

Industrial Hardware Final Exam Document

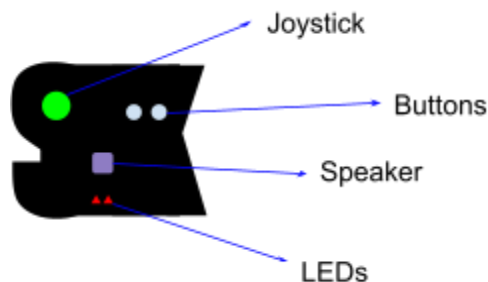
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Brainstorming (What was done)

I want to create a controller that would be able to play the Super Mario Bros. The thought process for the controller design is to integrate the initials of my name into an ergonomic design that will fit comfortably in a person's hand. The initial sketch looked like this:

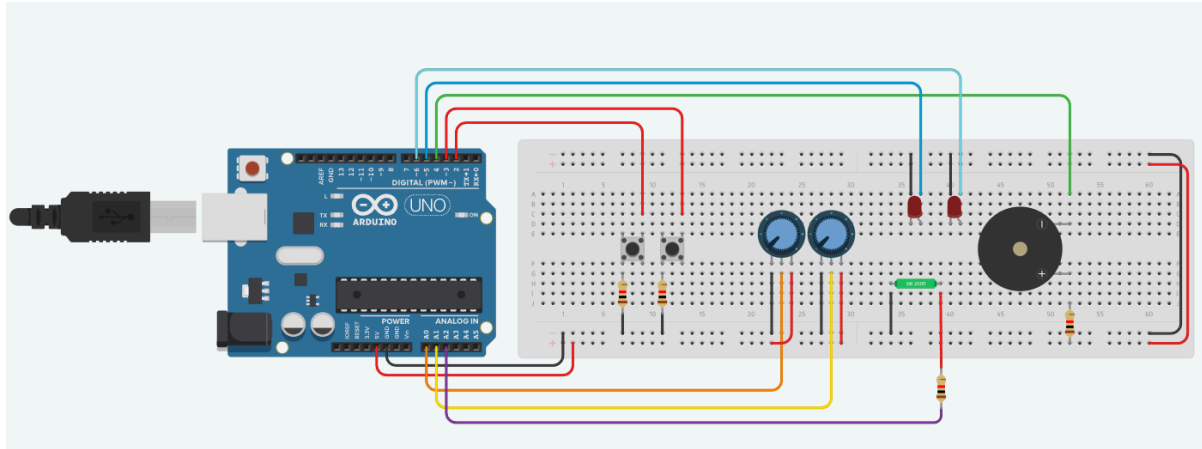


Where the person holds the section and uses the buttons and joystick where the letter K is and have the letter S be where the speaker and LEDs would go. However, due to the asymmetrical nature of the letter S, I've come up with a simpler design that will fit the hand better:



The design is similar to the first design, however, after a few iterations, this design would be able to cup the hands better. Additionally, by filling in the central areas of the letters, I could use that space for both inputs and outputs.

Electronic Prototype (How it was done)



The electronic prototype showcases two push buttons, two potentiometers which act as a stand-in for an analog joystick, two LEDs, a tilt sensor, and a piezo speaker. The prototype electronically allows the user to play Super Mario Bros. as its electronic components are similar to the NES controller. The difference here is that, instead of a D-Pad to control movement, I will use a joystick to capture movement to make the movement of the character more free. Another difference is the utilization of a tilt sensor, which could be programmed and used for many things. You could control Mario's movement with the tilt sensor, you can make him jump, or you can make him sprint. Additionally, I added visual and auditory cues through the use of LEDs and a speaker. The LEDs and speaker are reactive and respond to the button inputs. When you click the left button, the left LED will light up and the speaker will make a sound. Similarly, when you press the right button, the right LED will light up and the speaker will make a different sound, making it easy for the user to understand which button was pressed.

3D model (Why it was done the way it was)



I chose to create the controller this way because the top curve of the letter S and the top right corner of the letter K can be used as grips for the person to hold on to. For the steps on creating the controller, I used the sketch I made as a reference to create the sketch in Fusion 360, next, I created holes for the inputs and outputs, lastly, I created fillets around the controller so it's easier to hold and because it's good practise to eliminate sharp angles.