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TEJ 4M1

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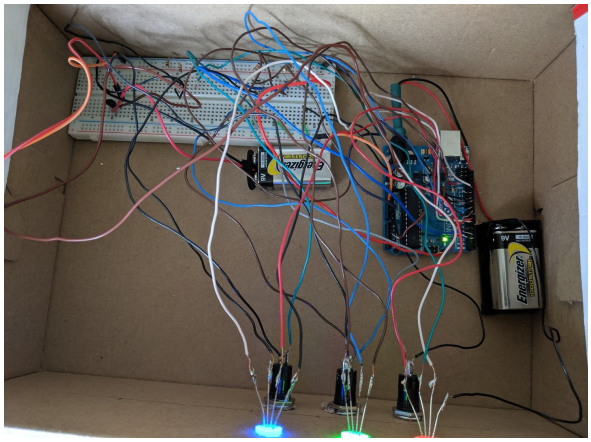
TEJ4M1 Culminating

Introduction

My project's inspiration was from a real life problem people encounter everyday. When people use their garage at home, many people have a 4 digit pin they type in on a keypad to open the door. The problem with this keypad is that someone can watch you type in the code from far away and memorize the locations of the buttons you click. Another problem may be the buttons you click get worn out so an intruder knows which buttons are in you combination. To solve this problem I made a combination lock where the order of the pin input changes every time the lock is used. The password remains the same however the choices that are presented to the user changes each time, so one can not just memorize the order of key inputs to open up the garage.



Parts List

- Arduino Uno
- 3x Push Buttons
- 3x RGB Lights
- Breadboard
- 2x 9V Battery
- Motor
- NPN Transistor
- Resistors
- Wires
- Shoebox

Technology: NPN Transistor

One problem I ran into while completing this project was that when you typed in the correct pin, the arduino did not supply enough power to the motor to open the door without rebooting the arduino and the code loop. I decided to solve this problem using a NPN transistor. Transistors are electronic components that act like switches. They have 3 pins, EBC. The first pin, emitter is used to provide the current. The middle pin, base is used to ‘turn on the switch’, or in other words allow the current to flow through emitter. The final pin Collector, is where you connect the bigger power source. In my application, the arduino sending a small charge to the base allowed for the motor to be powered by a separate battery. The first transistor like component was created in 1907 to be used in the telephone industry. Inventions like these

allowed for the first real transistor to be patented in 1925 by Canadian physicist Julius Edgard Lilienfeld. The more traditional bipolar junction transistors used today were later patented in 1950 in the Bell Company labs. They in 1954 perfected the design using silicon as the main production material.

Possible Improvements

I had sufficient time to complete this product. I feel that I was slowly able to add more functionality throughout the work periods for this project and finish with a good representation of a working prototype. If I was to add more, I would add something else that will happen when the garage door is unlocked or an incorrect pin is typed. I would try to make the arduino contact with a cellular device so someone could get real time notifications on their phone. Another improvement to this project may be to add a close door button to the motor.