IM3080 Design and Innovation Project (AY2023/24 Semester 1)

Individual Report

Name: _Lee si, Heidi_____

Group No: __Group 3_____

Project Title: ___nIEMtendo_____

Contributions to the Project (1 page)

- Guided software team in initial stages by providing resources and guiding through the learning process for Arduino.
- Initiated the game development process by coding the foundational logic to be used for Snake Games version A & B.
    - Rendering a dynamically growing moving snake
    - Snake movement (with WASD inputs and button controls)
    - Generating random apple
    - Implementing crucial gameplay functionalities such as pause, restart, game over, and start game logic
- This served as the groundwork for the subsequent development of Snake Game version B, providing a solid foundation for further modifications and enhancements.
- Implemented full snake game A with increased difficulty level by increasing the speed of the snake as it grows longer in snake A.
- Programmed snake movement with WASD inputs and implemented button controls.
- On behalf of the software team, collaborated with the hardware team to verify code compatibility with purchased components especially LED strips and serial mp3 player module.
- Implemented displays for small screens(scoreboard/color display, highscore/timer display) and its functionalities with gameplay involving using Adafruit and EEPROM for scoring system.
- Handled integration of all software team's code: menu screen codes, gameplay codes and additional screens.
- Integrated menu screen to switch to snake A or B game using button interactivity.
- Implemented background music, sound effects for menu screen and games using serial mp3 player module.
- Assisted in debugging and optimization process by removing duplicate, redundant codes and streamlining code for improved efficiency during process of integration involving all codes.
- Developed a comprehensive code flowchart for how-to guide, wrote up user guide, and focused on the software portion of the report, covering integration and utilized libraries.
- Created presentation slides outlining game logic flow and project ideas for supervisor reviews.
- Helped out in painting and beautifying of arcade game exterior

Reflection on Learning Outcome Attainment

Point 1: _____Individual and Teamwork_____

Due to my prior experience working with Arduino as compared to the rest of the software team, who this is their first time, in the beginning stages of our project I helped them with their learning process by providing resources to help them get familiar with the software. While doing so, I kickstarted the game development process and started experimenting with coding the snake game A, prioritizing the establishment of fundamental functionalities so that it would be easier for the rest of the team to subsequently reuse/modify these functions for snake game B. This also helped set the direction of utilizing LED strips in a continuous zigzag pattern such that only one data pin has to be used when connecting to the arduino board, allowing the hardware team an idea of how the strips should be soldered. I also offered valuable insights to the hardware team, providing guidance on selecting optimal hardware components to align more effectively with our coding requirements given I have worked with LED strips and serial mp3 player modules previously and hence suggested these to be used. Throughout the software development part of the project, I continued providing assistance either in terms of writing code or debugging whenever my teammates required help when coding their assigned portions of the project. This experience has enriched my understanding of collaboration by teaching me how to effectively engage with individuals possessing varying skill levels. It has also honed my ability to strategically leverage my own skills to assist and contribute to the overall success of the team.

Point 2: _____Communication_____

While handling overall code integration, effective communication became a crucial aspect of my role as it required me to collaborate with both the software team members and subgroups managing gesture sensors and opencv. In order to streamline and optimize code performance to prevent memory constraints in the Arduino Mega, I had to have a good understanding of how each individual code portions done by different members of the team worked as well and this pushed me to become a better communicator. On top of that, I also liaised with the hardware team on what kind of hardware components and requirements would best suit our code. An instance of miscommunication between the hardware and software teams occurred in the final weeks leading to the showcase. The issue revolved around the minimum required rows and columns for the LED strips used in the scoreboard display for Snake game A. Unfortunately, It was only discovered late into the project that the hardware team had unintentionally created the scoreboard short of one column of LED lights. By this point, the wooden frame for the scoreboard had already been cut and drilled into the overall fixture, making hardware adjustments impractical. The software team and I then collectively brainstormed solutions and opted for a dynamic bouncing score display rather than a previously used static one, overcoming the limitation of the hardware shortfall. While not the best solution, it proved effective within the constraints of our limited time frame. This experience taught me the importance of clear and constant communication especially when working in big groups.