Cmpe 443
Final Project

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Design

The design choices we made are as follows.

- Password will be 4 digits. The reasoning is that it is long enough to be secure that there are 10000 possible combinations.
- Password will be entered after pressing '*' button.
- Password reset state will be activated after '#' button pressed. Firstly, Correct password is expected after it is entered correctly, the user can create a new 4 digit password.
- The time given to a user to input a password is 10 seconds. This is enough time to enter a 4 digit password.
- Alarm will be activated after 3 incorrect passwords. Because it prevents Brute Forcing to password.
- The components will be connected to the same GPIO port, Port0, and their PINs will be 0 through 12, except TIMER and ADC.

Numpad and LEDs

- For the numpad we opted for the pull up resistors on the rows.
- We used the same grid design from the project document.
- The four rows are connected to pins 0,1,2,3 respectively.
- The three columns are connected to pins 4,5,6 respectively.
- Our scan rate will be 10ms. We will rotate the values of columns such as 011, 101, 110 at this rate. This number should be slow enough to get an input. And fast enough to get every input.
- When a input pin are high(1,2,3,4), we can understand a button pressed and according to column values, we can see which button is pressed
- As for the lighting we opted for the one LED behind each button choice. These LEDs are controlled by PIN 7. When LDR output is High, Leds are open.
- We can find a Keypad at the price of 9 TL and 12 LEDs for 3 TL

LDR

- We analyzed the LDR graph and decided to light the LEDs when LDR reaches 1000 Ohm resistance, which corresponds to a slightly darker environment than a well lit room.
- To achieve this cutoff we used a 1000 Ohm resistor which divides the voltage and a transistor with a threshold of $Vcc/2$ (1,65V).

- This circuit is connected to PIN8.
- We can find a LDR at the price of 1 TL

Buzzer
- We used a transistor to give increased current to the buzzer.
- Buzzer is connected to pin 11.
- We can find a buzzer at the price of 2.9 TL

Relay
- We used a transistor to give increased current to the relay. And used a freewheel diode to protect it.
- Relay is connected to pin 9.
- We can find a relay at the price of 10 TL

Tack Switch
- Tack switch is connected to pin 10.
- We can find a tack switch at the price of 0.75 TL

Total Bill

37.5 TL + 3 transistor = 40 TL