



Department of Computer Science and Engineering University of Dhaka

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1-2-3 Pieces

CSE-1211: Fundamentals of Programming Lab

Team Members:

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Roll - 13

Aniket Joarder

Roll - 48

Introduction

Our project named “1-2-3 Pieces” brings some of our childhood games back in a smart version. This game project consists of 3 different games (two different types of game with two different versions of one of them). The first game is an [arcade game](#) named “Egg Fry”, the second one is called “Tic-Tac-Toe”. The third game is actually a larger version of the second game, known as “Tetra-cross”.

Objectives

Our objectives were to bring back childhood games in a university project that will also help practicing our knowledge about C/C++. Not only this game helps us to entertain people but also it helps develop our thinking capability as it includes two brain games. Many of us played board games that worked with many pieces with their placement and movement. Two of our three games deal with this type of board game and their placement. Another game is about movement of a piece (shown as an egg here). This piece jumps on different platforms and thus collects gold coins.

To make this Unix operating system based game, we had to learn many things of C/C++ and SDL. This game needs no more additional files. That is why anyone with their Linux machine will be able to run this game (This game was made in Ubuntu distro of Linux).

Features

We have tried to incorporate multiple features in our game project that utilize our main objective into our application.

Introductory page:



This page contains an overview of the game at a glance. The title of the project is shown boldly at the center of the page. Some of the game's static pictures are added there.

Title page:



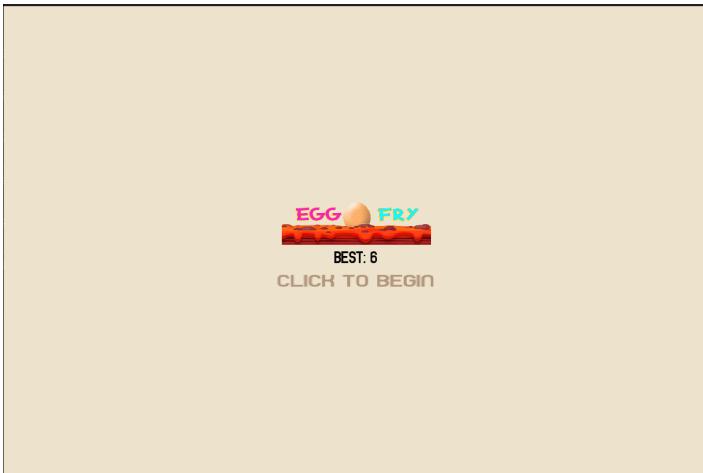
This page shows the main menu of the game. It contains three different buttons for each of the games along with three optional buttons in corners.

The three game button is to direct to the game's

page while the info button shows information of the games and how

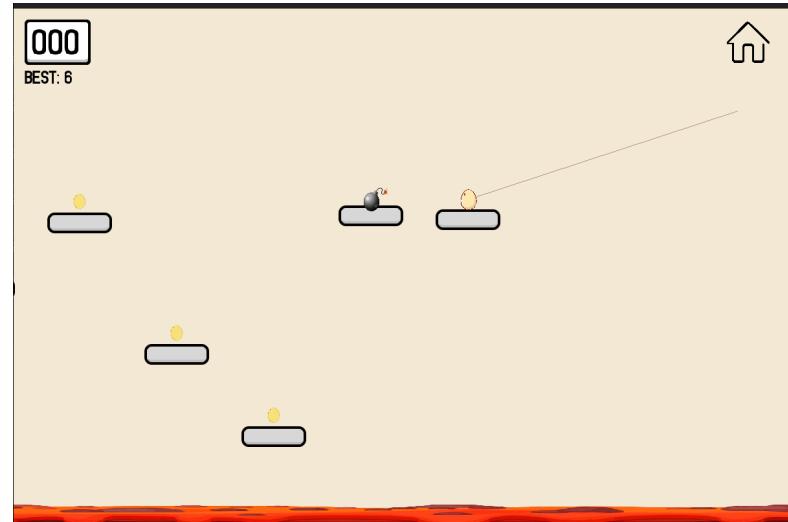
to play the games. The credit button is to show information about the team members of this game project.

Egg Fry:



This picture shows the initial page of our first game, “Egg Fry”. Here, the current high score of this game and a “Click To Begin” button appears. By clicking on that button, we can start our gameplay.

This picture shows the in-game state of our first game. We can see a few platforms with an egg on one of them. All the other platforms contain either a gold coin or a bomb on them. Collecting gold coins increases the score.



There is a line of hot lava at the bottom of the page. The egg may become fried in two ways, hitting a bomb or dropping on lava.

The player has to save the egg from being a fried egg and collect as many gold coins as possible.

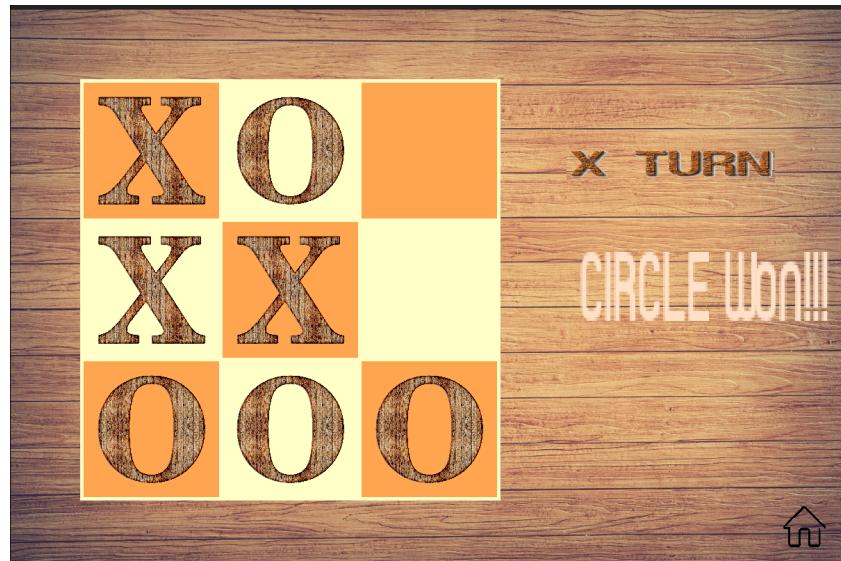
Tic-Tac-Toe



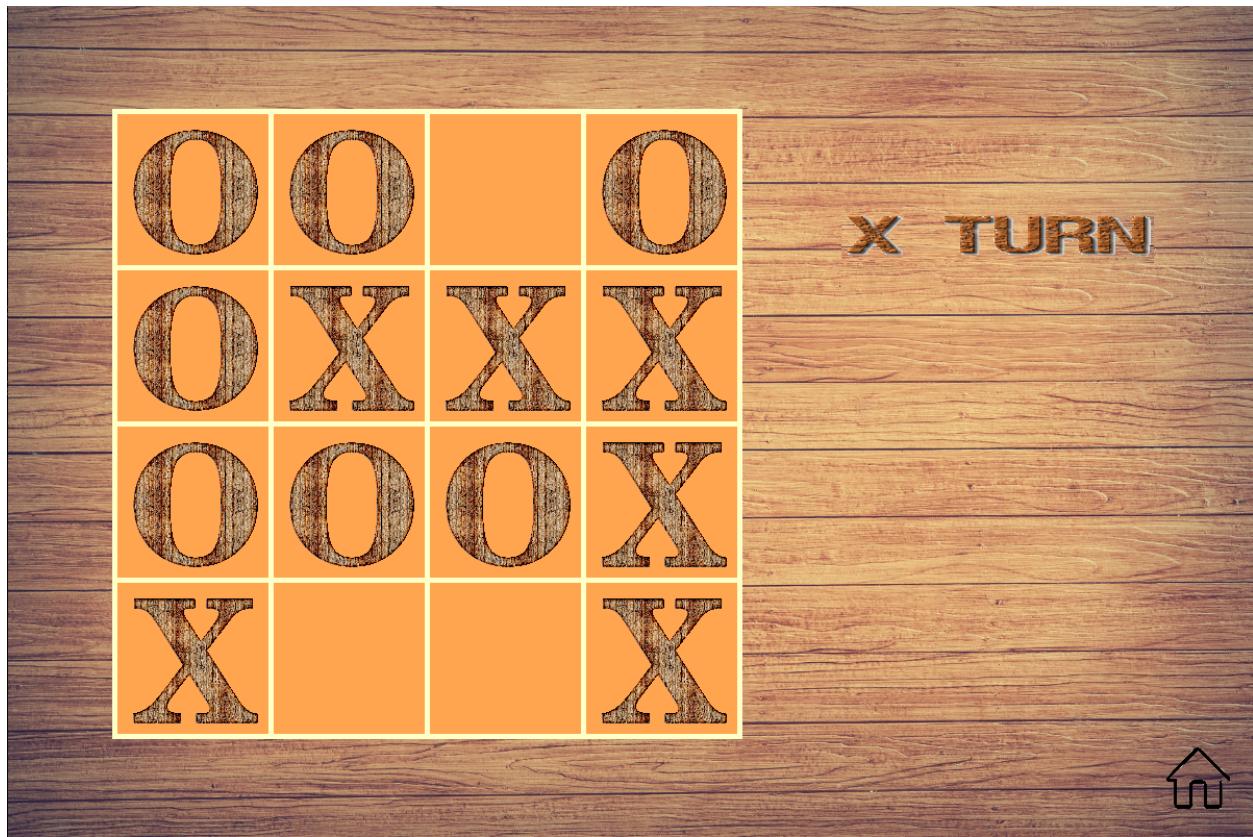
The second game of our project is a classic tic-tac-toe game. The goal of this game is to fill up 3x3 boxes with crosses or circles in turns and make a line of three pieces of the same kind vertically, horizontally or

diagonally. This picture shows an in-game state. Here, both players have played in their first two turns. The next turn is for the O player.

This picture is showing a winning state of the game. We can see that O has already made a horizontal line at the bottom. There is a winning message showing “CIRCLE Won!!!”.



Tetra-Cross



This is an extended version of the famous “Tic-Tac-Toe” game. This game comes with a 4x4 grid. One has to make a line of 4 identical pieces to win. The other rules are like the 3x3 Tic-Tac-Toe.

This picture shows an in-game state. Both of the players have completed several turns. Now it is X’s turn.

There were some additional features of the last two games. We developed an engine to play against human players. Unfortunately, due to OS crashing, those features can not be shown at this moment and are not shown in this report.

Project Modules

Our code relies on the following custom headers:

player.h

This is one of the main header files of the first part of the game egg fry which is a one-piece game. Here, this header file mainly contains the player's primary variable or the egg. In this file we have the functions required for the egg or player such as its positions, Mainly this header file contains all the variables and functions required to know its current status as well as the next positions. In this file, we also created a vector named structure for which the egg goes like a projectile.

platform.h

This file is similar to the player.h which we used for the player's status. The platform.h file is used to define the variables and the function which we used to show the platforms and update their positions. In this file, we created variables that are required for a platform's current and next positions. Here we have variables for which we can identify whether the platform has a bomb or coin and whether the egg or player is on the platform or not. Here we have functions with which we can bring new platforms from the left side of the window.

ttt.h

This header file contains function details and structure about our second game, Tic-Tac-Toe. Checking the input box, printing an associative sign, checking whether it is a win are three of the functions written here. The game engine and its functions were also added here.

ttt4.h

This header file is for the functions of our third game, Tetra-cross. It has several functions and structures that help us control the game. A function for taking the input mouse click and another function for checking if the last move is a winning move is also written here.

Team Member Responsibilities

The idea of making this game that will remind us about our childhood games was conceptualized by Himel Chandra Roy. Both of the two members contributed in coding the source code of our project. The SDL functions and their functionalities were first implemented by Aniket Joarder. Almost the whole part of the first game was done by Aniket Joarder as well. Himel Chandra Roy was on duty for the second

and third games. To build those two games and to add engines in them were developed by Himel Chandra Roy. However, due to OS failure, most of the developments done by Himel Chandra Roy are absent in this submitted project. Many jobs oriented to graphics were done by Aniket Joarder. Himel Chandra Roy also did graphical works for the project, specially for the second and third game and the title page. Assembling all the three games together and the bug fixing part were done by both of the team members. Other than the coding parts, all of the two members had to do extensive thinking and research to develop each feature of the whole project.

Platform, Library & Tools

Platform:

Our game application runs on a variety of platforms. So far we tested, it runs well on most Unix based systems (Specially Ubuntu).

Library:

We had to use open source tools such as SDL for providing a graphical and controlling system. We have used ttf fonts to write several things in our game project.

Tools:

Our project mainly uses the libraries and many graphical and audio resources.

Limitations

Creating a game for the first time lacks experience and knowledges about using different tools of a language. Moreover, learning and using a different library (here, SDL) for the first time also is not easy. These are why this project has a few limitations. We could not properly implement the whole project idea into reality.

Window resize option could have been added to the game to enhance the user experience. Moreover, the full game with single player mode is not implemented here properly.

We did not test this project anywhere other than Unix based operating systems. We could have tested and made a Windows version of this game project, or a cross-platform version that works simultaneously in every operating systems.

Conclusion

From the very beginning of conceptualizing this game, we have been thinking about making it easier and attractive to the users so that everyone enjoys playing this game. We used many functionalities of SDL and C/C++ in this whole project. We had to learn and implement many of the functionalities of these languages. We used many internet resources for our whole game project. We had to spend a lot of time debugging the source code though it still remains difficult to understand.

We had to go through many trial and error processes to make this project real.

Future Plan

Our future plan with this application is to extend the board games containing pieces and make a version containing 5x5, 6x6 or custom made grid. We plan to spread this game so that it runs simultaneously on different platforms like Windows, Android and iOS.

Repositories:

1. [Github](#)
2. [YouTube Link](#)

References:

[1] The SDL Library.

<https://wiki.libsdl.org/SDL2/FrontPage>

[2] The SDL Wiki.

https://wiki.libsdl.org/SDL_image/FrontPage

[3] YouTube

<https://www.youtube.com/>

[4] Github 2D Games

<https://github.com/topics/2d-game/>

[5] Lazyfoo SDL Tutorials

<https://lazyfoo.net/tutorials/SDL/>