IM3080 Design and Innovation Project (AY20xx/xx Semester x)
Individual Report

Name: Lim Xuan

Group No: 3

Project Title: Tube

Contributions to the Project (1 page)

I have contributed to the programming of the Arduino, the designing of the poster, as well as the finances in purchase of the materials.

Programming of the Arduino includes the directional wave code in conjunction with Yaoxuan's center ripple code. Numbering of the tube was done up by me to easier facilitate the coherence of the codes between Yaoxuan's segment and mine. The contribution is also inclusive of ideating the function of the more interactive segment of using the sensors, which displaces the 'wave' of lights away from the user's hand. The closer the hand to the sensor, the more the wave will be 'pushed' away from the user. This function of the code was eventually done up by me. There was also finer refinement of these functions of the code after the main bulk of it was done up by Yaoxuan, after fully understanding the intention of each line of code done by Yaoxuan. Multiple testing has also been done by both Yaoxuan and me to ensure that the code functions. The testing also includes ensuring the adjustment of the code to suit the hardware that was procured by the hardware team.

Design of the poster was done Yaoxuan and me. The photographs were taken by Zhi Xin and Zhao Yi. The design of the poster was adjusted to a neon theme to reflect the nature of the project.

Finances of the project was managed by Regine and me. The overall spendings of the project was tracked by both and the documentation of the spendings was done by me. We were able to keep the spendings below $200.

Reflection on Learning Outcome Attainment

Reflect on your experience during your project and the achievements you have relating to <u>at least two</u> 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: <u>Engineering Knowledge</u>

Engineering Knowledge that was gained includes Arduino and Ultrasonic Sensor HC-SR04. I have learnt to programme the utility of the ultrasonic sensors in the Arduino code, inclusive of how the trigger and echo pins work. The Arduino received information on how long it takes for the echo pin to retrieve the sound emitted by the trigger pin, hence by using this value, I was able to programme the interactive portion of the project, having the waves be displaced at a distance depending on the distance the user's hand is from the sensors. There was also knowledge learnt as to how the LEDs work in conjunction with the Arduino, in order for the tubes to light up accordingly.

Point 2: <u>Problem Analysis</u>

There were problems faced in the programming of the code, and they have been analysed and debugged accordingly. One problem faced was the rainbow code. The rainbow code was initially supposed to have the lights constantly change colours along the colour wheel. However, this could not be done as the code segment for the rainbow function eventually grouped all the LEDs component together, hence removing any capacity of the interactive element of the project. Since the interactive element was more impactful for our project, we have decided to drop the rainbow code for the sake of not only efficiency, but also such that we can focus more on the testing of the ripple and wave codes, such that the interactive elements are more refined.

Point 3: <u>Project Management and Finance</u>

While not much in the project management area, I have developed more from the finance aspect. I have learnt more on the importance on the finance for a project, as it is a limited resource that we have. Ensuring that we keep to the $200 we have been allocated was crucial as we are able to understand that we are in fact able to accomplish what we want to do within the allocated budget. This is important in project management as well since a part of project management also required planning of budget such that we are able to keep within the means of our resources, as it is also true for actual projects in the field