In the Name of Allah

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We aim to build a circuit for a digital lock project using Arduino, a keypad, an LCD, and a lock motor.

Explanation of Components:

1)Arduino:

A microcontroller that executes the main logic of the system. It reads inputs from the keypad, checks the password, and controls the outputs for the LCD and motor.

2)4x3 Keypad:

This keypad consists of twelve buttons wired in a matrix. The Arduino detects the pressed button by scanning the rows and columns.

3)LCD:

This display is used to show messages to the user, including error or success messages.

4)Lock Motor:

Used as an indicator for the lock. The rotation of this motor indicates whether the lock is open or closed.

How the Circuit Works:

After the circuit is powered on, the Arduino displays the following message on the LCD, and the motor rotates 90 degrees to lock => Enter password

The user enters their password using the keypad. The Arduino compares the entered password with the one stored internally. If the password is correct, the motor rotates 90 degrees to unlock, and the LCD displays two options:

Option 1: Change password

Option 2: Exit

If Option 2 is selected, the motor rotates 90 degrees to lock again.

If Option 1 is selected, the user can enter a new password (which must be 4 digits). After this, the motor rotates 90 degrees to lock again.

While entering the password, the user can press the asterisk key to delete the entire entered password and start over.

Usage and Handling of LCD Pins:

1)RS:

When this pin is low (0), the input data is treated as a command (such as clearing the display or setting the display). When this pin is high (1), the input data is interpreted as an ASCII code for a character, and that character is displayed at the current position on the screen.

2)RW:

When this pin is low (0), the LCD is in write mode. When it is high (1), the LCD is in read mode. If this pin is connected to ground, only the write mode is used.

3)E:

This pin acts as an enable pulse. A short pulse on this pin informs the LCD that data or a command is ready to be received.

4)VDD:

This pin is connected to the positive terminal of the power supply (here, ground) and provides the necessary voltage for the LCD to function.

5)VSS:

This pin is connected to the negative terminal of the power supply (here, ground) and acts as the zero voltage reference for the LCD.