



University of Dhaka

Department of Computer Science and Engineering

Project Report:

Fundamentals of Programming Lab(CSE-1211)

Project Name:

Defenders

Team Members

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Md Istahak Islam (Roll: AK-16)

1. Introduction

This game is about defending the planet against intruders. We defeat the intruders one by one to keep peace. Each intruder has their unique characteristics. We must defend ourselves to defeat the intruders. The game ends when all intruders are defeated.

2. Objectives

- ★ To create a challenging scenario for the user in the game.
- ★ To make the game as exciting as possible while keeping the UI feasible. The user has to use the mouse and the keyboard collaboratively from the starting level till the very end.
- ★ The end goal is to give the user a friendly experience and a challenging time completing each level.

3. Project Features

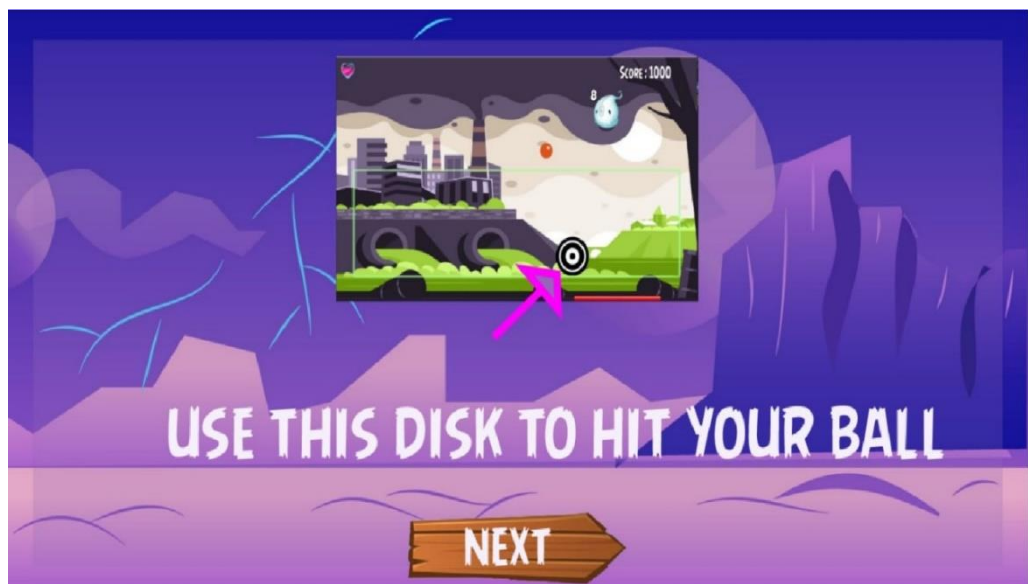
Game UI:

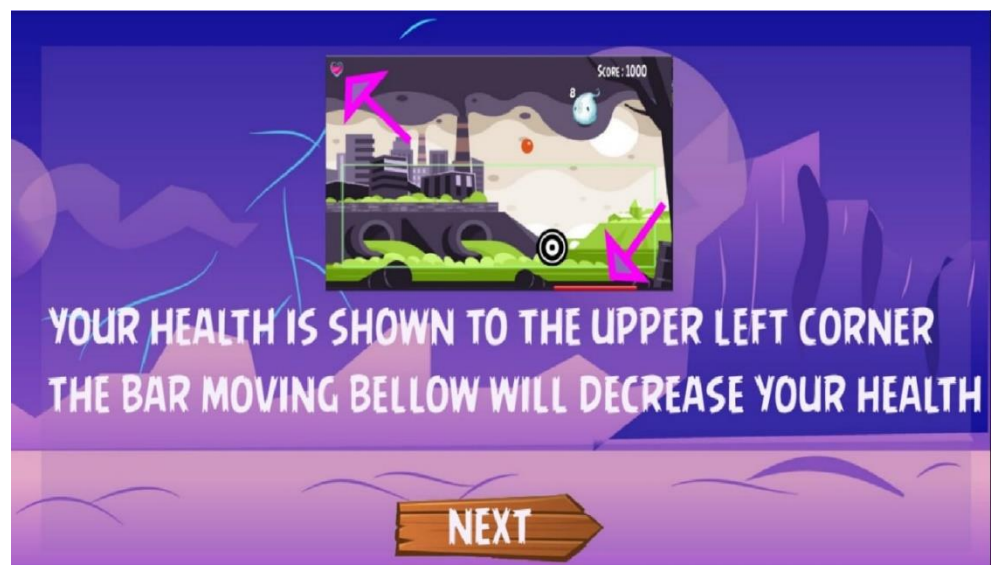
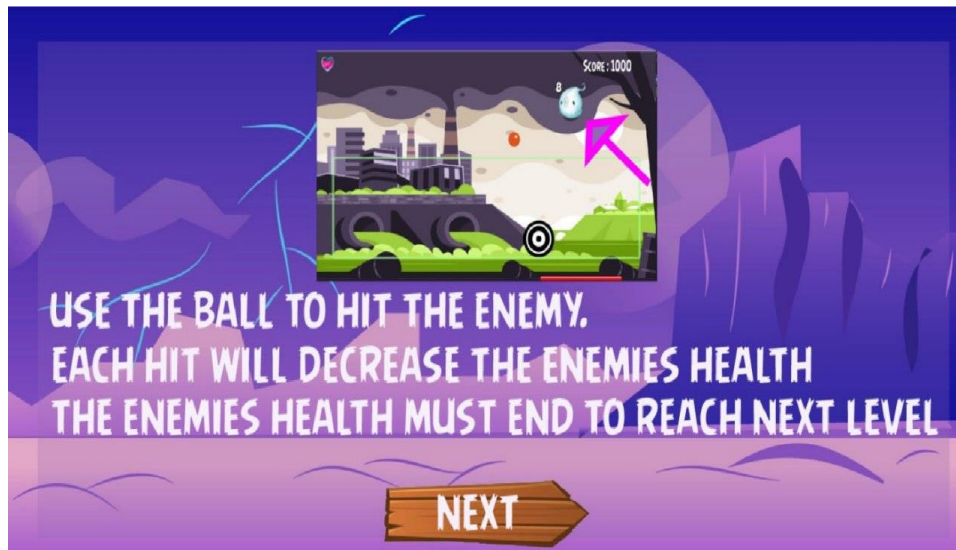
- **Main Menu:** The game starts with an easy-to-use main menu. There are 4 options on the menu.



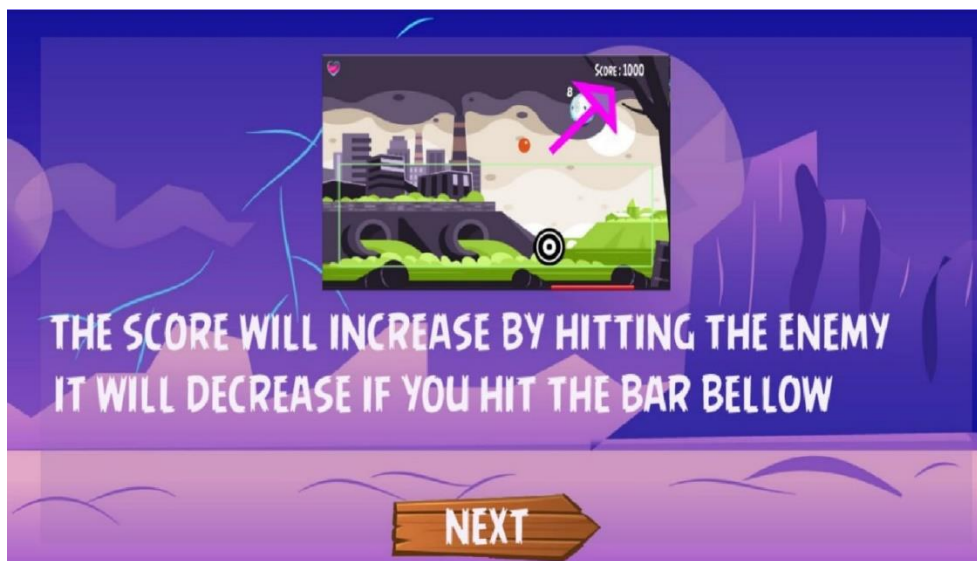
- 1) **NEW GAME button:** If we click on the New game button, we jump to the play options:

A) *New game:* Begin a new game from level 1.





- 2) **Help button:** Clicking on this button, directs us to the Instructions



- A) *Instructions*: Gives us a fleeting summary of the levels
- B) *Game controls*: How to play the game

We can find 1 types of buttons here:

a) *Next button*(Bottom on the Instructions page)

- 3) **Highscore button**: Leads to the Leaderboard. Here we can find the top 5 scores of all level on a pages:

A) High score Placeholder



- 4) **EXIT GAMES button**: For exiting the games. We can find 2 types of buttons here:

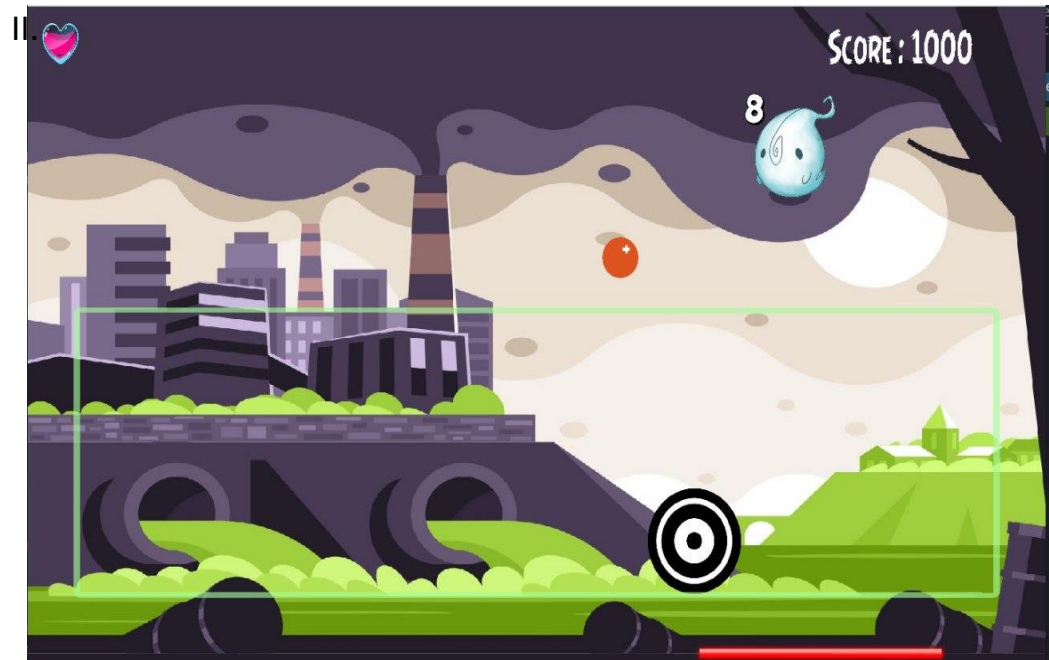
- A) YES
- B) NO



Gameplay:

- **LEVELS:** The game contains 3 different levels.

I. **Level 1 - The Factory:**



★ The factory ghost has the polluting the city

★ Defeat the ghost

★ **Completing the level Condition:**

☐ Ending the enemies health

★ **Game over Condition:**

→ Getting your health to zero

★ **Scoring:**

The score depends on the skill and efficiency of the player

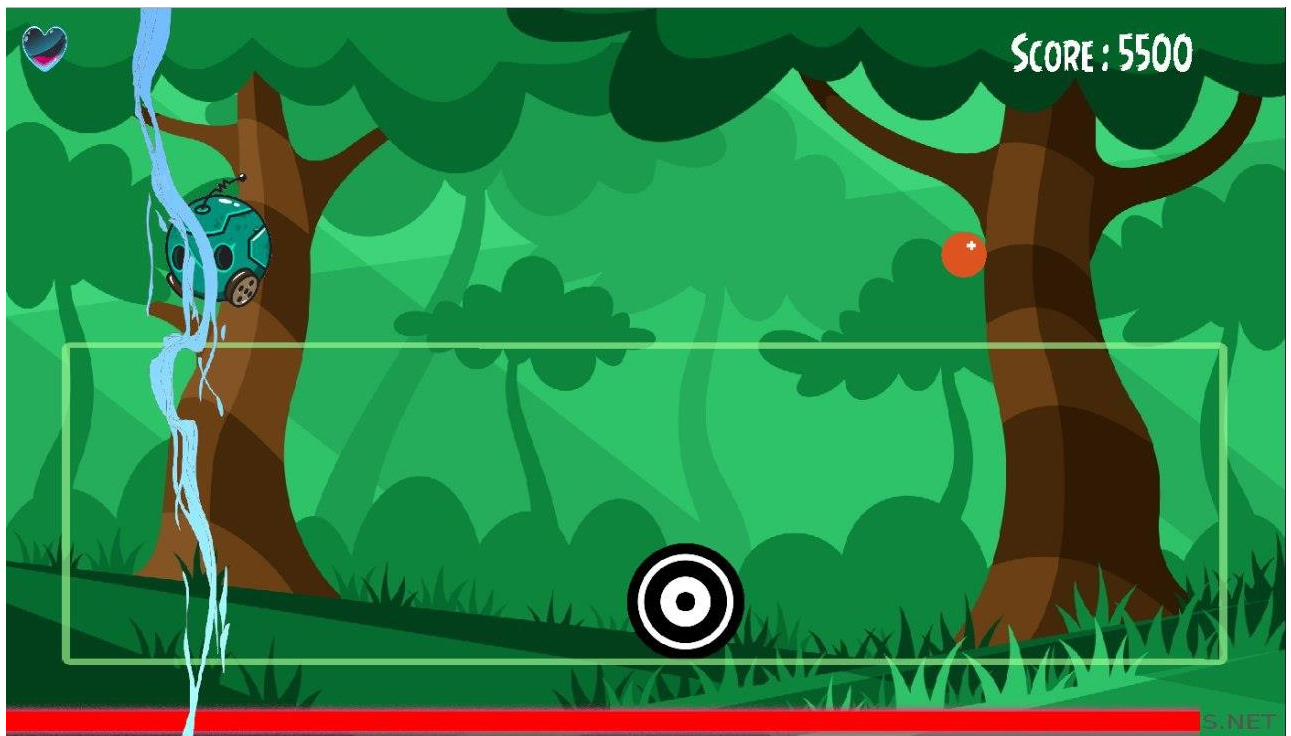
→ If you hit the enemy your score increases

→ Your health decreases if you hit the bar moving in the bottom screen

→ If your health decreases your score also decreases

→ The score of this level will also affect the score of the next level.

III. Level 2 - The Forest:

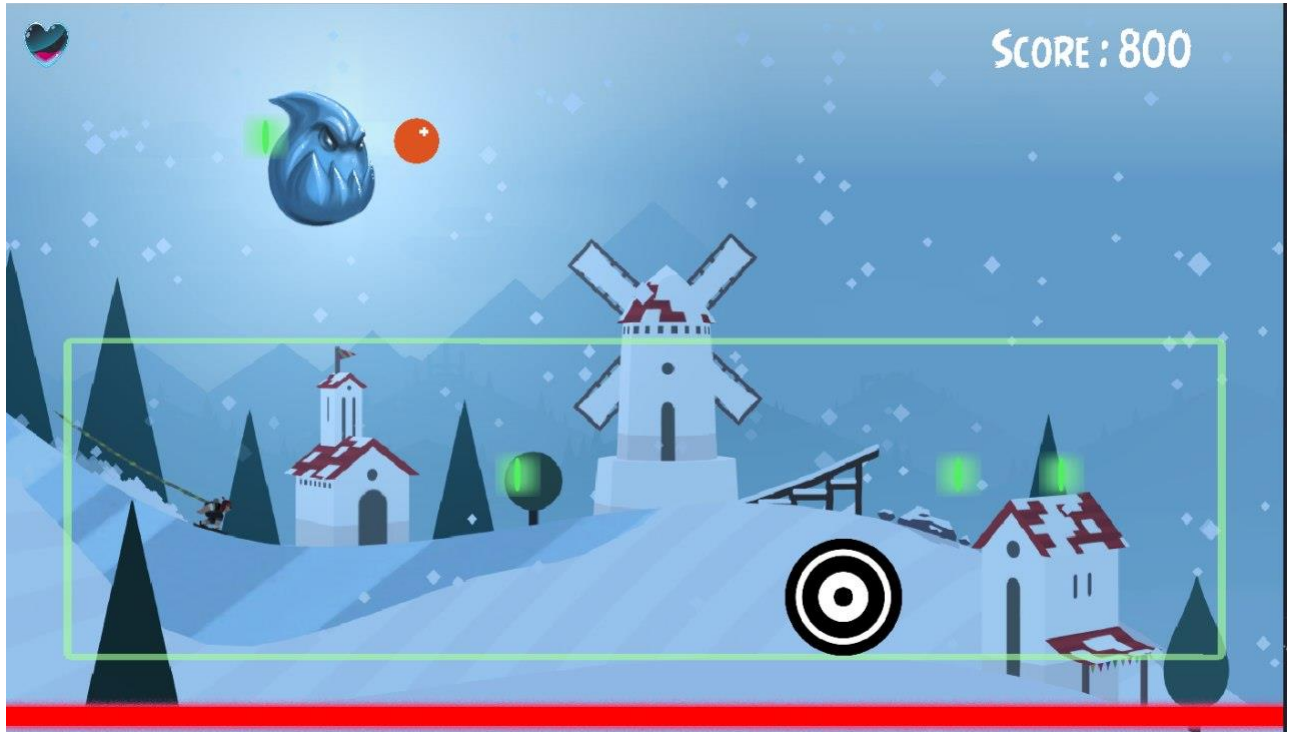


- ★ The enemy moves across the screen.
- ★ The player can hit it with the ball.
- ★ The enemies health is now displayed at the bottom of the screen
- ★ **Level Complete Condition:**
 - ☐ Killing the enemy
- ★ **Gameover Condition:**
 - Killing the enemies
- ★ **Scoring:**

The score depends on the time and efficiency of the player

 - ➔ Hitting the enemy will increase your score
 - ➔ There will be random lightnings dropping from the top. If your ball gets hit by it you will lose points.
 - ➔ When the score reaches 0 points, it stops decreasing.
 - ➔ The score of this level will also affect the score of the next level.

IV. *Level 3 - The Frost:*

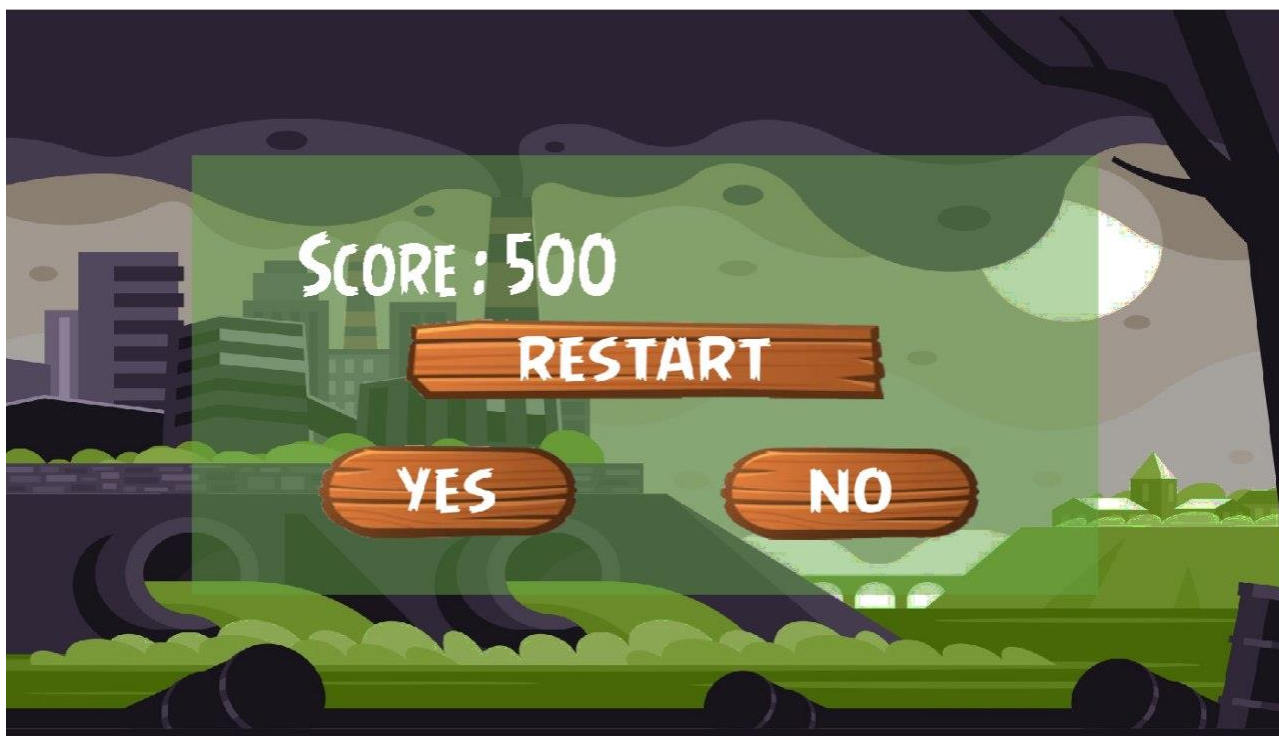


- ★ The intruder is moving across the screen
- ★ It's raining down bullets
- ★ If the bullets hit the disk you lose your life
- ★ The game ends when your life ends
- ★ **Level Complete Condition:**
 - ☐ Defeat the enemy
- ★ **Gameover Condition:**
 - When your life ends
- ★ **Scoring:**

The score depends on the skill of the player

 - ➔ You gain points if you hit the enemies
 - ➔ You lose points if you get hit by the bullets

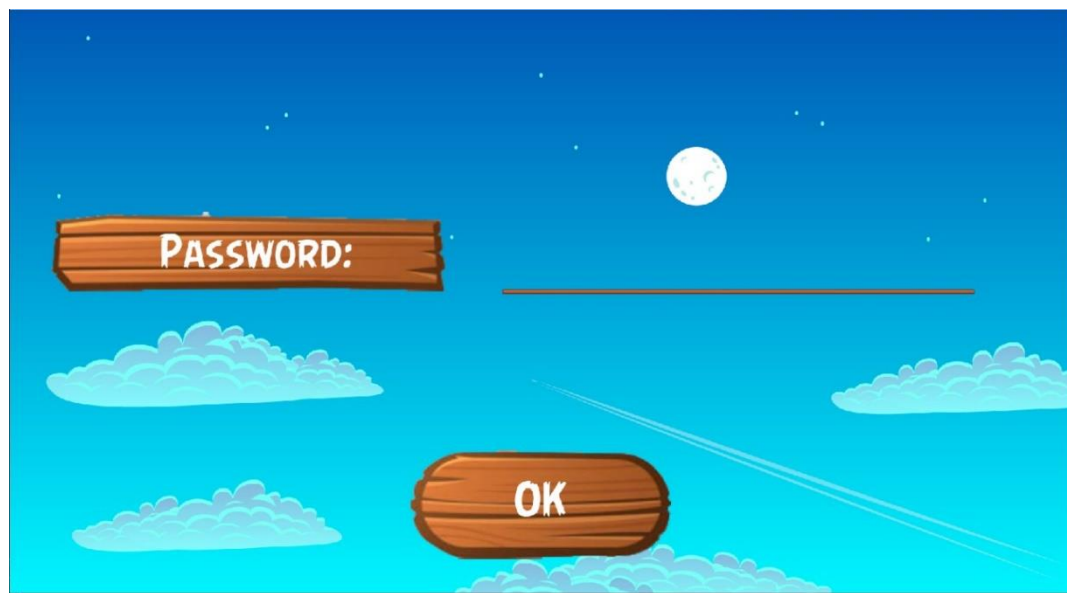
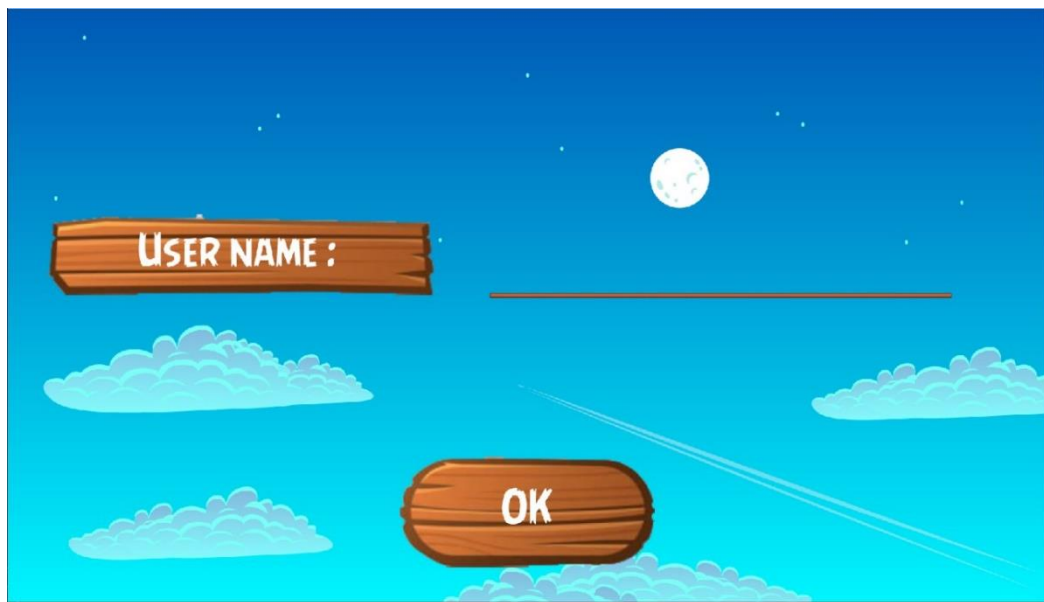
- *Gameover*



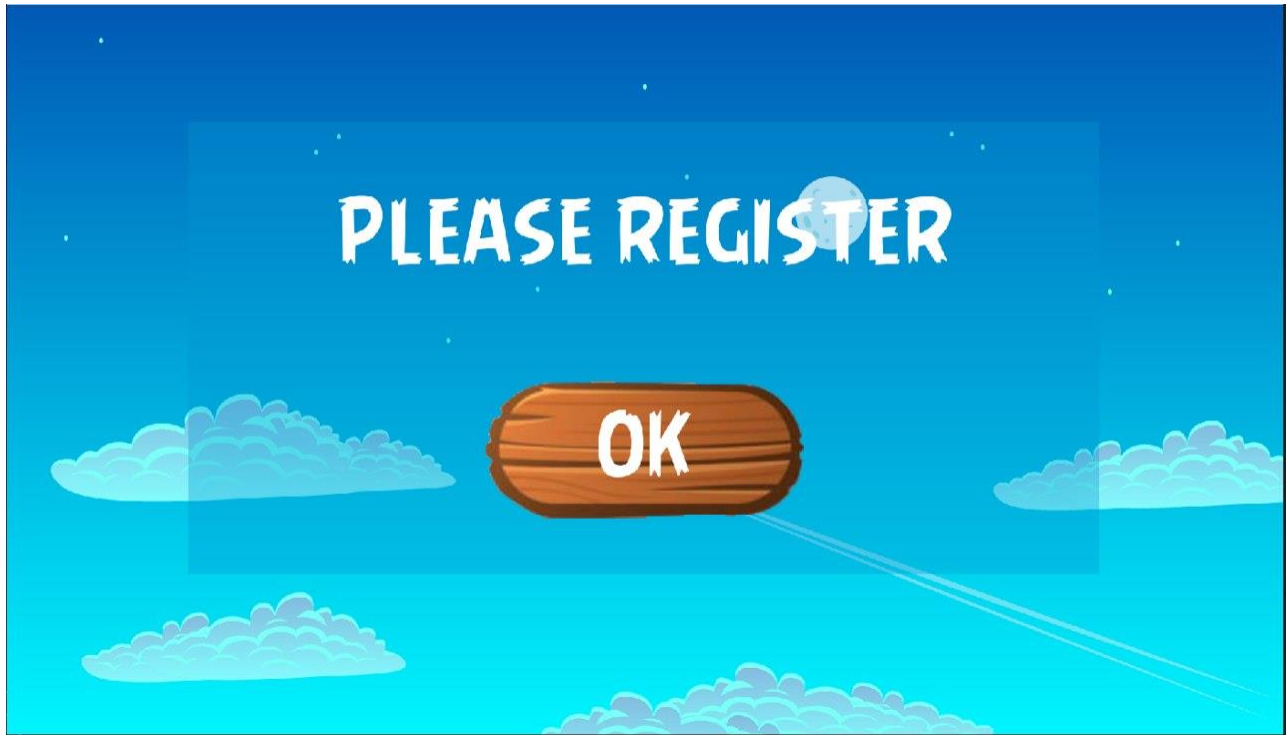
Pressing the Yes button will restart the game with full health and zero score

Pressing the No button will exit the game and will bring you back to the menu

★ **Registering:** You can register an account with user name and password



- ★ **Logging in:** You can login with your username and password. You can't log in if you don't have an account. In this case an error pops up and brings you to the register menu



4. Project Modules

Our code is divided into many cpp files and header files:

Cpp files:

These are the cpp files that have separate header files and are used in different aspects of the game.

- **main.cpp:** Most important cpp file. Connects all the other cpp files and header files.
- **menu.cpp:** Connects all the things related to the main menu and works on the main menu.
- **header.cpp:** Everything related to the header file is done here. All the important variable and constant are declared in this cpp file. All important function like init , close, load are defined in this cpp files.
- **loadmedia.cpp:** Everything related to the loading is done here. All the games important element are loading in this cpp files. Draws the player, enemies, items, cursor, and also some level backgrounds. Loads all the sprites and renders them when needed.
- **highscore.cpp:** Everything related to the score is done here.
- **gamelogic.cpp:** Builds the stage for each level and determines the position of the items as well as collisions.

Files for storing information:**Highscores:**

These are the text files that store the username and score of that specific user.

Names:

- `highscore.txt`: Stores highscore placeholder names.

Save:

- `database.txt`: stores all the information of registered user for matching the information when they log in the game.

5. Team Member Responsibilities

Istahak Islam:

- *Game UI:*
 - Game Objectives
 - Sound and Music
- *Gameplay:*
 - Collision detection
 - Scoring
 - Level Complete
 - File Systems

Rifat khan:

- *Game UI:*
 - Main Menu
 - Game Story
- *Gameplay:*
 - Level designs
 - Player & enemy movements
 - Gameover

6. Platform, Library & Tools

Platform: Linux (Ubuntu)

Library: SDL2 Library

Tools: Adobe Photoshop, Krita, online video trimmer, online audio cutter, online mp3 converter.

7. Limitations

- ❖ We could have added more levels if we had more time and then it would be greater.
- ❖ In levels, only one enemy is moving.
- ❖ In levels, it would've been better and more interesting with more enemies.
- ❖ In highscores if there is a space input in username, It doesn't show so in highscores.

8. Conclusions

To be honest, We did not expect much. Still, we wanted to make a decent game that's fun and challenging to play. And we had a slow start but eventually, it all came around.

At first, we just thought of making a game where our player would hit the ball to target something. Then we only made level 1. Our next plan was to make different levels with the same theme. We tried to add different functionalities. We had some trouble controlling the dynamics. We tried our best to design and construct the game.

In conclusion, we would like to say that we have learned a lot of things from this project. Like, using files to store information, dividing code into different files and headers.

9. Future plan

We plan to make this game even more attractive and fun to play. We would like to add

- ❖ More advanced graphics & improve what we have made now.
- ❖ Some more interesting levels.

Repositories

GitHub Repository:

https://github.com/Istahak/CSE-1211_project-Defenders-.git

Youtube Video:

<https://youtu.be/1JdcP7bxXvw>

References

Pictures:

[Vecteezy](#)

[Freepik](#)

Music and sounds:

[Mixkit](#)

[Melody Loops](#)

SDL2 codes:

[SDL Wiki: FrontPage](#)

[SDL2 Game Tutorials - parallelrealities.co.uk](#)

[Beginning Game Programming v2.0](#)