



University of Dhaka

Department of Computer Science and Engineering

*Project Report:
Fundamentals of Programming Lab(CSE-1211)*

*Project Name:
RUNNING MAN*

Team Members

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2. *RK-61 Anika Tabassum*

Introduction

Runningman is an endless running game where the players take the role of a young man who has to run through the city roads or forest, collecting coins and weapons, and dodging obstacles by jumping unless he collides with the obstacles. It is a single player game where the obstacles can be still or animated. The player also can kill the animated obstacles or enemies by shooting knives at them. Collecting coins and killing enemies will score points for the player. The goal is to survive as long as possible in the game and score as much as possible.

Objectives

The main objective of the game is to implement the C/C++ language in some practical field and develop an application or game with it. By making the game, to expand the knowledge of C/C++ language is also intended. The game is developed using SDL2 library functions to improve our thinking ability and game development. So the application of SDL2 library is also another objective. Developing a project using custom header files in a modular way is a goal of the project too. Moreover, this game can engage people in an entertaining way. So giving people thrilling experiences through the gameplay is also a motive of the game.

Project Features

The project contains general game features like menu page, instruction page, sound, pause and basic running game features like jumping, colliding with the obstacles and collecting coins. The game also contains special features like allowing the player to play the game in two different modes, showing sorted highscore of two different modes. The features of the game is described step by step below :



The first page of the game shows four options to the player. Newgame, Help, Highscore and Exit.

Newgame Features :

If the player clicks the newgame option he encounters two options named City Mode and Forest Mode. These are the two modes to play the game. The player can choose either option to proceed.



- **City Mode :** The city Mode brings the player to a city road where there are three different kinds of obstacles which come randomly in the path of the player. The player has to jump over the obstacle to save himself. The player can jump by pressing the spacebar. There are also coins in the path of the player as well as above the path. The player can collect the coins by just running or jumping.



- **Forest Mode :** The Forest Mode brings the player to a forest path where the player meets some animated obstacles. Here the obstacles are also of three types and they move towards the player. The player can jump over



them just like in the city mode. But in the Forest mode there is a big obstacle which the player cannot avoid just by jumping. Here the player has to shoot knives towards the enemy three times by pressing the "S" key. The player can also kill the lower obstacles to gain some extra points. The player can collect the knives by jumping. Each collected knife is equivalent to five knives. The number of knives appears on the right corner of the screen. The game starts with three knives and each time the player shoots knives the number of knives will decrease.



- **Pause Feature :** The player can also pause the game anytime he wants. The player has to press the key "P" to pause the game and "C" to resume it. The player also can press "Backspace" to go back to the menu. Going back to the menu will automatically pause the game. From the menu, the player can either choose to continue the game or start the game from the very beginning.
- **Score Features :** The player can score by collecting coins in the city mode. Each coin increases the score by ten. The forest mode also has the same feature. Along with that, a player can score points by killing the animated obstacles in this mode. The smaller enemies will bring fifteen and twenty points each. And the larger will bring thirty points. The score appears in the left corner of the screen in each mode. There is also a decrease in the score. Each time the



player collides with an enemy the score will decrease likewise. After the end of the game, the score will appear on the screen.

- ***Game Over And Extra Lives Features***

: The game starts with three heart signs depicting three lives of the player. Each time the player collides with the obstacles the life decreases by one. After colliding three times, the game gets over. After the game, the gameover writing and the score appears on the screen.



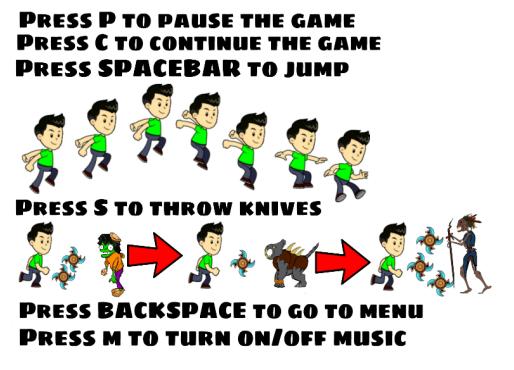
- ***Name Input Feature*** : The player gets to input his name after the game.

The character limit of the name is seven words. If the score of the player is within the range of the high score then the name and score of the player gets saved in a file and the page of highscore of that particular mode also appears. A player cannot leave the game without entering his name. After entering the name, the game takes the player back to its first page.



Sound Effects : The game has three different sounds in the menu and two different modes respectively. Different sounds also can be heard when a player clicks the mouse, collects coins, collects knives, shoots knives, collides with the obstacles or enemies, when the enemy dies and finally when the game gets over. A player can turn off the music anytime by pressing the "M" key and can turn it on again by pressing the key again. But the player has to press the button separately to turn on or off each separate music.

Help Feature : If the player clicks on help, the instructions regarding the gameplay appear on the screen. The player can leave the page by simply pressing the backspace key.



Highscore Features : If the player clicks on the Highscore, the option for two modes appears. The player can choose City mode or Forest Mode to see the highscore of the respective modes. Each mode has different sets of highscore. The first five scores appear on the screen in the descending order.

SL	NAME	SCORE
01.	anika	180
02.	bithi	110
03.	lina	100
04.	dipto	100
05.	shamik	80

Exit Features : The player can quit the game by going to the menu and clicking on the exit button. The player can also quit the game anytime by clicking the cross on the left corner of the game window. Only after gameover, a player cannot quit the game without entering the name.



Project Modules

The Project code is divided into five separate header files and fifteen cpp files. The header files are divided as firstmode, second mode, UI,

runningman and all the four header files are put together into another header file. The header files are described separately below :

- ***firstmode.h*** : In this header file, functions and variables related to the first mode or citymode of the game are declared. The variables like background texture, obstacle texture and the functions for rendering obstacles and preventing the obstacles from overlapping are also declared here by the obstacle and obstacle and coin position function respectively. All the necessary functions are put together in another function named firstmode. Anyone can use this library and its functions to make a basic running game.
- ***secondmode.h*** : The functions and variables necessary for second mode or forest mode are declared in this header file. The textures of forest background, animated enemies, knives are declared. The enum and structures used for enemy animation, weapons and for the lives of the enemies are declared. The functions to kill the enemies, animating enemies, shooting knives, rendering knives and projecting knives on the screen are declared with appropriate names which can easily be detected by anyone. All the functions used here are put together in another function named secondmode.
- ***runningman.h*** : The texture and music related to the whole game are declared in this header file. The basic window of the game, coin texture, man texture and the functions which are used in both modes are declared here. Score texture, life texture, highscore texture are also included here. The functions for initialization, loading, rendering, animating background, animating and jumping of the man, gameover, converting score, showing score on the screen, sorting highscore, saving highscore and showing highscore are also included here. The variables necessary to use these functions are also declared here.
- ***UI.h*** : In this header file, the variables and functions related to user interfaces, like, starting and middle menu, mouse handling,

keyboard handling, getting instructions and name input functions are included for the interactions of the user with the game. The flags necessary for the pause features are also included here. The textures and functions to render the menu and handle the game are included. Anyone can use this header file and its functions to make a user interface for any game by changing the variables accordingly.

- **header.h** : All the custom header files are combined here into one header file.

Besides these custom header files, there are also built-in SDL and C/C++ library files used to make this game. The functions and variables of these custom header files are divided into fifteen cpp files. Init file is used for initialization, load file contains all the functions necessary for loading, free is used for clearing all the used textures. The file named score, man, highscore, coin are used in both modes and contain the functions related to the section according to their names. The files named obstacle and firstMode are used for the city mode. The files named knifes, enemy and 2nd mode are used for forest mode. Rendering menu and the basic render function is done in the rendermenu file. All the works related to user interface like keyboard and mousehandling are done in the UI named file. Lastly all the functions are combined in the main file and the gameover function is also described here.

Team Members' Responsibilities

Shahanaz Sharmin, Roll-07(Team Leader)

- Background related work like rendering and animating the background of the city mode.
- Obstacles related works like rendering, preventing the obstacles from overlapping and detecting collision of the man and the obstacles.
- Works related with ttf like creating and rendering the menu

- User interfaces related work like mouse handling and input name along with necessary flaggings.
- Score related works like converting the score into ttf and projecting it on the screen.
- Converting and projecting the number of lives and knives on the screen.
- Lastly saving the name and score in the files and showing them on the screen.

Anika Tabassum, Roll-61

- Man related work like animating and rendering the man.
- Controlling the man like jumping functions and related key works.
- Coin related works like rendering the coin and collecting mechanics.
- Forest mode related work like animating background and enemies and detecting collisions with the animated enemies.
- Knives related works like rendering and shooting knives and killing enemies.
- Adding all the sounds to the game.
- Lastly saving the name and score in the files and showing them on the screen.

Platform, Library & Tools

Platform

The game is developed on Ubuntu 20.10 and Pop OS 20.10. The game can be played on all Linux platforms as well as on Windows 10.

Libraries

The game is built using the C/C++ language and SDL2 supporting library.

Tools

Online image converter and resizer, Pics art photo editor, online music cutter, online music converter.

Limitations

- There is limited control over the character of the game.
- The name of the player which he has to input at the end of the game has to be within only seven words.
- The player has to press the “M” key separately to turn on or off separate music.
- After a new starting, there will be no records of the previous games except the high score.

Conclusions

This is the first time we have developed any kind of game and written a modular code with a custom header file. At first we had thought to make a full role playing game with a well developed character. But as we never had built a game before, we failed to achieve this fully and also experienced many hurdles. We had no idea about animation or building up an application. So we did not have any idea about where or how to start. We had to learn things from the very beginning. Even after learning things we found it difficult to apply our ideas fully because of the lack of necessary images on the internet. Even for some technical parts, we could not find any proper directions on the internet which was difficult.

However, we have learned a great deal through this project. We have learned to use SDL header libraries and write our own custom header files. We have gained experience about basic game development. Our problem solving skills also increased. Moreover, we also learnt to handle problems and find solutions ourselves. We worked as a team so our

communication and coordination skills were also enhanced. We learnt to write proper modular codes. As developing a game is quite different from regular C/C++ problems, we had to imply the C/C++ knowledge in a different way. Though it seemed hard at first, it definitely improved our coding skills and we learnt new and effective things from it. We will surely make use of them in our future projects.

Future Plan

The graphics and the controlling elements in this game were quite limited. We want to develop better graphics and animation skills and use them in our game. We want to make a more user interactive game. We hope to achieve a greater difficulty level for the player in the game. We would also like to give more score increasing options and add more levels to the game. Beside all these, we would also like to improve the basic knowledge achieved in this project and make a better and stronger project in the future.

Repositories

GitHub Repository : <https://github.com/anika235/Running-Man>

Youtube Video : <https://www.youtube.com/watch?v=jK9MewPLlCI>

References

- <https://lazyfoo.net/tutorials/SDL/>
- <https://www.libsdl.org/>
- <https://www.geeksforgeeks.org/write-header-file-c/>
- <https://www.dreamstime.com/stock-music-sound-effect/mouse-click.html?pg=3>