Object-Oriented Programming and Design

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Group: *ОПД 1*

Task: *Implement the game and rendering engine I designed in Assignment #4 for "Flappy Bird". (assignment 5&6)*

GitHub link: *https://github.com/VY-Assignments/asmt-5-game-engine-MarharytaFilipovych*

Modifications:

- **Removed UserAction Class**: *The UserAction class was deemed unnecessary. Instead, boolean flags (started, over, paused) have been implemented within the GameEngine class to effectively manage the game state across both the GameEngine and Render classes.*
- **Introduction of Entity Class**: *A new Entity class has been created, which serves as the base for the Pipe, Heart, and Bird classes. This class encapsulates essential attributes of game objects, including x, y, width, and height, along with their corresponding getters.*
- **Additional Lives Feature**: *A new feature has been introduced to provide additional lives, specifically for pipes (excluding the top and bottom edges of the screen). This is facilitated by the newly developed Heart class, which includes functions for generating hearts and managing their user interface. Hearts can sometimes appear on pipes, intentionally making them impossible to collect to enhance the game's challenge.*
- **Dynamic Game Speed**: *The game begins at a slower pace, with the speed increasing every 10 seconds to maintain an engaging level of difficulty. The hearts will appear rarer as the pace increases.*

MiniTest: *https://www.kapwing.com/videos/67262738f77c2b5317da013f*

Conclusions:

- **What was implemented:**

I have implemented an exceptional Flappy Bird game featuring a user-friendly interface with clickable icons for actions like stop, play, and reset. Players have the flexibility to use either the mouse or keyboard for control:

- *Starting the Game: Press the spacebar, left click, or the play button.*
- *In-Game Controls: Flap the wings by left-clicking or pressing the spacebar; right-clicking stops the game.*
- *Game Stopped: Players can resume (left click, spacebar, or play button) or reset (right-click or reset button).*

The game features continuous background music that automatically resets when it ends. Additionally, there is a sound effect when the bird successfully flies through pipes.

Hearts appear on the screen every 7 seconds after the game starts. If the bird catches a heart, it disappears and is displayed in the top right corner, with a maximum of three hearts allowed. Once three hearts are collected, no more hearts will spawn. When the bird has hearts, it can fly through pipes,

causing those pipes to disappear. However, this also consumes the hearts, increasing the risk of losing if the bird runs out.

Soft pipes, which are darker in color, appear randomly and can be passed through.

The score is displayed in the top left corner, updating in real-time as players progress. If the player loses, a message appears showing the current score and the best score achieved. The player will always lose if they touch the top or bottom edges of the screen. In addition, they will die if the bird without additional hearts collides with pipes that are not soft.

- **Additional notes:**

  I was sad when I had to change many things in my previously developed design 🥺. It was difficult to find the most suitable values for gravity and velocity.

- **Appendices**: chat GPT, plantUML, https://youtu.be/Xw2MEG-FBsE?si=r09hMHp6D19ky07X, 2.6 Tutorials (SFML / Learn), Game Icons & Symbols, Library of Game Sounds | OpenGameArt.org, Flappy Bird Tap Bird 2D Spike Bird, PNG, 2357x1491px, 2d Computer Graphics, Flappy Bird, Android, Art, Bird Download Free