IM3080 Design and Innovation Project (AY2022/23 Semester 1)
Individual Report

Name: Hou Bo

Group No: 3

Project Title: Cloud Tubes

Contributions to the Project

Appearance design：

Discussed the appearance design with the hardware group members. Offered 3 designs and one was chosen. (Finally we chose to use the original design we had but we applied some design ideas to the installation.)

Materials design and preparation (for install and decoration)：

Thought, calculated and prepared (e.g. cut, install) materials needed for hardware installation and decorations. (e.g. wire, breadboard, foam board, cotton, frosted cellophane…)

Circuit design：

Applied electric related knowledge to design the circuit to power all the LEDs. Studied the power supply we got from Prof.Chua. With the help of the professors, we were able to connect the power supply to the 220V socket power.

Soldering & Wiring：

Soldered the LED strips. Wiring the LED and sensors to power supply and Arduino.

Testing:

Assisted to test the work of the power supply, LED, Arduino signal and sensor.

Slides preparation & Video editing:

Prepared slides for some formal presentations with other teammates. Edited the final demo video.

Meeting record:

Participated all formal presentation and record the feedbacks from supervisors and professors.

Reflection on Learning Outcome Attainment

Reflect on your experience during your project and the achievements you have relating to at least two of the points below:

(a) Engineering knowledge
(b) Problem Analysis
(c) Investigation
(d) Design/development of Solutions
(e) Modern Tool Usage
(f) The Engineer and Society
(g) Environment and Sustainability
(h) Ethics
(i) Individual and Team Work
(j) Communication
(k) Project Management and Finance
(l) Lifelong Learning

Point 1: Engineering knowledge

When we were doing circuit design, we applied our electric engineering knowledge to calculated the feasibility of series and parallel connection (25 12V LEDs powered by 5v batteries). We tried to calculate series, parallel connection and even series-parallel or parallel-series. It is hard to achieve using the batteries we have. Maybe it was possible if we divided the LEDs into 5 groups, but that would be troublesome and wires would be very messy. So we asked Prof.Chua for help. We finally got a 20v power supply from Prof.Chua and it was much easier to do the circuit design.

Point 2: Problem Analysis

During the process, it happened a lot that some of the tubes cannot work. We did analysis from different aspect, such as connection, power source, signal pin or programming problems. I found that the most common reason is that the connections. So we reconnect everything and tape every end of the wire. We also added wire junctions with screw to fix the wire when there is a fork in the circuit.

Point 3: Modern Tool Usage

Used 3D model software and 2D design software (mainly procreate) to do the appearance design and circuit recoding. Used Adobe software (mainly Premiere) to edit the video. Used online recording application (mainly GoodNotes) to organize and record meeting materials. Used GitHub to share the coding result. Used online library to study Arduino and power supply.

Point 4: Communication

At the beginning, I have discussed about the appearance design and circuit design in our hardware sub-team. During the testing process, I closely worked with the Arduino team to test different features and communicated frequently to solve the problems faced. After each formal presentation, all the teammates discussed the feedback and different groups communicated to get a better result. During the video editing, I actively communicated with teammates to get there feedbacks and tried to make a better piece.