their health **increases by 25**, **unless the player's health points are less than 75**.

31. Whenever the player's health points **reaches zero**, the player **dies** and **“Game Over screen” is displayed**.
32. Any item that gets picked up from the ground by the player should be destroyed.

3.2 Enemies

3.2.1 Champion

1. Enemy champion can either stand **idle** or **walk** in patterns around the arena.
2. Enemy champion should **go after and attack** the player whenever the player enters his/her range.
3. Enemy champion can use their primary weapon to attack the player.
4. Enemy champion **CAN NOT** jump, double jump, crouch, change weapons.
5. Enemy champion initially has **100** health points.
6. Enemy champion should have a **health bar above them**.
7. Enemy champion attacks every **fixed interval** (e.g: every 3 seconds) while the player is in range.
8. Whenever an enemy champion gets hit, he/she loses an amount of health points based on the damage amount of the weapon used to attack him/her.

3.2.2 Hero

1. Enemy hero can either stand **idle** or **walk** in patterns around the arena.
2. Enemy hero should **go after and attack** the player whenever the player **enters his/her range**.
3. Enemy hero can **only** use its primary weapon to attack the player.
4. Enemy hero **CAN NOT** jump, double jump, crouch, change weapons.
5. Enemy hero initially has **400** health points.
6. Enemy hero should have a **health bar above them**.
7. Enemy hero attacks every **fixed interval** (e.g: every 3 seconds) while the player is in range.
8. Whenever the enemy hero gets hit, he/she loses an amount of health points based on the damage amount of the weapon used to attack him/her.

4 Controls

4.1 Player Controls

1. The player controls the camera with the mouse movement (player Look At).
2. The player controls the walking movements forward and backward using the up and down keys as well as the "W" and "S" keys respectively.
3. The player controls the champion walking movement right and left using the right and left keys or the "A" and "D" keys respectively.
4. The player runs/sprints by holding down left-shift along with one of the movement keys.
5. The player jumps by pressing space.
6. The player double jumps by pressing space mid air.
7. The player crouches by pressing "C" or left ctrl key.
8. The player fires bullets from their currently equipped weapon using left mouse click.
9. The player can pick up weapons by pressing "E" key.
10. The player can reload their currently equipped weapon using "R" key.
11. The player can switch between different weapons types (primary with secondary and vice versa) using "Z" key.
12. The player can activate their special-ability by pressing "Q" key.
13. The player can pause the game by pressing ESC.

5 Weapons

5.1 Primary Weapons

Each weapon has the following properties:

- **Damage Amount:** The amount of damage each bullet deals.
- **Firing Mode:** Automatic (fires by holding)/ Single-shot(Fires on singles press)
- **Fire Rate:** How many bullets are fired per second.
- **Ammo Count:** The maximum amount of bullets in a weapon
- **Range:** The distance the bullets is effective for, after which no damage is dealt.

5.1.1 Assault Rifle

- Damage Amount: 10
- Firing Mode: Automatic
- Fire Rate: 10
- Ammo Count: 35
- Range: 65

5.1.2 Sniper Rifle

- Damage Amount: 85
- Firing Mode: single shot
- Fire Rate: 1
- Ammo Count: 6
- Range: 100

5.1.3 Shotgun

- Damage Amount: 70
- Firing Mode: single shot
- Fire Rate: 3
- Ammo Count: 12
- Range: 30

5.2 Secondary Weapons

Secondary weapons can damage not only the enemies, but also the player himself.

- **Flame Grenade Launcher:** it launches a grenade projectile, that fires in a curve downwards, and creates a flame explosion of a radius of 4 units for a period of 5 seconds upon making contact with an object. The fiery explosion causes a damage of 25 points per second to the anyone within its range.
- **Grenade Launcher:** it launches a grenade projectile, that fires in a curve downwards, and creates an explosion of a radius of 4 units upon making contact with an object. The explosion causes a damage of 50 points to the anyone within its range.

6 Characters

In this section you will find a detailed description of different characters and their special-abilities as well as passive-abilities. Special-abilities can be triggered by the player after the special-ability meter is full. Passive-abilities are always active on the character. If your team consists of **5 or 6 members**, you are required to implement **2 characters**. If you are team consists of **7 members**, you are required to implement all the **3 characters**. You are **required** to implement **Loba character** and choose from the other two characters according to your team number. At the start of the game, the player will get to choose which character to play with, where each character has one of the following abilities:

Note: *All the characters' abilities should be implemented only in the Combat Level*

6.1 Loba

6.1.1 Passive-ability: Secondary Ammunition

The character has double amount of the maximum secondary ammunition.

6.1.2 Special ability: Teleportation

Whenever teleportation ability is activated, the player throws a certain object (3D model) in a curve down-wards. On contact with the ground, the player teleports to the location of the object and the object gets destroyed.

6.2 Bangalor

6.2.1 Passive-ability: Fast Runner

This character has the ability to run twice as fast as the other characters' running speed.

6.2.2 Special ability: Defensive Shield

Visually represented as a small front-faced shield deployed only around the player which protects them from any damage for 10 seconds.

6.3 BloodHound

6.3.1 Passive-ability: Midair Jump

The character can double jump in mid-air while being airborne.

6.3.2 Special ability: Core Ability

The current weapon automatically fires at the nearest targets within a distance of 10 unit radius and does not consume ammunition in this mode.

7 Level Design

You are required to have at least two levels throughout the game; one combat level and one parkour level. You can create your own levels or use some of the original ones from the game as a reference.

7.1 Battle Region

The battle region is a **visually represented spherical area** that surrounds the player and the enemies. Initially, it encapsulates the whole environment, then shrinks every 30 seconds until it is fully vanished. The game play interactions occur normally within this zone. Whenever the player is outside the zone, he/she will lose 10 health points every 10 seconds. In addition, whenever an enemy is outside the zone, he/she dies.

7.2 Combat Level

- A combat level is a level where the player **must** kill all enemies before reaching the end.
- A combat level must contain both enemy champions and enemy heroes.
- A combat level must contain a minimum of **2X** enemy champions.
- A combat level has **int(X/2)** different types of enemy champions where each type has a particular primary weapon equipped.
- A combat level must contain a minimum of **X** enemy heroes.
- A combat level should have **int(X/3)** different types of enemy heroes.
- When the player is the only remaining survivor within the battle region, he/she goes automatically to the next level.
- If the player dies, the credits will roll and the game ends.

7.3 Parkour Level

- A parkour level **is the 2nd level** of the game where the player must use the champion's platforming abilities (i.e. jumping, double-jumping, crouching) to reach a goal area.
- **Platforming Abilities** should be implemented regardless of the character chosen at the start of the game.
- In this level the player dies by falling into an endless void if they fail to platform correctly.
- Choose from one of the levels of the original game or create your own.
- When the player finishes a level by reaching a particular trigger area, he/she goes automatically to the next level or the game ends and credits roll.

Note: The Battle Region should be implemented **ONLY** in the Combat Level

8 Screens

1. Main menu

- Start : takes the player to the choose character screen which allows him/her to choose his/her the character of this game play the game.
- Options
 - Audio
 - * Music level
 - * Effects level
 - How to Play
 - Credits
- Quit Game

2. Choose Character

- allows the player to choose a character. This character cannot be changed throughout the game.

3. Pause Screen

- Resume
- Restart
- Quit to main menu

4. Game Over Screen

- Restart Level
- Quit to main menu

9 Heads-Up Display (HUD)

The HUD is the display area where players can see their character's vital statistics such as current health, bonus attributes, armor level, ammunition count, and more.

9.1 Player's HUD

- Health bar
- Ammo count (Ammo Count/Maximum Ammo)
- Special-ability bar
- Weapon selected (Name)
- Battle Region Indicator (tells whether the player is inside or outside the region)

10 Graphics

10.1 Models

You will need models for the environment, characters and weapons. You can use models from the game, or alternative models as long as they are fairly representative of the requirements.

10.2 Animations

1. Player Animations

- Falling (Once the player loses in the combat, the animation will be played on a 3D Model representing the player)
- Idle (or) Celebration (Once the player wins in the combat, the animation will be played on a 3D Model representing the player)
- Pick Up (Hands 3D model should be used to apply the pick up animation on picking up any item)

2. Enemy Champion Animations

- Idle
- Walking
- Sprint/Run
- Firing Weapon
- Hit Reaction
- Dying

3. Enemy Hero Animations

- Idle
- Walking
- Sprint/Run
- Firing Weapon
- Hit Reaction
- Dying

11 Sounds & Music

11.1 Sound Settings

The audio in your game should be divided into at least two independently controllable categories; Music and Sound effects (SFX). The easiest way to achieve that in unity is to create at least one audio mixer with at least two groups other than the master. Each group should represent one of the two categories and all the clips belonging to that category must pass through it. This way, you can control the entire audio category by controlling its mixer group.

11.2 Sounds Needed

1. Effects

- Footsteps of player champion as he moves.
- Footsteps of enemy hero as he moves.
- Footsteps of enemy champion as he moves.

2. Feedback

- When player is hit.
- When player dies.
- When an enemy is hit.
- When an enemy dies.
- When picking up a weapon.
- When switching the weapon.
- When bullets are fired.
- When bullets hit an enemy.
- When bullets hit the player.
- When player exits the battle region.
- When player enters the battle region.
- When activating core ability.
- When activating defensive ability.
- When activating the teleport ability.

11.3 Music Needed

- Slow-paced track for the main and pause menus.
- At least **two tracks** for the game levels depending on the atmosphere.

12 Cheats (Optional)

Implementing cheat codes is **optional**. We highly recommend you do them as this will help us to test individual aspects of your project, just in case we were not able to test it throughout the game.

- Spawn Enemy Champion (with AI)
- Spawn Enemy Champion (without AI)
- Spawn Enemy Hero (with AI)
- Spawn Enemy Hero (without AI)
- Spawn Primary Weapon

- Spawn Secondary Weapon
- Spawn Primary Ammo
- Spawn Secondary Ammo
- Go to Parkour Level
- Go out of the Battle Region
- Activate Special-Ability

13 Useful Resources

The following links might be helpful to you during your implementation:

- [Unity Standard Assets \(Asset Store Version\)](#)
- [Standard Assets Characters \(Github Version\)](#)

13.1 3D Models

- <https://assetstore.unity.com/3d>
- <https://free3d.com>
- <https://mixamo.com>
- <https://www.blendswap.com>
- <https://sketchfab.com>
- Modern Weapons Pack
- champion 3D Model
- Path Finder
- Loba
- Med kit
- Bulets Case

13.2 Textures

- <https://assetstore.unity.com/?category=2d%2Ftextures-materials>
- <https://www.textures.com>
- <https://quixel.com/megascans/library>

13.3 Audio

- <https://assetstore.unity.com/audio>
- <https://freesound.org>
- <https://filmmusic.io>
- <https://www.bensound.com>
- <https://www.purple-planet.com>
- <https://www.bfxr.net>