Bilkent University

Department of Computer Engineering

CS 319 Term Project

Icy Tower

Final Report

Section 1

Group 1C

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Content

1. Introduction

The implementation of the game Icy Tower is progressed as it is planned. After the first demo we continued to implement the missing parts. As we planned, collectible objects as bonuses are added. Also, some new behaviour to the bars is added. After some time, bars are moving in different ways to make the game more challenging. The features of the bars are regulated as well. For example, when the character is on the icy bar, character may accelerate faster etc. Score is added so that players can try to get a high score to compete with their friends. High Score system is added, so users can track the best scores they achieved. Pause menu is added so that users can pause the game, and sound settings can be changed in the game. We write some unit tests for the Logic classes. In short, we did not only what we planned but also some extra features.

2. Design Changes

As we planned at the beginning of this project, Icy tower system adopts the MVC architecture. Our main system architecture is not changed. We decomposed our system to subsystems which are model, view and controller which are explained detailed in the design report.

We used some design patterns which are Singleton Design Pattern, Facade Design Pattern and Strategy Design Pattern. The Facade design pattern is decided in the first iteration of the design report. We decided that we need to use Singleton and Strategy patterns in the second iteration of the design report. We used the Singleton for the

manager classes. These classes' needing only one instance to get the functionalities leads us to use this pattern. As mentioned above we decided to add some behaviour to the bars. So, Strategy pattern is used for this purpose. Different than it's indicated in the second iteration of the design report, we made some changes in this area. MovingBehaviour interface is created. SlidingBehaviour, FallingBehaviour and StandingBehaviour classes which implement the MovingBehaviour interface are created. While the wooden bar has the Slidingbehaviour, the other types of bars have FallingBehaviour. Base class has the StandingBehaviour. These behaviors are for the movements of the bars that makes the game more challenging.
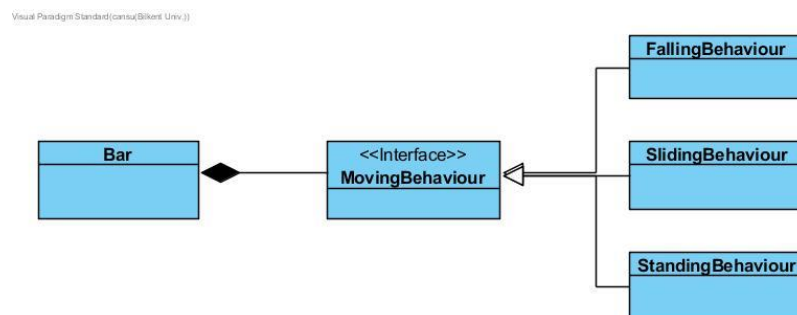

Figure 2.1 Strategy Pattern

3. Lessons Learnt

According to us, being a group is one of the important part of this project. From the beginning to end, we managed to be a real group. Every one of us fulfilled his/her responsibilities. When one of us needed help, the others helped. We talked everything about the project and made decisions together.

Technically,

We discovered the advantages of the Intellij and Github. Since it's rather a big project that our other course-related assignments, using an advanced IDE and version control tool helped us to maintain our project.

We always tried to make our code object-oriented, readable, reusable and extendable. We thought that we should separate the user interface and game logic so that we learned to use the system architecture MVC. We also learned to choose the proper design patterns which we also learned in the class and to apply them into the project. We learned fxml for the user interface. It provided convenience to us so that we placed the buttons, texts, images etc. easily. It enabled us to edit the code and add new items without dealing with code.

We learned non-functional requirements which are important for any project. In trade-offs, we had to give up one and stick to other. We learned to choose it according to our project.

We learned how to write an analysis report, design report and final report and what they should include. Analysis should be intended for the users and design should include more technique information. We learned to use Visual Paradigm to draw multiple kinds of diagrams represents our game.

Problems with JAR:

At the last stage of the implementation, we tried to make our game executable. But we encountered many problems when we tried to importing the project to JAR. Many of these problems were occuring because of external image and text files that seeks for class relative paths. After we make that translation the problems about reading images from

source code still occurred from unknown reasons, so we decided to cancel creating executable JAR file.

Problems with version control:

Although we had some prior experience using Github, we still had some issues with version control. When we working on same class, we had some merge issues. Later on, we learned more about it, and resolve the problems faster.

Problems with testing:

Since we are implementing a game that contains graphics and animations, we had a hard time at debugging the code. There is no basic way to test some cases, you really have to run the game and play it until you reach that the case you want to test. (We'd still written some test cases for non-graphical units).

4. User's Guide

In this section, the user will be informed about how to install and play the game Icy Tower.

4.1 System requirements & Installation

Icy tower game requires Java Runtime Environment to play the game. The game is expected to run any computer which has at least Windows XP, Intel Pentium III as CPU, and any graphics card which have 32MB memory.

- Go to this link: https://github.com/okeremd/1C.Icy-Tower
- Clone the project or download it as a zip file and run it in any Java Compiler.

4.2 How to use

After installing the Icy Tower game, players encounter with the main menu given below.

In this main menu, there are six options that players can choose. Player can choose to play game, to change the settings, to learn how to play, to see the developers of the game, to see the high score list or to exit from the game.

How to Play

To learn how to play the Icy Tower game would be a good start for the players who have never played this game before. By selecting the "how to play" button from the main menu, players can see this page.
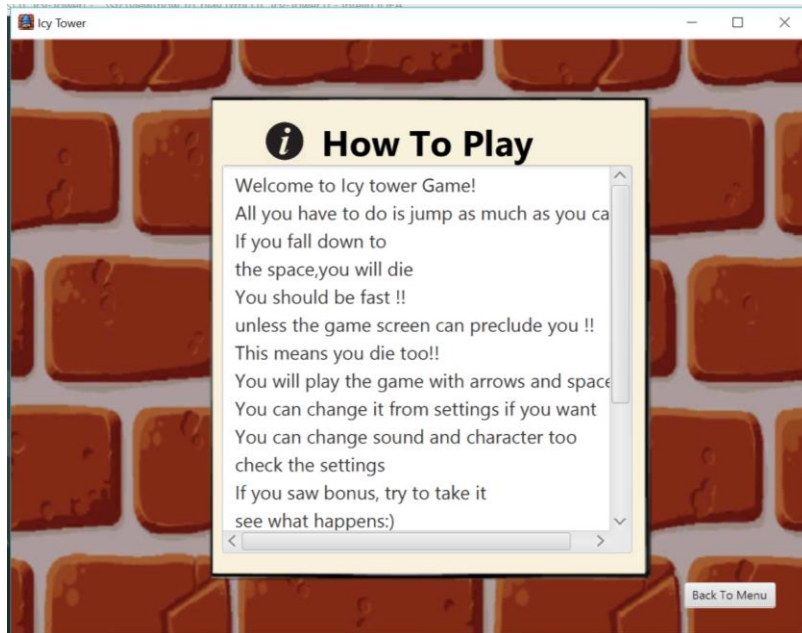
After reading the instructions and being sure that it is understood, players can click the

"back to menu" button and turn back to main menu.

Settings

Before starting the game, it may be a good idea to change the game settings. By selecting

the "Settings" button from the main menu, settings page is opened.
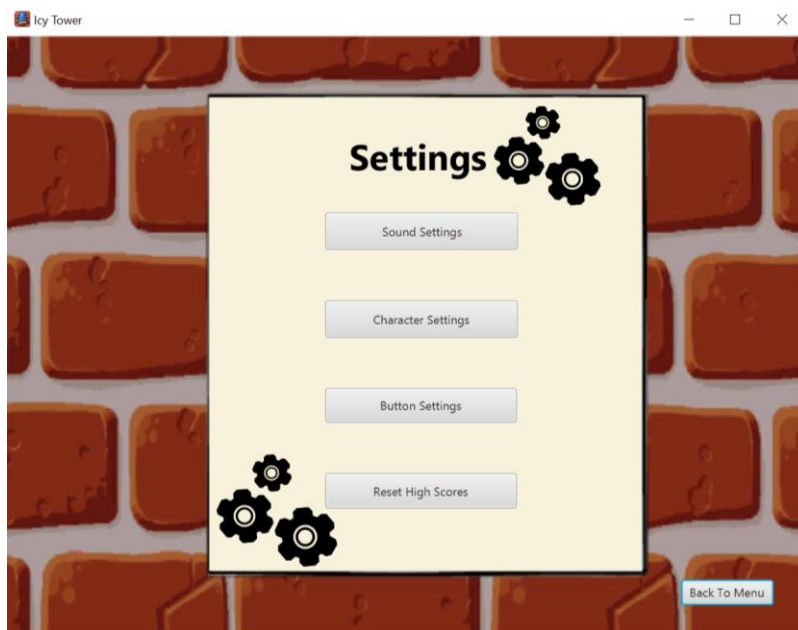
There are three settings options for the game. Sound settings, button settings and character settings. Also there is an option that enables players to reset the high scores list. If players click that button. The whole high scores list will be deleted.

Sound Settings
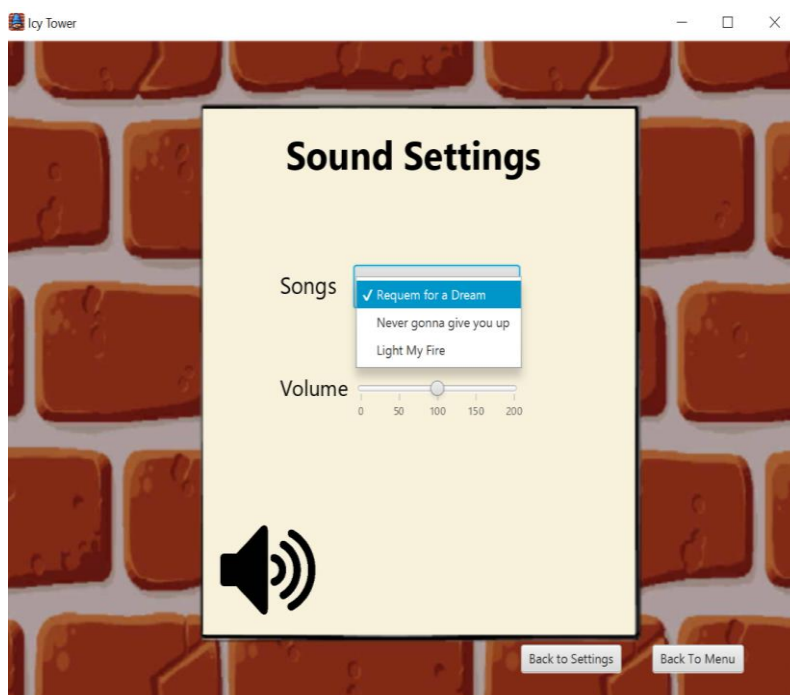
In sound settings, players can change the song that will be played during the game. In the choicebox there are three popular songs which are chosen by the developers.

Also, players can adjust the volume of the music from the slider.

If the player does not change any sound settings, the game will start with the song "Requiem for dream" and automatically adjusted sound level.

After finishing the adjustments, player can go back to main menu or settings page.

Button Settings
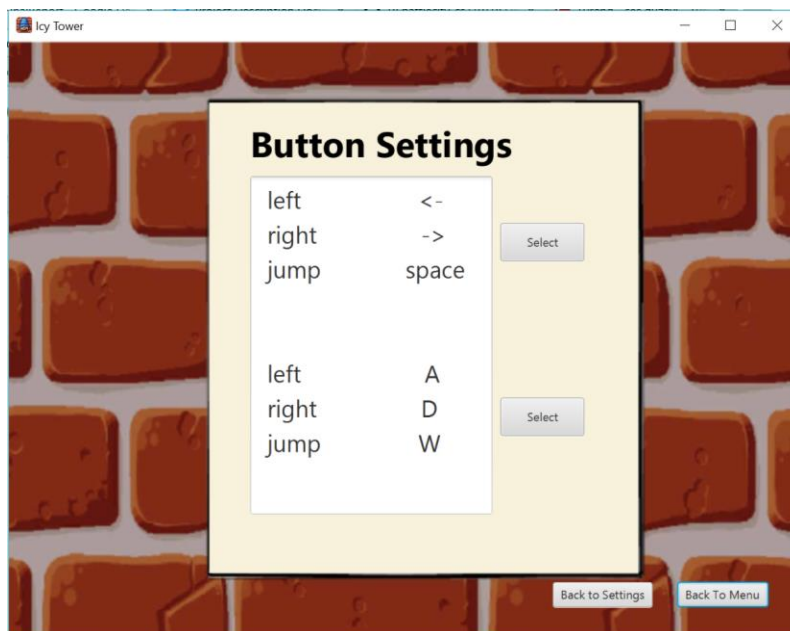
For the game, there are two options for control buttons. These are the buttons that gamer's generally used to use. If the player does not change anything from the button settings, control buttons will automatically be right-left arrows and space button.

Character Settings
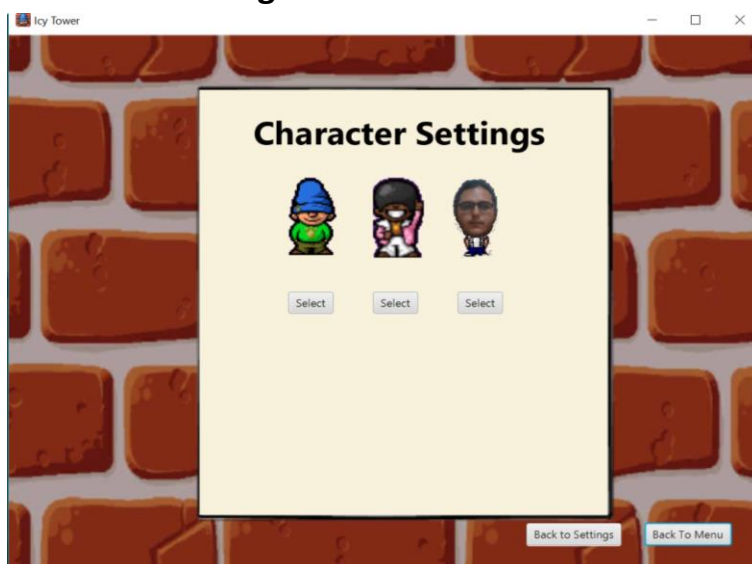
Icy Tower game also gives the opportunity of changing the game character. Players can click the button under the character which they want to play with. After "select" button is pressed, character is adjusted. Players can go back to menu and starts the game.

Credits

Players may want to learn the developers of this new and extended version of the fun and addictive game Icy Tower. By clicking the "Credits" button form the main menu, credits page can be opened.
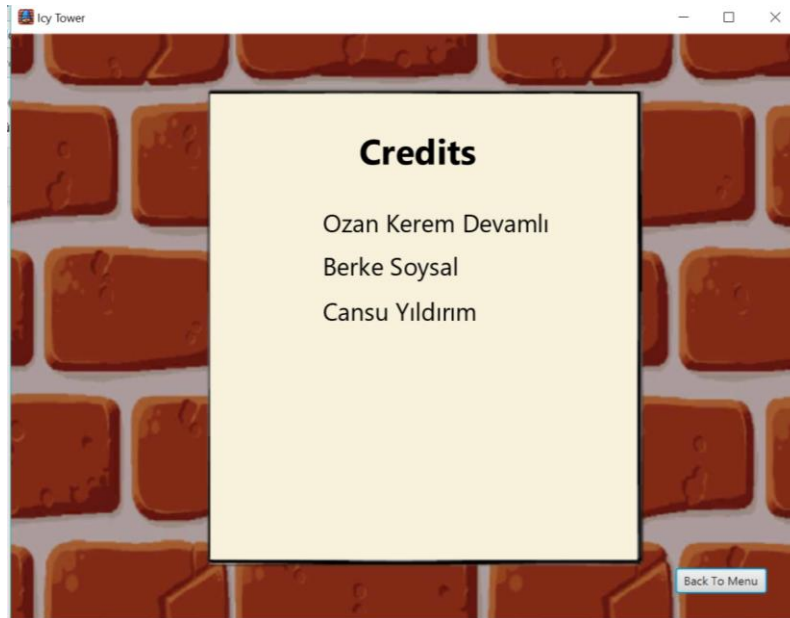
Play Game

After deciding and clicking the "Play Game" button from the main menu, players encounter with the page that asks the difficulty level that you want to play in.

There are three levels of the difficulty. From the easy to hard level, the initial game screen speed increases.

After deciding in which difficulty level that the player wants to play, the game starts.


On the right top corner of the game screen, there is a score indicator. With the progress of the player in the game, the score increases and it is shown simultaneously with the progress. Under the score indicator, there is a combo jump counter. When player makes the combo jump this counter will count it in a way that will be explained later.
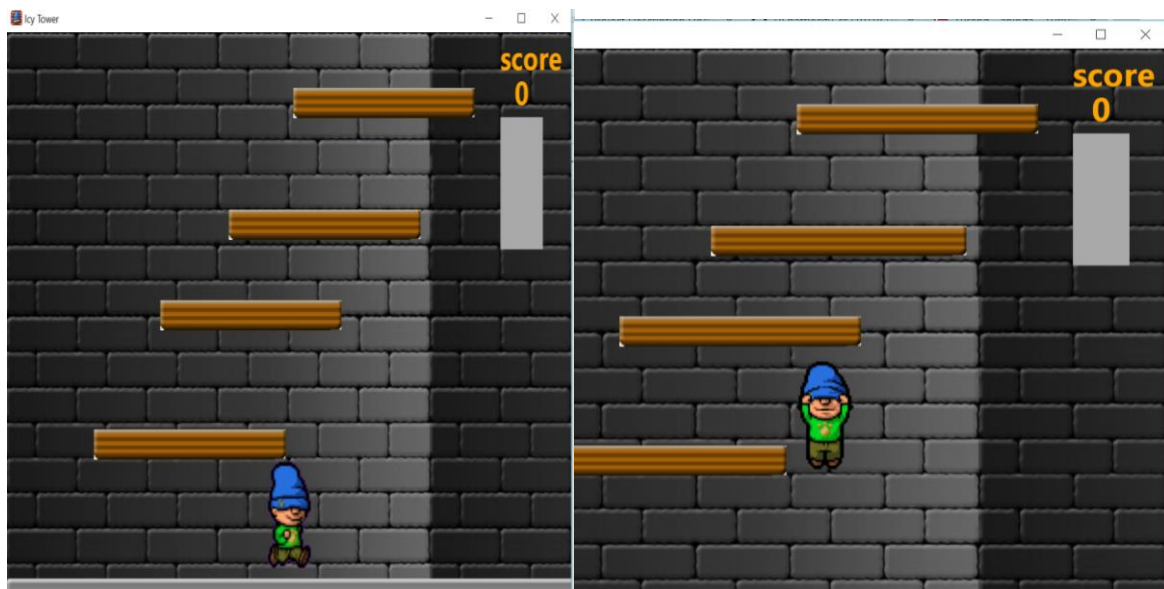

Character can go left-right and jump as it can be seen in the pictures above.

When the player makes the combo jump, character will go up by whirling around himself. By making combo jump character will jump higher and gets more points. As it can be seen, combo jump counter is raised according to the power of the jump. The number of floor that character passed in the combo jump is shown under the combo jump counter.
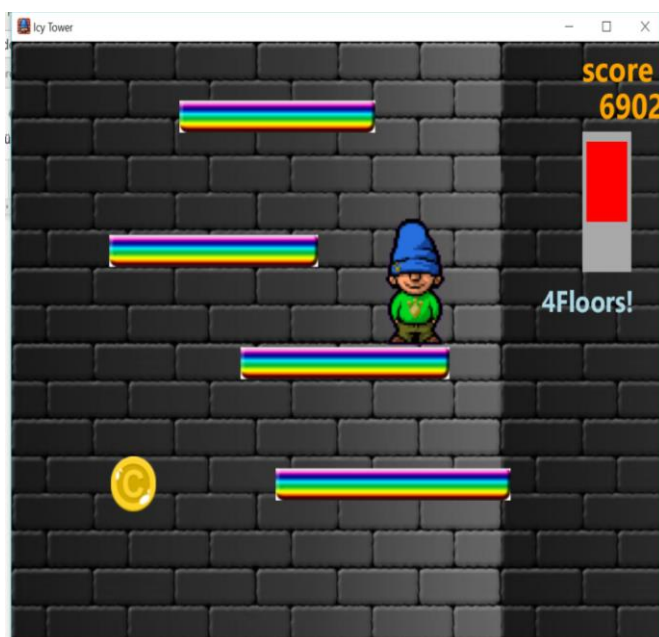
In the game, there are different kinds of floors that players will encounter. Also, there are some bonuses such as coin which can be seen in the above picture.
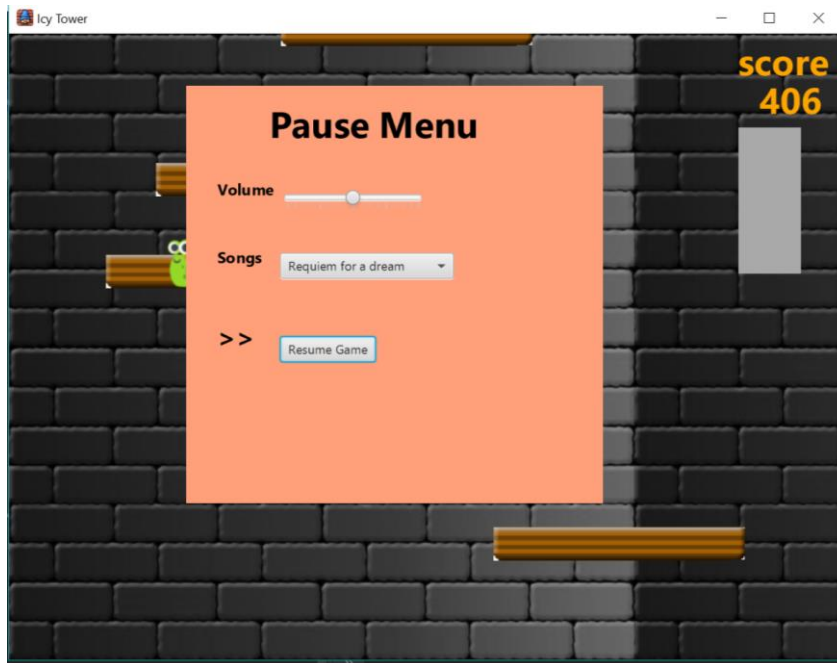
In game, players have an option to pause the game. "P" control button in the keyboard will help to pause the game. When the game is paused, pause menu is opened. In this menu players can change the sound settings which are the song and the volume. When the player wants to go back the game, clicking the "resume game" button will be enough.
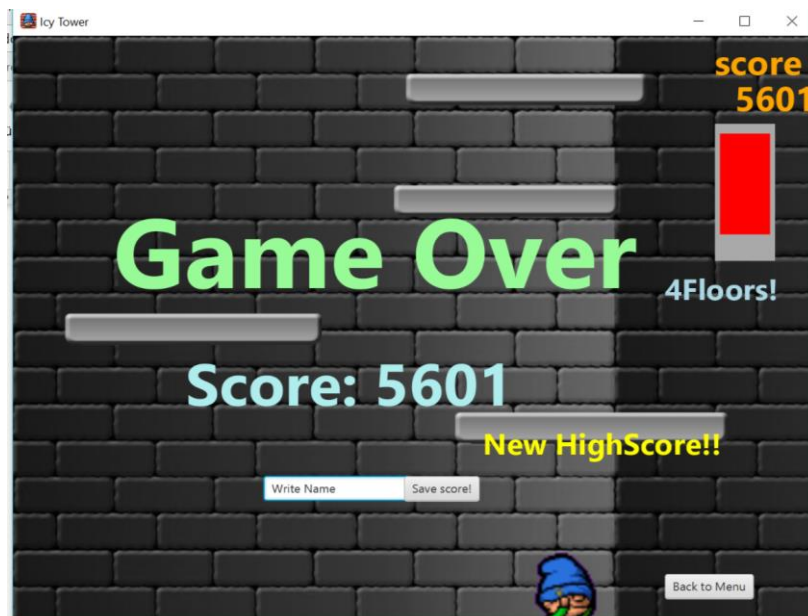
When the character falls to the space and be out of the game screen, the game is over. If the player have a score that is in top ten scores, "New High Score!!" text is appeared and player is asked for entering his name and the system will save that new score.

High Scores
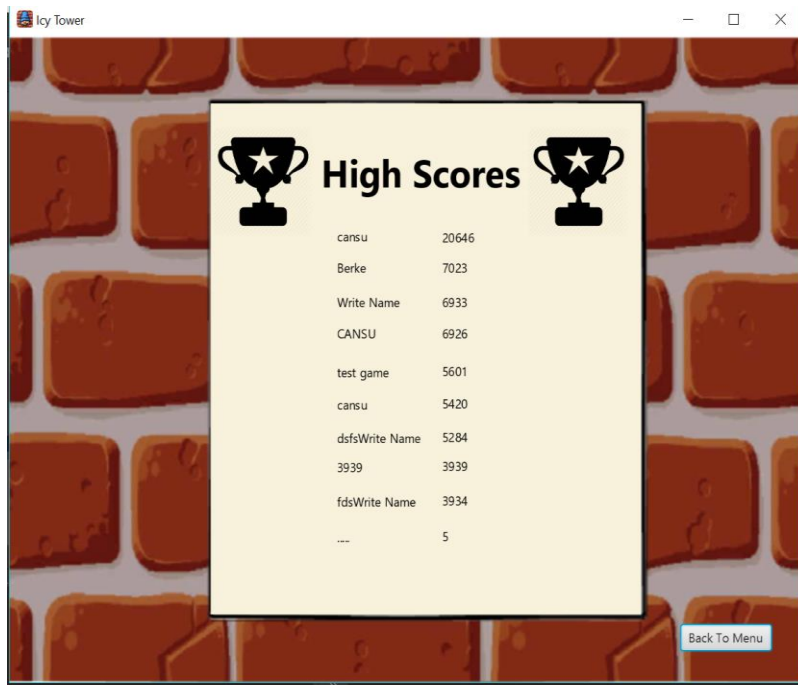
When "high scores" button is clicked from the main menu, players are able to see the top ten list. This list is in a descending order so that when player made a new score, it will take its proper place in the list.

Users can reset the high scores from Settings->Reset HighScores.

Exit

If the player wants to quit the game, s/he should select the "Exit" button from the main menu. In the exit page, player is asked again whether player is sure about existing. If s/he chooses "no", main menu is opened. If s/he chooses "yes", the game is exited.