

Activity Report
On
Password Access Control Circuit with LCD
for
(Embedded System Design and Applications)

Submitted by

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OBJECTIVE

Password Access Control system uses IoT devices and is used to provide security to a system. It secures the system with a digitally coded pin and only identifies or grants access to that system when the correct pin is entered.

THEORY

In this experiment a password-based security system is built with the Arduino in Tinkercad. To input the password, a **4×4** keypad module is used together with a **16×2** LCD display. First, the LCD display prompts the user to enter a **four-digit password** via the keypad module.

It uses a default predefined password (**i.e. 1234**) to unlock the system. When a user enters a password, it is read by the Arduino and it matches with the predefined password stored in it. If the password or pin is matched, then the LCD display will show **"WELCOME BACK MASTER"** and once the system has been unlocked, by entering the correct password, the message **"UNLOCKED"** will be shown on the LCD display then light bulb controlled with the Arduino and relay will also light up, it means the current will flow through the circuit if the correct password matches.

The system can be locked again by long pressing the **asterisk(*)** key button. There is also a choice to reset and enter a new password and it can be done by long pressing the **hash(#)** key. The new password will store in the Arduino **EEPROM** memory. Using **EEPROM**, data such as the correct password can be saved onto the Arduino Uno.

REQUIREMENTS

As for the visualization purpose here we used the TinkerCad simulating platform:

Name	Quantity	Components
U1(Arduino Board)	1	Arduino Uno R3
KEYPAD2	1	Keypad 4x4
U2(LCD)	1	LCD 16 x 2
K1(Relay)	1	Relay SPDT
T1(Transistor)	1	NPN Transistor (BJT)
P1(Power)	1	10 , 5 Power Supply
D1	1	Diode
R1, R4(Resistor)	2	1 k Ω Resistor
R2	1	100 k Ω Resistor
R3	1	220 Ω Resistor
L1, L1(Bulb)	2	Light bulb
W(Wires)	30-35	Jumper Wires
Wires	2-5 m	Copper wires

CIRCUIT DIAGRAM

First of all, we will make a connection with 4×4 keypads. We are using digital pin D6 to D9 and A1 to A5 for **a keypad connection with Arduino**. Connect all 4 Row pins of the Keypad to Arduino's pin D6-D9. Similarly connect all 4 column pins of the keypad to Arduino's pin A1-A4.

Next make a connection for LCD with Arduino:

Connect 4 pins of LCD(DB4 to DB7) to Arduino's pin D2-D5.

<u>LCD</u>	<u>Arduino Uno</u>
VCC_____	5V
RS_____	D12
ENA_____	D11
GND_____	GND(Ground)
RW_____	GND(Ground)
VO_____	GND(Ground)
LED-_____	GND(Ground)
LED+ pin_____R3 220ohm__5V (Arduino).	
Pin D13_____R2 100K resistor__GND of Arduino	

Now we done with LCD and keypad connection.

Lets move on to the Relay or can say the circuit design with the Arduino.

Here we already used 16 no. of pins of Arduino.

<u>Arduino Uno</u>	<u>Different Components</u>
Pin D13_____	1K ohm Resistor R1_____Ib Base NPN CE config Transistor.
GND_____	Ie Emitter NPN Transistor.
5V____220 R3 Resistor____	N(-) Diode D1 & Coil 1(Relay's)____LCD's LED+ .

Now the connection of Arduino with components is over .

Lets connect the components to each other.

NPN transistor's collector Ic connects with positive (+) side of diode D1 and relay's Coil 2

Transistor , diode and coils connection is over.

Now connect the relay's common 1 (COM 1) to the anode of bulb B1 and bulb B2 and p(+) side of LED bulb with R4 resistor 1K ohm.

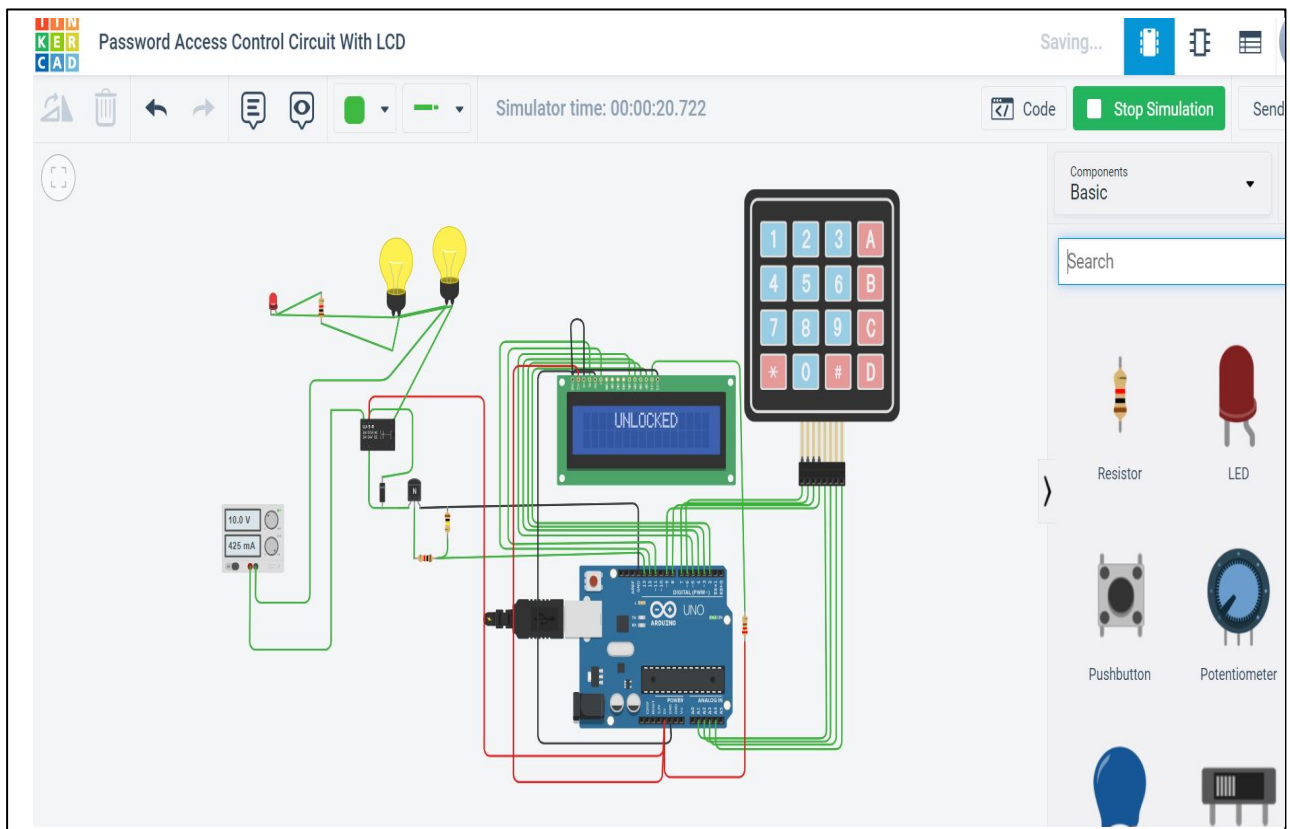
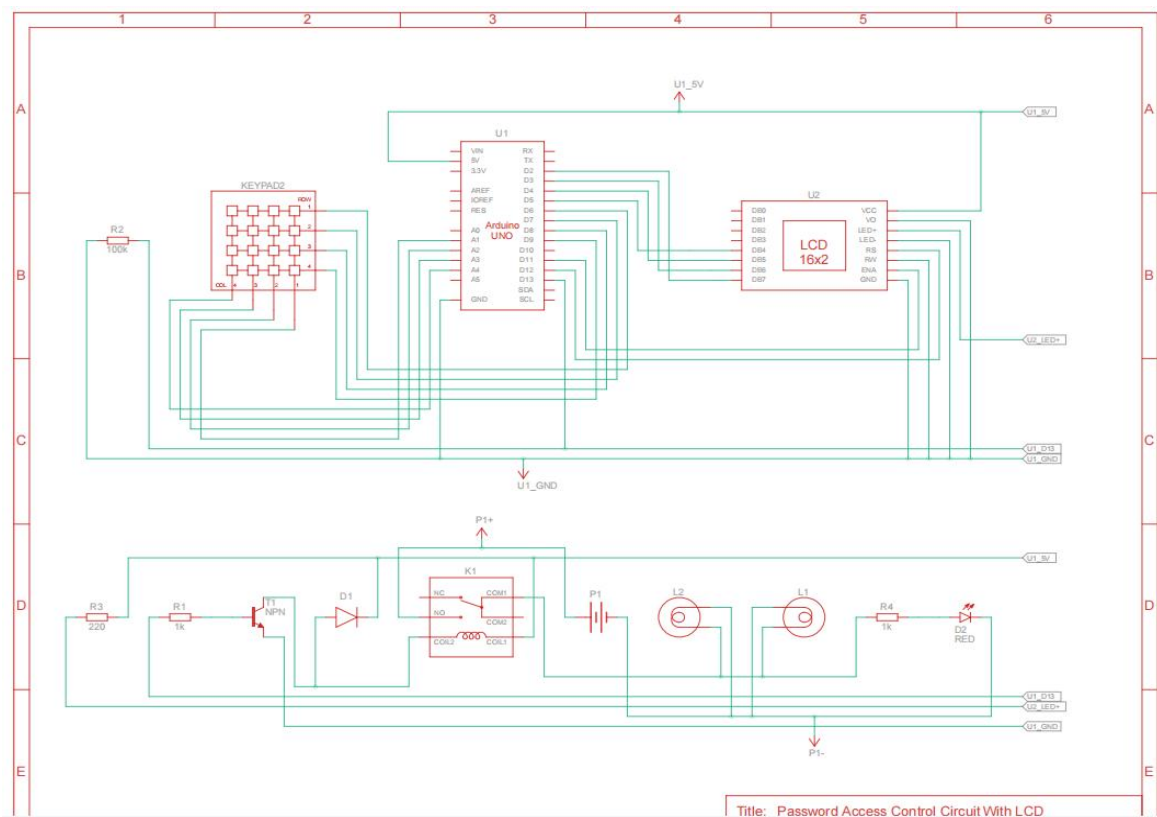
Now connect the power supply to the relay and Bulb.

NO of relay is connected with positive terminal of power supply.

Negative terminal of supply is connected with cathodes of bulbs .

Now the overall connection is over.

The schematic diagram is given below:



WORKING

At first, Arduino is put into standby mode and prompts the user to enter a password to unlock the circuit. In this Password Access Control Circuit Using Arduino project, we set the Arduino default password to "1234". You can, however, change this later by coding.

When users enter the correct key, they will be able to modify the default password. It now validates the password stored in the Arduino EEPROM. If it is correct, it will display 'Access is granted, welcome' and circuit ON. If the password is incorrect, the device will return to standby mode and display "Incorrect Password."

OBSERVATIONS/RESULTS

Here we observed that the current flow in the circuit is totally dependent on the entered password.

BUTTONS PRESSED/ PASSWORD	CORRECT/INCORRECT PASSWORD	MESSAGE ON LCD	LIGHT BULB ON/OFF
1234	CORRECT(DEFAULT PASSWORD)	WELCOME BACK MASTER	ON
*(Long Press)	SCREEN LOCKED	LOCKED	OFF
#(Long Press)	NEW PASSWORD	ENTER NEW PASSWORD	OFF
9999	INCORRECT	INCORRECT PASSWORD!	OFF

DISCUSSION OF RESULTS

We got the above result because of relay switch and NPN transistor as the output pin D13 of Arduino gives the signal of correct password, and allows the NPN transistor to get active and I_c current of transistor switch ON the relay switch that makes the closed circuit with the power supply. This is how the system works. But in practical we may face damaging of switch because of high voltage.

CONCLUSION

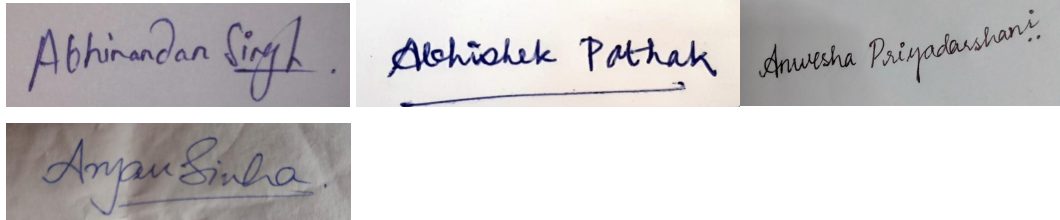
Every innovative work is started with a view to attaining a specific motto. Our main goal was to make such a type of barrier which will provide highest security with the sacrifice of little cost. In this regard our project is an attempt to design and implement password protected electronic barrier using PIC18F452 microcontroller. PIC monitors the entered password and closed the barrier when the correct password is inserted. This system is also reliable and user friendly.

Various novelty and modification can be performed in our project. We can make the barrier system more secured by adding more stage.

REFERENCES

- [1]G. Verma and P. Tripathi, “A digital security system with door lock system using RFID technology”, *International Journal of Computer Application*, Volume 5–No.11, pp. 6-8, Aug. 2010.
- [2] M. Madusudan ,“Implementation of automated door unlocking and security system”, *International Journal of Computer Applications*, pp. 5-8, Jul. 2019

STUDENT SIGNATURES



SIGNATURE OF THE CONCERNED FACULTY

Signature of the concerned faculty member with date and comments (if required)