

Advanced Computer Lab Winter 2021

Mini-Project 1: Invincible Runner

Due: 11:59 pm November 5th 2021

1 Project Description

The main aim of this mini project is to test your ability to develop the core parts of a video game that can be deployed on a mobile platform. In this project, you will be creating an infinite runner simple game ⁽¹⁾ which is similar to subway surfers.

2 Gameplay

The player controls a Sphere that moves forward automatically on an infinite road. The road is divided into three lanes. The player encounters **Collectibles**: that can be found along the road and collecting them adds to the player's score; and **Obstacles**: that can be found along the road and touching them decreases the player's score or instantly kills the player (more about that in Sections 3 and 4). The goal is to get the highest score before the player dies. The game ends when the player hits one of the obstacles that causes instant death or when the score reaches zero.

3 Rules of Play

- The player automatically (not controlled by the input) moves forward in the positive z-direction (think about the final effect and not just the literal meaning of the sentence).
- The player can steer left and right to change lanes.
- The player can jump to avoid obstacles.
- The player encounters two different types of collectibles which increase the player's speed or activate the player's invincible mode (See Section 4 for more details).
- The player encounters two different types of obstacles that he/she has to avoid. On the same horizontal line, there can exist one, two or three obstacles.
- After the blue spheres reach the maximum capacity, the player will be able to move faster.

⁽¹⁾<https://www.androidauthority.com/best-endless-runner-games-android-690566/>

- After the coins reach their maximum capacity, the invincible mode gets activated instantly.

4 Game Items

Category	Item	Description
Collectibles	Blue Spheres	Collectible blue Spheres that can be found along the road. Collect to Make the sphere's forward motion faster .
	Coins	Collectible coins that can be found along the road. Collect to Activate the invincible mode .
Obstacles	Iron Ball	Grey spheres that can be found any place on road, spanning one, two or the three lanes. Touching an iron ball Makes the player lose 10 points from the score .
	Bomb	Black spheres that can be found any place on road, spanning one, two or the three lanes. Touching a bomb Destroys the player (Game Ends) .
Cameras	Main Camera	To view the game from the Third person perspective of the player character (represented by a sphere).
	Secondary Camera	To view the game from the First person perspective of the player character (represented by a sphere).

Note: Minimalist design with only primitive shapes is required.

5 Game Controls

1. Windows:

- (a) The player moves left and right using the left and right arrows, or A and D.
- (b) The player should be able to jump using the space bar in order to avoid the obstacles.
- (c) The player should be able to switch between cameras by pressing C.
- (d) The player pauses and resumes by pressing the esc button.

2. Android:

- (a) The player should swipe left and right to move the player.
- (b) The player should be able to jump by pressing on an Up button on the bottom right/left of the screen.
- (c) The player should be able to switch between cameras by pressing on a camera button on the bottom right/left of the screen.
- (d) The player pauses by pressing on a pause button on the top left/right of the screen.

***Note:** The buttons for the android controls do not have to be hidden in the windows version.*

6 Mechanics

- The player's score points starts at 0 and increases by collecting coins. Each **coin** increases the score by **15 points** and each **blue sphere** increases the score by **10 points**.
- After collecting 3 coins, the player's invincible mode is activated for **5 seconds**.
- During invincible mode, the player won't be affected by the obstacles (**shield effect**).
- After collecting 3 blue spheres, the player's speed is **doubled** for **7 seconds**.
- All collectibles are destroyed whenever the player collects them.
- If the player hits an iron ball, the player loses 10 points of the score.
- If the player hits a bomb, the player dies instantly.
- Both the collectibles and obstacles are generated automatically and randomly throughout the entire game.
- All GameObjects are destroyed after they are no longer needed (i.e. they go past the player). This is done in order to maintain a tolerable memory usage. Otherwise, your memory usage will continue to grow indefinitely until the game crashes.

7 Screens

1. Title Screen

- (a) Play
- (b) Options
 - i. How to Play
 - ii. Credits
 - iii. Mute Sound
- (c) Quit

2. Gameplay HUD

- (a) Score Points
- (b) Coins Collected
- (c) Blue Spheres Collected

3. Pause

- (a) Resume
- (b) Restart

4. Game Over

- (a) Restart
- (b) Main Menu

8 Sounds & Music

1. Sound Effects/Feedback

- (a) Whenever the player collects a coin or a blue sphere.
- (b) Whenever the player hits any of the obstacles.

2. Soundtracks

- (a) Slow-paced track for the title, pause, and game over screens.
- (b) Exciting and/or tensing soundtrack for the game.
- (c) A different track while invincible mode is active.

9 Guidelines

- This mini project should be done **individually**. You can share ideas, consult the manual, and search online. However, all work done in this mini project must be done by your hands and your hands only.
- You are **not required** to use external assets. However, you can include external assets (e.g. audio, music, 3d models, etc.) if and only if **any and all of them are credited in the credits section of the Title Screen**.

- Use **Unity** and **C#** to create this project. Once you are done, build the project into an .exe as well as an .apk files and compress them into a zip file (make sure to include all files generated on build e.g. "**Data**" folder, "**UnityPlayer.dll**" file, etc.). All three files, .exe .apk .zip, should be named in the following format "**Tutorial_ID_Name**", for example: "**T01_43_1234_Adam.zip**".
- Use the following link to submit your .zip file:
<https://forms.gle/Z7cBEq39iwDato7s6>