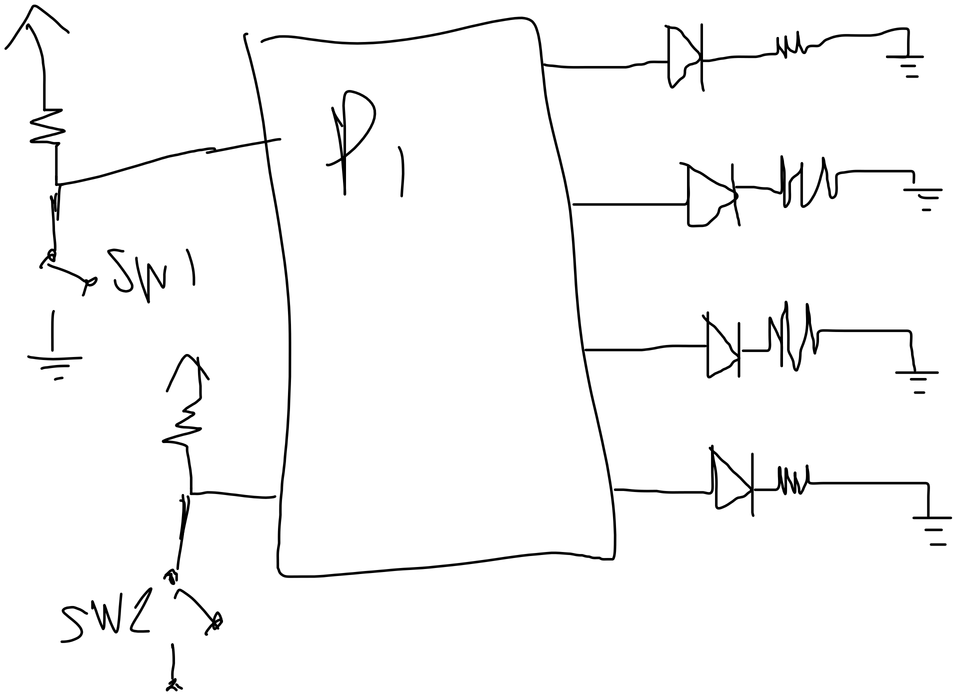
Objective

Pre-Lab

- Decoder- a circuit that changes a code into a set of signals
- Switch Debouncing- removes the resulting ripple signal, and provides a clean transition at its output
- Array Data Structure- a collection of elements (values or variables), each identified by at least one array index or key
- Debugging strategies used:
    a. Saff Squeeze – a technique of isolating failure within the test using progressive inlining of parts of the failing test
    b. Print debugging is the act of watching trace statements, or print statements, that indicate the flow of execution of a process

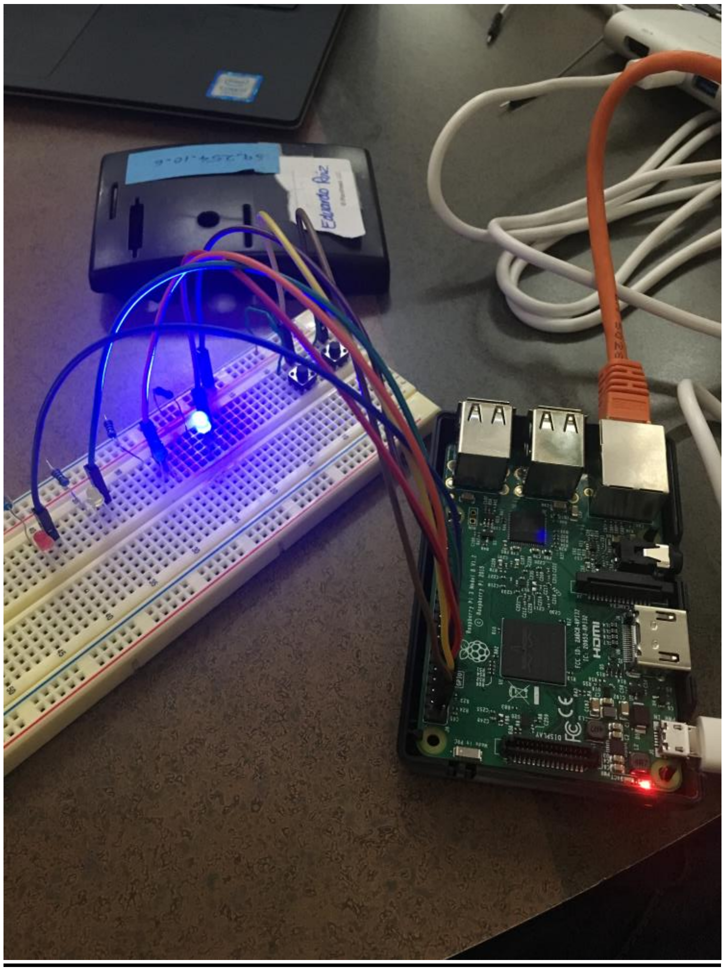
Decoder Schematic

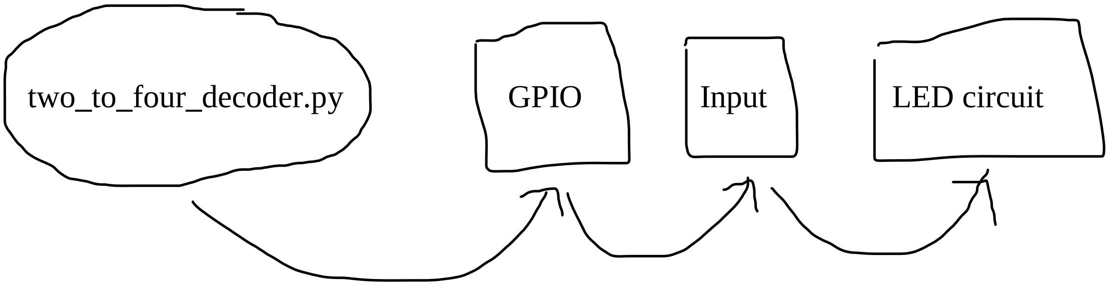


Procedure

1. Set up two GPIO pins to be your input and four GPIO pins as your output. Use one GPIO pin for your ground.
2. Connect the ground GPIO wire to the breadboard first.
3. Connect only one GPIO input wire to only one switch. Then connect a ground wire to the end of each switch.
4. Connect only one GPIO output to only one LED each. Then connect a resistor at the end of the switch. The resistor will connect the LED to ground.
5. Once your Pi and circuit are connected, fill in the code with gate commands to implement the specific logic needed.
6. Debug when necessary. For me it took an hour due to input errors
7. Run the code and make sure that an LED is automatically turned on without pressing a switch. It should turn on another LED if you press switch one, turn on another LED when switch two is pressed, and turn another LED on if both switches are pressed at the same time. Debug if you get a different result

Pictures/Block Diagram





Conclusion

We combined our knowledge of coding with our knowledge of circuit analysis to effectively implement four outputs, our LEDs, just by using two inputs, our switches. Software and hardware go hand in hand, if one is missing the other is useless. If one is set up wrong, the other becomes useless. As ECE, our job is to reduce cost and increase efficiency, so if a program becomes useless, all hard work goes down the drain. We must be patient and concentrated when writing our code due to its strict syntax as well as follow the laws of basic circuit analysis to make this whole lab work. We must balance our software and hardware knowledge to efficiently become great Electrical and Computer engineers.