COMP140 Project

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1 Proposal

1.1 Introduction

I plan to make a flying simulator in which the user can control an aeroplane with a more realistic controller made using an Arduino.
The user will have some of the more important buttons and switches for flying an aeroplane instead of re-assigning the keys on a keyboard. A pre-flight manual will be available to describe what the different buttons do. There will also be a throttle and joystick to control the speed and direction. Before take-off the user will have to complete an in-game checklist to make sure they understand the controls. They will then be able to take-off and fly around and attempt to land again at the airstrip.

1.2 Design

Resistors and switches will be used for the toggle controls (with LEDs to show on/off) and I will use a potentiometer for the throttle adjustment. These controls will be built into a solid dashboard and labeled underneath to ensure a more user friendly experience. Steering the aeroplane will be done with an old Logitech joystick which I will redesign by removing the buttons and smoothing out where they were so that it feels more like an authentic joystick in an aeroplane might feel.

2 Hardware

A list of hardware i used:

2.1 Components

On-on switches.
LEDs (light emitting diodes)
Resistors.
Wires.
Breadboard.
Arduino Uno.

2.2 Materials

Cardboard model aeroplane box for controller casing.
Sticky labels for the switches.
Card and Superglue to reinforce the controller casing.

3 Process and Reflection

The first lesson I learnt from this project is that i should have ordered the components and parts I needed sooner as I had to wait for some time before they arrived. This slowed down the creation of my game as I was not quite sure what to start on because my plan was to start by making sure I could get the serial communication working. Instead I began by creating a simple model of an aeroplane and programming it to fly with keyboard input.
When my parts arrived I made a prototype for my controller using the Arduino Uno and two switches. I then added some LEDs to the circuitry so that I could tell easily whether the switch was classed as on or off.
Next I started to attempt the serial communication which proved to become a long and difficult task as I had to do a lot of debugging and testing from both the Arduino and Unity. Finally I got the two to communicate and then had to program functions in Unity for when the serial data from the controller changed.
The serial communication between the controller and the game took me a lot longer than I had planned for so the controller only has two functions: toggling the landing gear up or down, and turning the positioning lights on the wing tips on or off. The aeroplane must still be flown with the keyboard so I added a tutorial popup that the user can activate by pressing the 'Tab' key.
For the case of the controller I used a box from a model aeroplane. I opened

the box so that i could access the inside more easily and i cut holes in the top of it for the switches and the LEDs which i reinforced with card and superglue so that the switches will be less likely to come loose. I then stuck the breadboard and Arduino to the inside of the box and glued the box back shut. I also added labels for the switches so it easy to tell what their functions are.

4 Conclusion

From this project I learnt that I need to give myself more time than I assume I need as unforeseen issues are always a possibility and can be very time consuming. I have also realised that making notes of what I am working on as I work on it would be beneficial for accurate documentation, as opposed to trying to remember everything at the end of the project.