

# **Embedded Systems EC382**

## **End Semester Project Report**

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**Aim:** To design a smart door lock using Psoc.

### **Objectives:**

1. To design a GUI for password input using MATLAB.
2. To program Psoc kit to verify the password received from PTTY.

### **Device:**

1. Psoc5LP

### **Working:**

#### **PuTTY:**

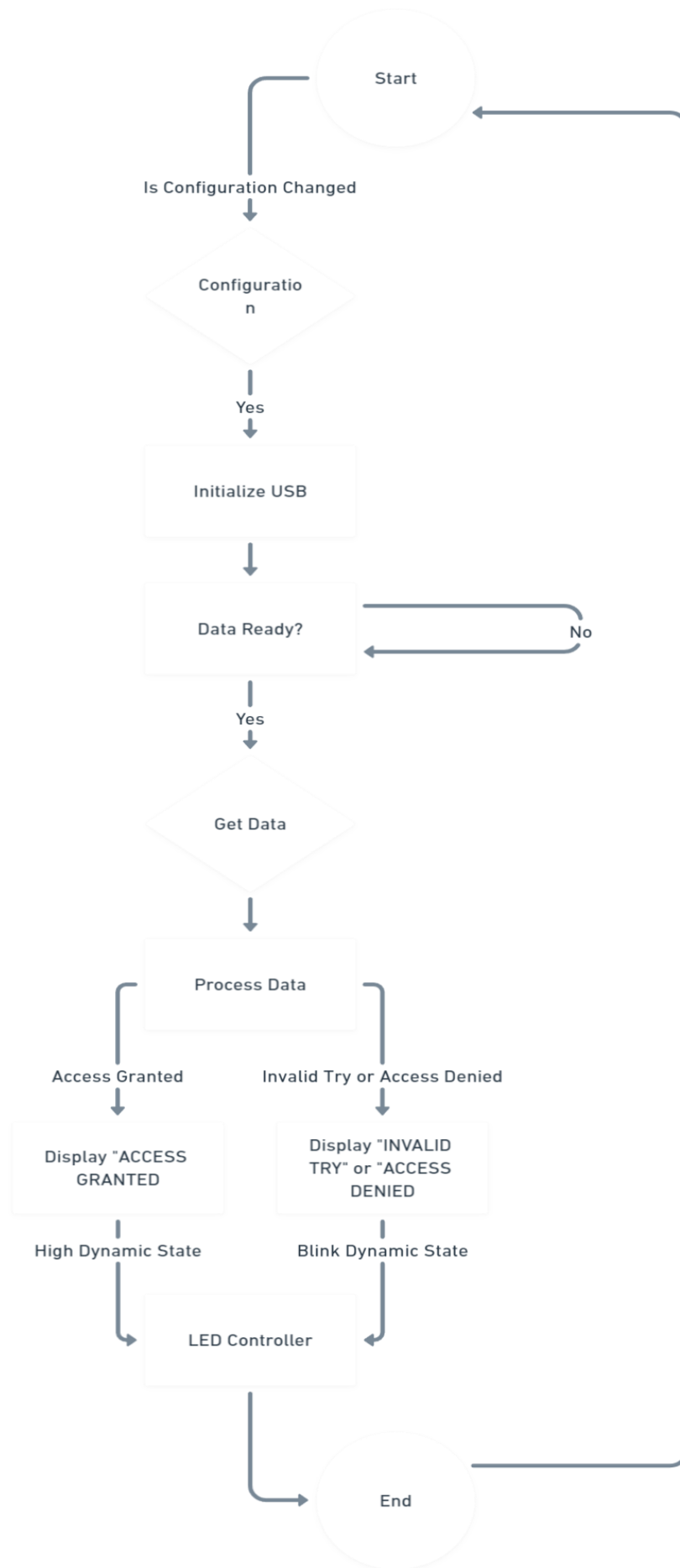
1. Graphical User Interface in the PuTTY is used to take input.
2. PuTTY is used as bridge between Psoc and Laptop's Keyboard.
3. UART communication protocol is used to transmit the password entered to Psoc.
4. The serial communication is established and it is accessed using the COM port of the computer from the PuTTY.

#### **PSoC:**

1. Psoc gets the password entered in MATLAB through UART communication. It proceeds to verify the password which is received.
2. LCD is used to display the status of Lock(Locked or Unlocked).
3. If the door is unlocked the LED turns on.
4. LED blinks if password is incorrect multiple times.

### **Flow Chart:**

#### **PSoC:**



# PseudoCode:

Constants:

```
MAX = 4
BLINK = 1000
HIGH = 2000
LED_ON = 1
LED_OFF = 0
MAX_TRIES = 1
PASS = "0406"
```

Variables:

```
access_count = 0
received_pass[MAX]
```

Functions:

LED\_Controller(dynamic\_state):

  If dynamic\_state == HIGH:

    Turn LED ON

  If dynamic\_state == BLINK:

    Blink LED indefinitely

process\_pass():

  Increment access\_count

  If access\_count > MAX\_TRIES:

    Return -1 (Access Denied)

  Else:

    Compare received\_pass with PASS

    If they match:

      Return 1 (Access Granted)

    Else:

      Return 0 (Invalid Try)

display\_state(state):

  If state == -1:

    Display "ACCESS DENIED" and blink LED

  If state == 0:

    Display "INVALID TRY"

  If state == 1:

    Display "ACCESS GRANTED" and turn LED ON

Main Function:

  Enable global interrupts

  Start USB UART and LCD

  Loop forever:

    Check for USBUART configuration change

    If configuration changed:

      Initialize USBUART

    If USBUART is configured:

      If data is ready:

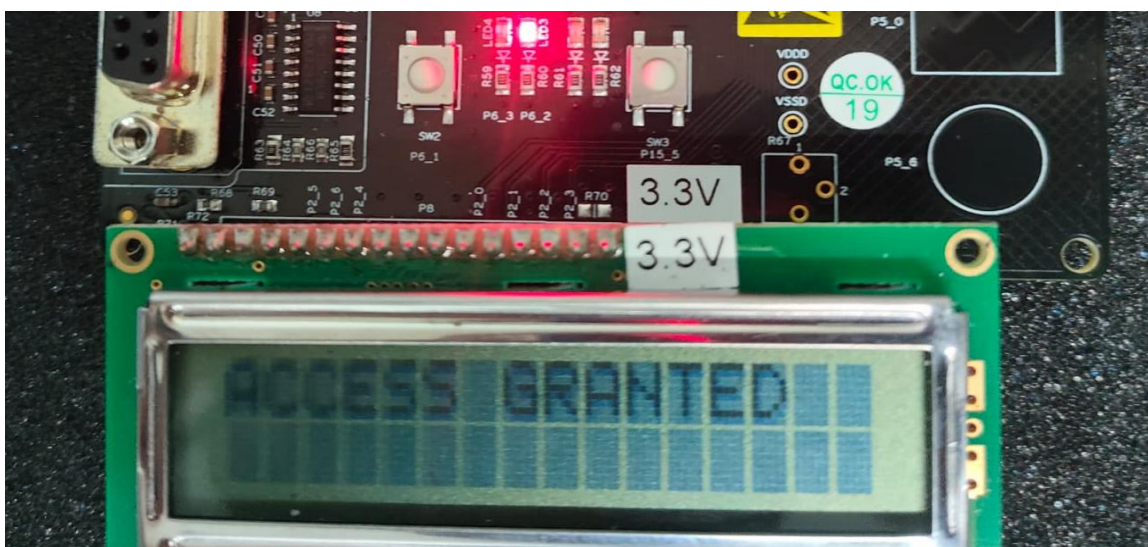
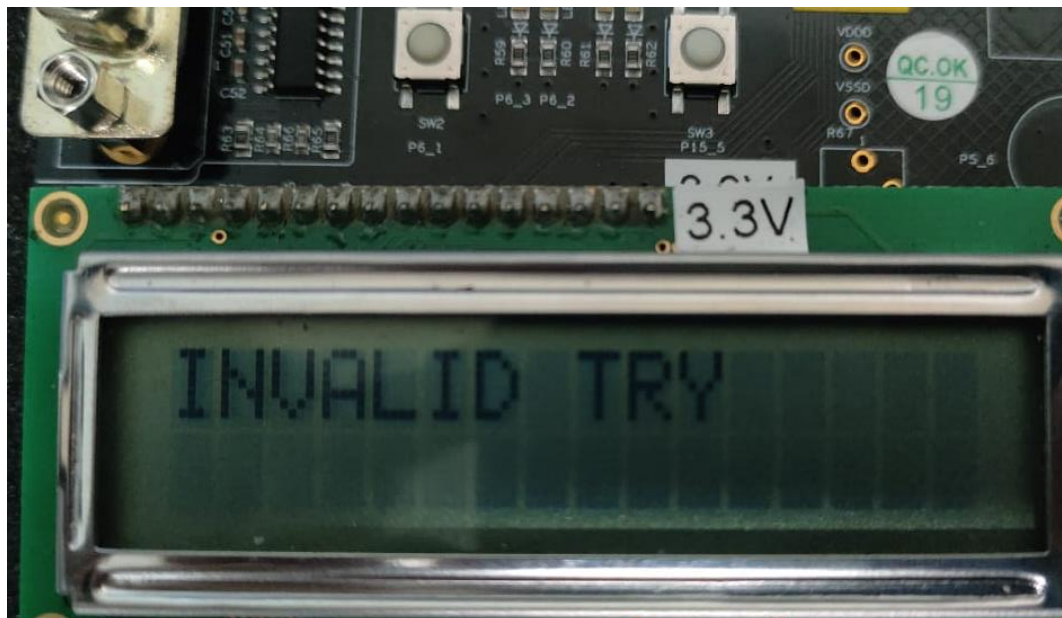
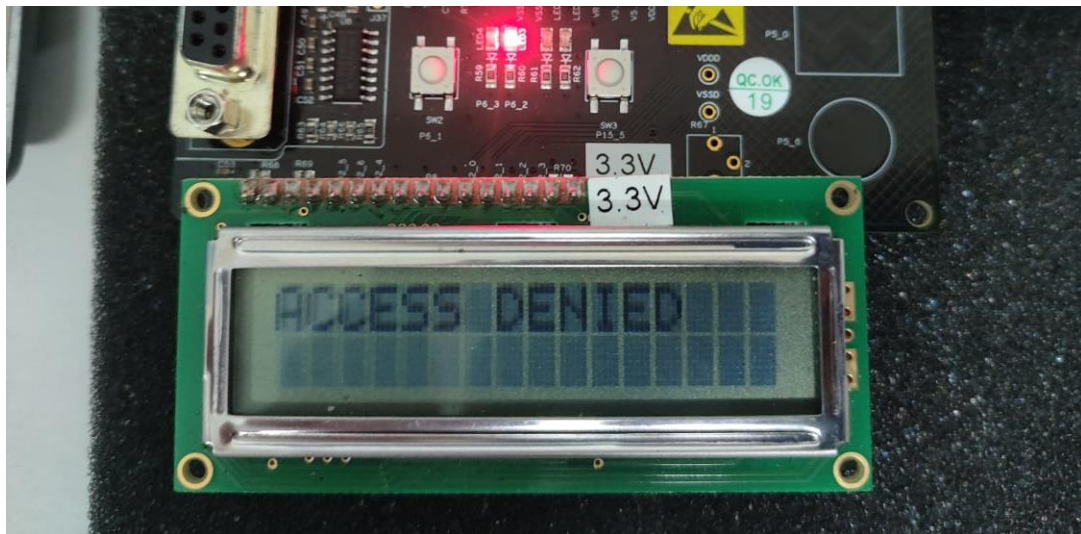
        Read character from USBUART

        Store character in received\_pass

        Process password

        Display state based on processing result

Result:



## **Conclusion:**

We can conclude that Password protected door lock has been successfully implemented using PuTTY and GUI.

If Password is verified it is shown in LCD and LED turns on and if the entered password is incorrect for multiple times, LED blinks.