



ULAB

UNIVERSITY OF LIBERAL ARTS
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Course Code: ETE 205(Sec:1)

Course Title: Digital Electronics Lab

**Project: Password Based Door Lock Security
System**

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- **Abstract:** To show a Password Based Door Lock Security System on tinkercad software.
- **Introduction:** This is a Password Based Door Lock Security System Using Arduino, Keypad and LCD. A digital code lock can secure our home or locker easily. It will open door only when the right password is entered.
- **Theory:** In this project, we try to make the Password-Based Security System Using Arduino & Keypad. As thefts are increasing day by day security is becoming a major concern nowadays. So, a digital code lock on doors can secure our home or locker easily. It will only open door only when the right password is entered.

The circuit of this project is very simple which contains Arduino, keypad module, buzzer, Servo Motor, Resistors, NPN transistor, and LCD. Arduino controls the complete processes like taking a password from the keypad module, comparing passwords, driving buzzer, rotating servo motor, and sending status to the LCD display. The keypad is used for taking the password. The buzzer is used for indications. Servo motor is used for opening the gate while rotating and LCD is used for displaying status or messages on it.

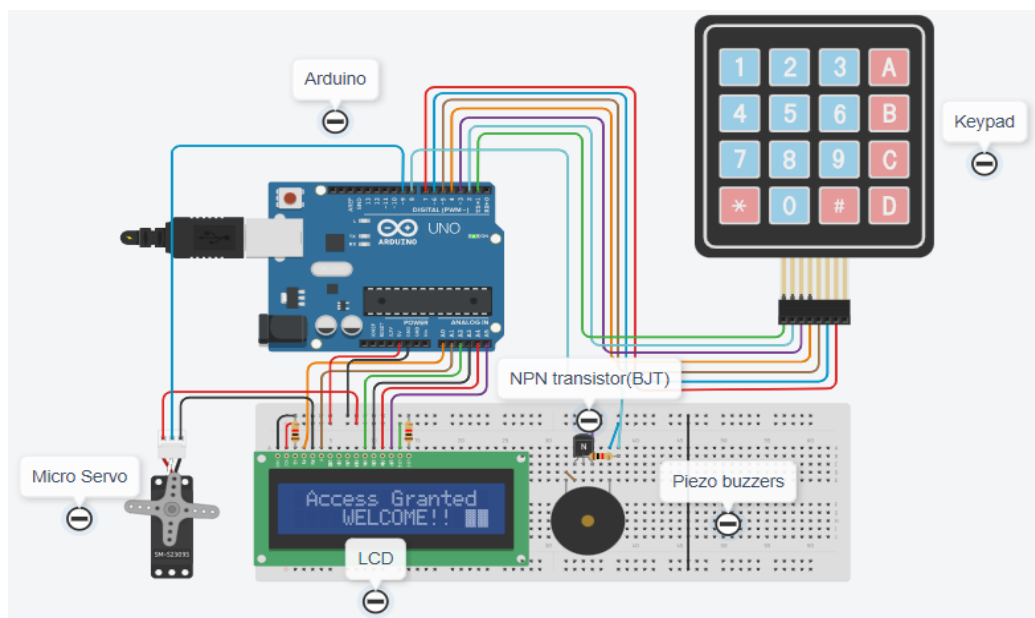
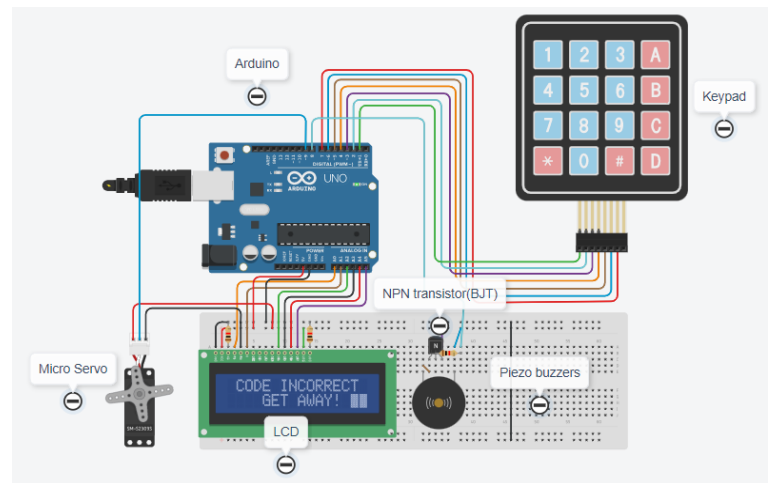
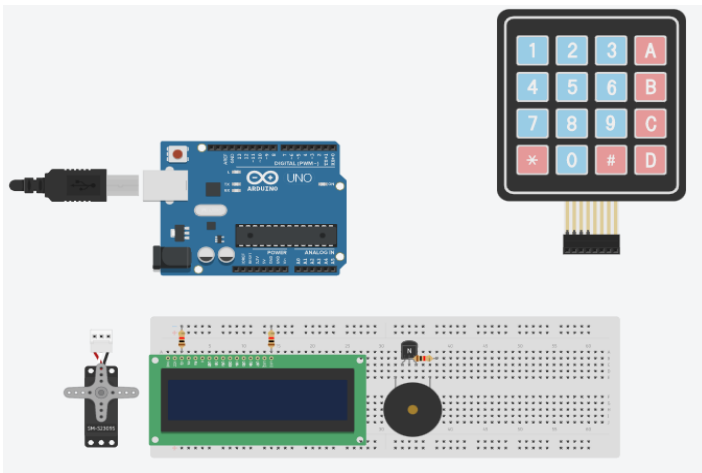
- **Components Required:** In order to construct our desired circuit we use the component listed below:
 - Tinkercad
 - Bread board
 - Arduino (Arduino UNO R3 Development Board)
 - Keypad (4X4 Keypad)
 - Servo Motor (SG90 Servo Motor)
 - Buzzer (5V Active Buzzer)
 - Resistors (10k)
 - Connecting Wires (Jumper Wires)
 - LCD display (I2C 16×2 LCD Display)

- **Implementation:**

- First of all, we make a connection with 4×4 keypads. In this process, we use digital pin D2 to D9 for a keypad connection with Arduino.
- Then we connect all eight pins of the Keypad to Arduino's pin D2 to D9.

- After that we try to connect the servo motor to the Arduino. We use the Arduino's digital pin D11 to output the servo motor's PWM pin.
- Then we connect the positive wire of the servo to the pin 5volt of Arduino and the negative wire to the ground.
- Next, we have connected 16×2 I2C LCD to Arduino and Connected the VCC and GND pin of 16×2 I2C LCD to the 5 volts and GND pin of Arduino respectively.
- Finally, we connect SDA and SCL pin to Analog Pin A5 and A4 respectively.

• Circuit Diagram:



- **Experimental Results:** At first, Arduino is initialized in standby mode where it asks the user to enter the password to unlock the door. In this project, we have defined the default password in Arduino as “6070”. However, we can change this password according to our interest via coding later. When users enter the “*” key it will allow the user to enter the password. Now, it checks the password stored in this Arduino. If it is correct, it will show ‘**Access is granted, welcome**’, and then the door is opened. But, if the password is incorrect then it will go back to the standby mode by displaying ‘**Incorrect Code Get Away**’.

Similarly, in Arduino Password Security Lock System, if the user presses “#” it will ask for the code. Now, if the entered code is incorrect then it will get back to standby mode. On the other hand, if it is correct it will ask the user to enter the new password and confirm the password by retyping it. Here, the Arduino will compare the code; if it is incorrect then again it will get back to standby mode. But, if it is correct then it will change your current password.

- **Conclusion:** We try our best to implement the circuit as we designed. During this process we get to know some new components and their uses. Finally, the Project of password-based door lock system is successfully simulated on tinkercad.

- **References:**

<https://www.learnelectronicsindia.com/post/password-protected-security-system-project-using-arduino-keypad-piezo-buzzer-and-leds-on-tinkercad>