Project: Password based door locking system

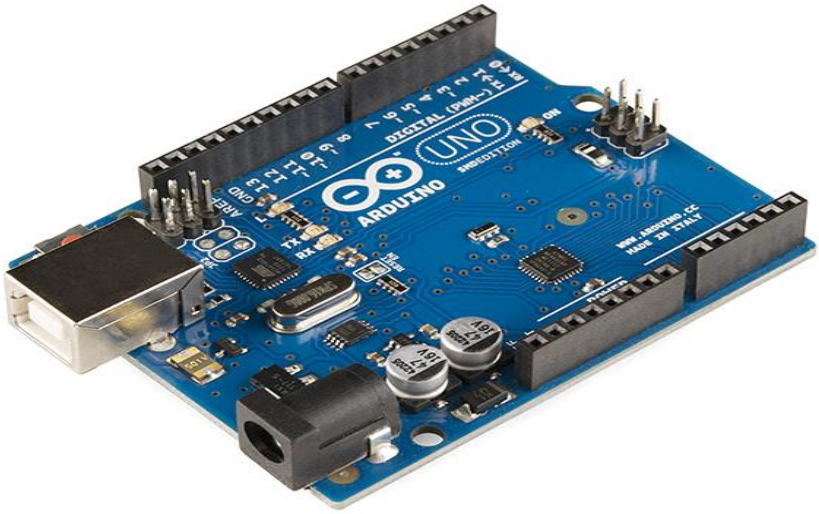
Objective: In this project we will do an automatic door lock system using a 4×4 keypad and servo motor controlled by Arduino**.**

Materials needed:

1. Arduino Uno R3
2. 16x2 LCD (Liquid Crystal Display)
3. 4×4 Matrix Keypad
4. Servo Motor
5. LED (Red,Blue)
6. Buzzer
7. Resistor(100ohm)
8. Variable Resistor/Potentiometer (10k)
9. BreadBoard

Material's description:

1.Arduino Uno R3 : The Arduino Uno is a microcontroller board based on the ATmega32. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



2. 16x2 LCD (Liquid Crystal Display) : A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals This LCD screen can display two lines with 16 characters each. Every character consists of 5x8 or 5x11 dot matrix. Depending on how many lines are used for connecting an LCD to the microcontroller, there are 8-bit and 4-bit LCD modes. The main purpose of the 4-bit LCD mode is to save valuable I/O pins of the microcontroller. Only 4 higher bits (D4-D7) are used for communication, while others may be left unconnected. Each piece of data is sent to the LCD in two steps- four higher bits are sent first (normally through the lines D4-D7), then four lower bits. Initialization enables the LCD to link and interpret received bits correctly.

3. 4×4 Matrix Keypad : This keypad has 16 buttons, arranged in a 4x4 grid. It's made of a thin, flexible membrane material with an adhesive backing so we can attach it to nearly anything. The keys are connected into a matrix, so you only need 8 microcontroller pins (4-columns and 4-rows) to scan through the pad.

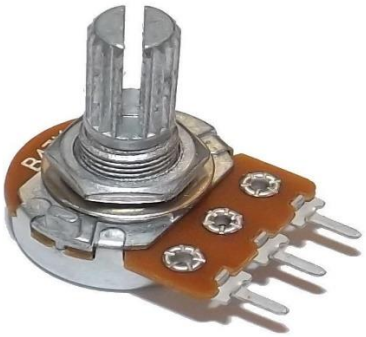
4. Servo Motor : Servo motors have three wires: power, ground, and signal. The power wire is typically red, and should be connected to the 5V pin on the Arduino or Genuino board. The ground wire is typically black or brown and should be connected to a ground pin on the board. The signal pin is typically yellow, orange or white and should be connected to pin 9 on the board.

5. LED : A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated.

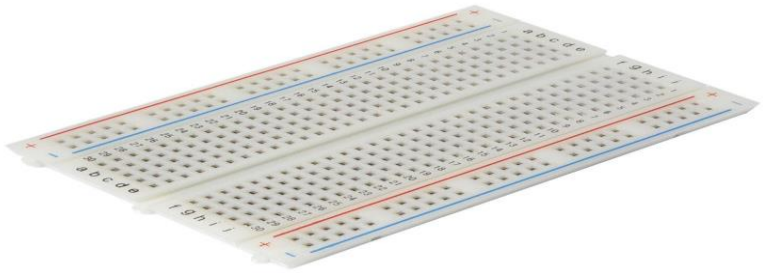
6. Buzzer : A buzzer or beeper is an audio signalling device,[1] which may be mechanical, electromechanical, or piezoelectric.

7. Two 100ohm resistor is connected to secure the led .

8. A Potentiometer is added to adjust the contrast of the lcd.



7. used one Bread Board to support the hardware.



Theory : Each user will have their own password. Whenever a user wants to enter through the door he needs to enter his password. If his password matches to the password that we have in our database then a blue LED will be activated and the door will automatically open. Then after a few seconds the door will be closed. If a user enters wrong password then our system will activate Red LED and give some audio signal and the door will remain close.

Simulation :

We have interfaced a 16x2 LCD , 4×4 Matrix Keypad , two LEDs ,servo motor with the Arduino Uno board. Pins 12,11,4,3,2 are connected with the LCD , pins A0,A1,A2,A3 pins are with the rows of the keypad and 10,8,7,6 pins are with the columns of the keypad. Pin 9 is attached with the servo motor and pins 0,1 are with 2 LEDs via resistor and . Pin 1,2,3 are connected to the potentiometer .

Problems we face:

1. The keypad use in the simulation and the real hardware are not same. Because proteus does not support that keypad.
2. We need to download an extra library file for support the arduino board also arduino IDE.
3. The servo motor just support with pin 9 of arduino for that we have to redraw the diagram to use pin for servo motor.
4. Keypad pin are not mark witch one for row and witch one for column.

Link that we use:

https://www.arduino.cc/en/Tutorial/HomePage

http://playground.arduino.cc/uploads/Code/keypad.zip