Design Manual - Flappy Bison

Team 8: King’s Queens

Introduction

“Flappy Bison” is a 2D side-scrolling game that utilizes similar mechanics as Flappy Bird. The objective of the game is to navigate a bison through a series of obstacles by moving the cursor around the screen to successfully avoid as many obstacles as possible. If the bison collides with an obstacle or the bison is moved outside of the game window, the game is over.

From a technical standpoint, Flappy Bison was created using the JavaFX framework, which provides a set of libraries and tools for building cross-platform user interfaces. The game was built using a combination of Java code and SceneBuilder, a visual layout tool that allows developers to create complex UIs using a drag-and-drop interface.

The game logic is implemented using event-driven programming, with the bison's movement and collision detection handled through a combination of lambda expressions and timer-based animation loops. The game also features a scoring system that tracks the player's progress and displays their score on the screen.

The graphics for Flappy Bison were created using JavaFX and SceneBuilder, with images for the bison, the background, the title, and the buttons, and the pipe obstacles being generated with Rectangle objects.

Overall, Flappy Bison is a fun and challenging game that showcases the power and flexibility of JavaFX and SceneBuilder for building rich, interactive applications.

User Stories

Angel Enheven, *iPad Kid*

Quote:

“I like games and I like Fortnite. I like colorful games and I like when games have sound because I like being loud and annoying my mom.”

Narrative:

Angel is 8 years old and loves playing games on her iPad. She loves to play games that can keep her engaged with bright, colorful graphics. She likes to compare her gaming skills with her friends at school, so she prefers games that are simple, and don't require too much thought.

Aya Yay, *Easily Angry Boomer*

Quote:

“I am a simple, angry woman. I hate games that have too much to do in them. If I don't get something right away, I get extremely frustrated.”

Narrative:

Aya is the CEO of a famous TV Network company. She is nearing retirement, and as she is trying to pick someone to be the next reign, she is getting more and more irritable and has trouble controlling her temper. She is looking for something simple to help relieve her from the stress of retirement, and would like a game that is easy to maneuver and understand.

Marina Ra, *Ice Cream Truck Owner*

Quote:

“I like games that allow me to play as many times as I want and that I do not need to keep track of.”

Narrative:

Marina, a 35-year-old ice cream truck owner runs a successful business selling ice cream to families and children in her community. She has been running her ice cream truck for several years and loves being able to bring joy to her customers. During her break times, Marina enjoys playing games on her phone.

Patty Krabs, *High School Student*

Quote:

“I enjoy challenging games just not the ones with multiple commands.”

Narrative:

Patty is a 19-year-old high school student who is passionate about gaming. He is an avid gamer and loves to explore new games and challenges. Patty is always on the lookout for new and exciting games that he can play in his spare time.

Tina Nguyen, *Software Developer*

Quote:

“I like to play games often! I especially love puzzle games, and games that challenge my reaction time.”

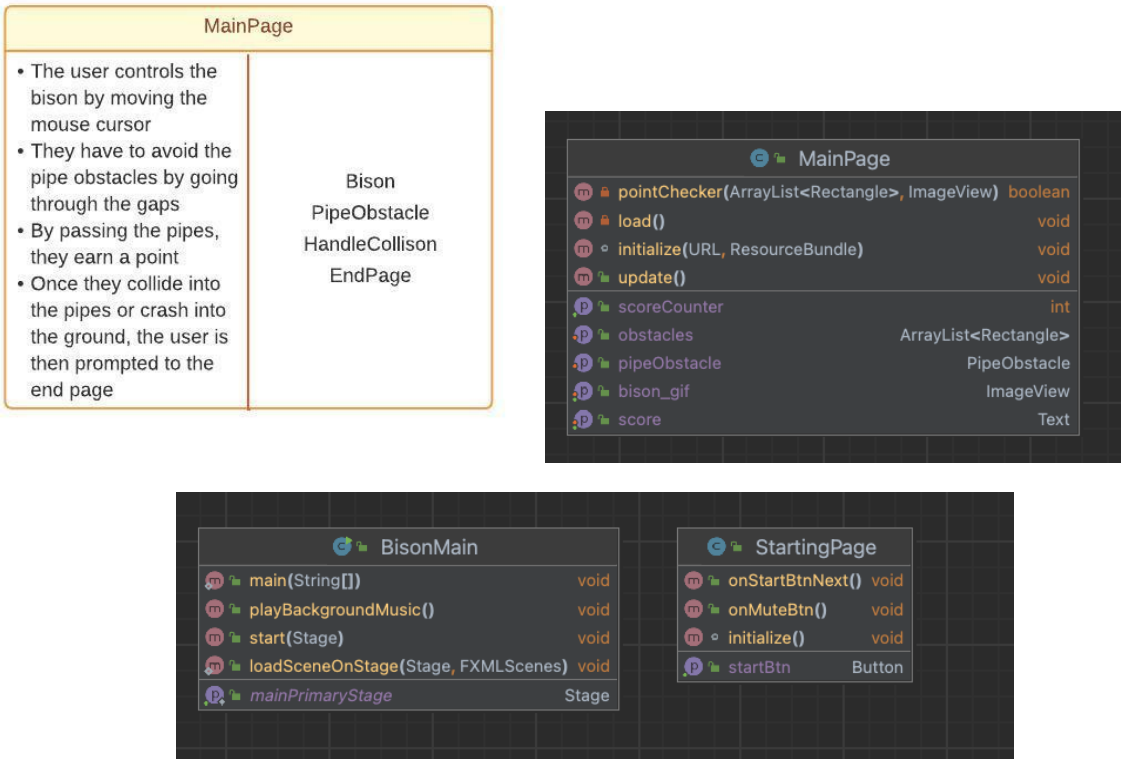
Narrative:

Tina is a 30-year old software developer who has been in the industry for nearly 10 years. She's familiar with developing games, and likes games that aren't easy to beat. She likes a challenge, and wants a game that will take a long time to master.

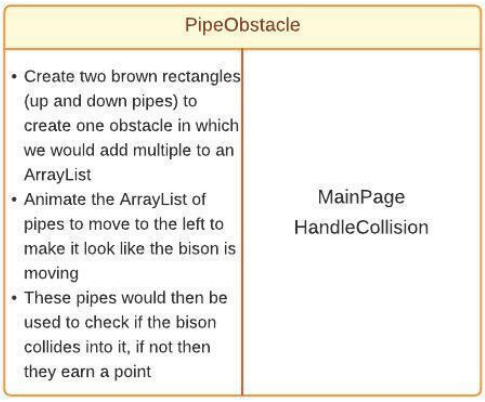
Object Oriented Design

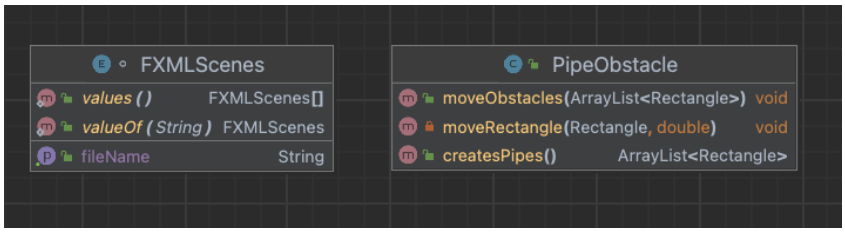
"Flappy Bison" was built on IntelliJ, using JavaFX and SceneBuilder, providing smooth and efficient performance. When the game is running on BisonMain, the user is met with a starting page. The Starting Page was produced from SceneBuilder, with an AnchorPane that contains four elements: the title and the directions right below it, the Bison gif, the background, and the start button. On IntelliJ, we have a StartingPage class that has the different objects in the Starting Page, the three Image View objects (background, bison_gif, and title & directions) and the Button object (startBtn). The Starting Page also includes directions on how to control the Bison, which is just to move the cursor around the screen. Furthermore, we had added music to add to the user experience. The aesthetics of the game were based on the User Persona, Angel Enheven, a young kid who stated she likes colorful games and music to keep her engaged and stimulated. The StartingPage class also has a method called "onStartBtnNext" that loads the Main Page when the user clicks the start button. These details are further clarified in the CRC cards and Class Diagram attached below.

The Main Page was also built similarly, having its own SceneBuilder file and MainPage class. The game is run with the BisonMain class, loading the Starting Page file. The Bison's mechanics are handled within the MainPage class using an event handler where the Bison moves wherever the user's cursor is on the screen. Initially, we planned for the Bison to jump upwards when the user presses the space key, but we found a lot of issues in its positioning, which made it difficult to control the Bison. With these simple mechanics, one of the Users' wishes, Aya Yay's, is granted, as she stated she wanted a game that was easy to maneuver and understand. The MainPage also handles the pipe obstacles in the game.

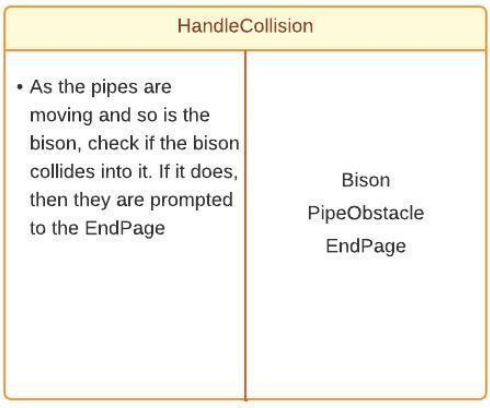


The obstacles are generated in a class named “PipeObstacle” and called in MainPage. The obstacles are made with an ArrayList of Rectangle objects and the heights are randomly generated. Because the pipes are randomly generated, the game can still provide challenging stimulation to the user, despite using simple mechanics. Patty Krabs, one of the users, said that he likes challenging games that don’t use too many commands. The only thing the user has to do to play the game is to move their cursor. In addition, pipe obstacles being randomly generated tests the users’ reaction times, a feat that Tina Nguyen said she wanted in a game.



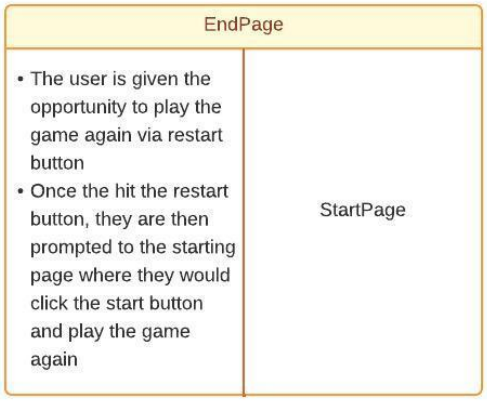


Even though all the user has to do is move their cursor to control the bison's movements, there is still a strategy behind avoiding the obstacles within the game. In MainPage, there is a load() method that loads and adds the obstacles, and an update() method that updates the obstacles as the Bison successfully goes through them. To handle collisions, we created a HandleCollision class that checks the bound of each rectangle obstacle and if it intersects with the Bison object, returning a boolean value.



When a Bison collides with an obstacle or touches the edges of the window, the game state changes to GAME_OVER, and will show a screen with the amount of points the user earned and gives them the option to start a new game. If the user decides to start a new game,

they are led back to the starting page. Since the only goal of the game is to get the highest score possible, the user is able to play as many games as they'd like, which is something that Marina Ra specifically wanted.



- UML Class Diagram