جامعة عفت

EFFAT UNIVERSITY

CS 2132 - Object Oriented Programming

project Report - spring 2023

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1 Snake Game Project Description

The Snake Game is a classic arcade game in which the player controls a snake. The project is implemented in Java using the JavaFX library for the graphical user interface. The project includes two stages.

The first stage in the game is the starting screen, where the player can click the button to start the game. The second stage is the actual game, where the player controls the snake and tries to eat as many apples as possible without crashing into the walls or their own body. The game keeps track of the player's score and displays it on the screen. The player can also restart the game if the game was over.

The game board is a grid of squares, with the snake and apples represented as images. The player controls the snake using the arrow keys on the keyboard. The snake moves around the game board, eating apples and growing longer with each apple eaten. The player must avoid running into walls or the snake's own body, as this will end the game. The game becomes more challenging as the snake grows longer and moves faster.

There are several objects connected to each other in this project. The first one is a list of Corner objects that represent each "cell" of the game board that constitutes the snake's body. Another object is a Dir enum that determines the direction of the snake's movement. A Random object is used to generate random positions for the food, and there are three Image objects that depict the various types of food. The game board is drawn using a Canvas object, and finally, a Speedup object increases the game's pace based on the player's score. These objects work in conjunction to create a functioning and enjoyable game experience.

2 Analysis

-Input: JavaFX Event-handler using the arrow key on the keyboard.

-Process: In our project, we implemented three classes. The SnakeGame class is a JavaFX application that implements the classic Snake game. The game consists of a snake that moves around the game board and eats food that appears randomly on the board. The game ends when the snake collides with the wall or with its own body. The class has a set of constants and variables that define the game's behavior and state, including the speed of the snake, the size of the game board, the snake's position and direction, and the location and color of the food. The class also has a nested Corner class that represents a single cell of the game board, and a nested Speedup class that can be used to increase the speed of the snake as the player's score increases. The class has two methods: start, which creates the game's start screen, and startGame, which starts the game by creating the game board and updating the frames of the snake's movement on the screen.

The Corner class is a simple class that represents a single cell of the game board. It has two integer instance variables, x, and y, that represent the cell's position on the board. The class has a constructor that takes two integer parameters and initializes the instance variables.

The Speedup class is a class that can be used to increase the speed of the snake as the player's score increases. The class has an integer instance variable scoreThreshold that stores the score at which the speed will be increased. The class has a constructor that takes an integer parameter and assigns it to the instance variable. The class also has a method increaseSpeed that takes an integer parameter score and increases the speed of the snake based on the score. If the score is equal to 3, the speed is set to 7. If the score is equal to 6, the speed is set to 10. If the score is equal to 8, the speed is set to 14. If the score does not match any of these values, the method does nothing. The class is used in the SnakeGame class to create an instance of the class with a score threshold of 3.

-Output: the snake's moves, winning and losing messages, and the score.

3 Why We Chose This Project

We chose this project because it is a timeless game that is both fun and challenging. The Snake Game has been enjoyed by people of all ages for decades, and implementing it in code provides an opportunity to learn programming concepts in a practical and engaging way. Additionally, the project allows for creative experimentation with additional features such as sounds, different stages, and graphics; providing an avenue

for problem-solving and innovation.

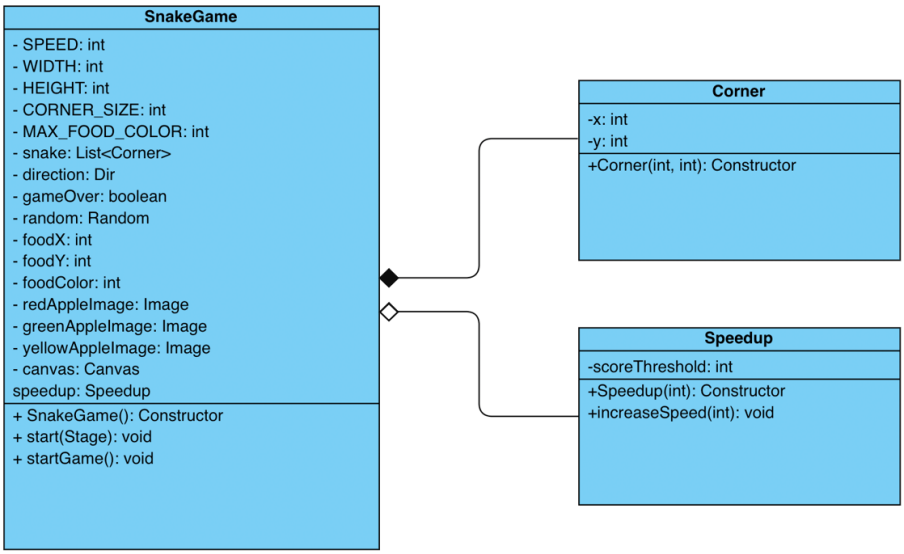
4 Creativity

To make the game more fun and challenging, we added some creative features to the game. We added funny images and also funny sounds when the snake eats an apple or crashes into a wall. We added different levels of speed to the game, increasing the speed as the player scores more points. Additionally, we added different types of apples, each with a different point value, making the game more engaging. Overall, these features add a touch of creativity and fun to the classic game of Snake.

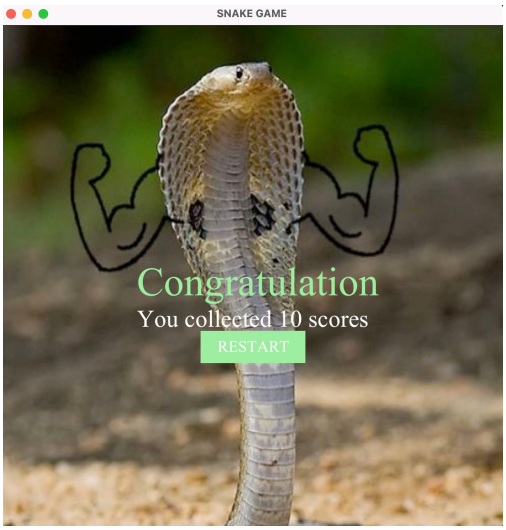
5 What We Learned

While working on this project, we learned to create a Snake game using JavaFX. The game revolves around creating a snake that moves around a board and consumes food to grow longer. With the help of JavaFX, we made the graphical user interface and grasped the concept of using graphics contexts to add images and shapes to the canvas. Furthermore, we acquired skills in handling user input and updating the game state accordingly. In addition, we explored how to use enums to represent directions and how to use switch statements to manage different cases effectively. We also learned about the significance of lists to keep track of the snake's body and how to use random numbers to generate food in random locations on the board. Finally, we gained knowledge on aggregation and composition, which we applied when designing our game's architecture.
Throughout the project, we honed our skills in time management and project organization, ensuring that we delivered a polished product that met the project's requirements. Overall, the project provided a valuable learning experience and allowed us to apply our newly acquired skills in a real-world project.

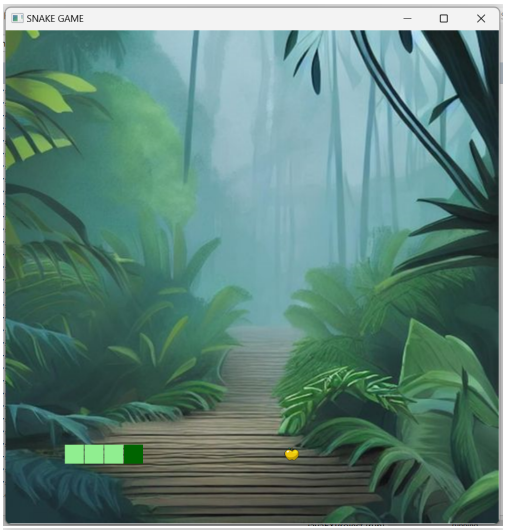
6 UML



7 Execution


SNAKE GAME
Congratulation
You collected 10 scores
RESTART


SNAKE GAME
Game Over
Score: 2
RESTART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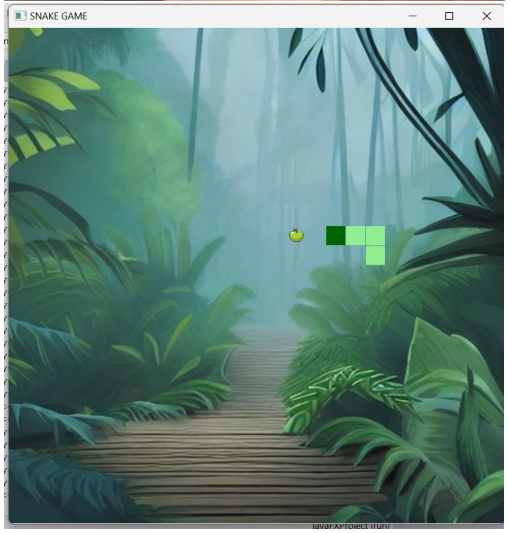
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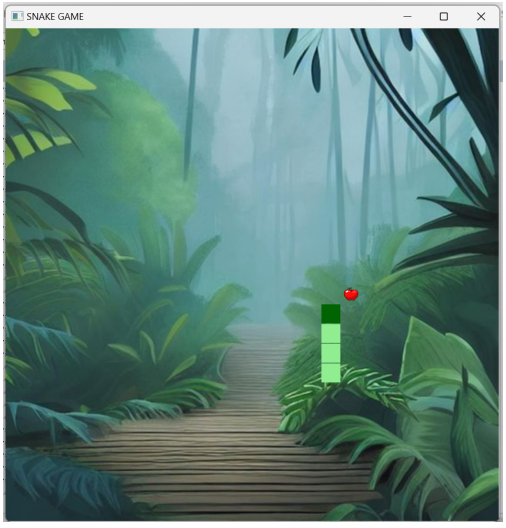
SNAKE GAME