Automatic Door Lock System using Keypad and Arduino UNO

The Automatic Door Lock System using Keypad and Arduino UNO is a project that aims to provide a secure and convenient way to control access to a door using a keypad and an Arduino UNO microcontroller. The system allows users to enter a predefined code on the keypad to unlock the door, and it automatically locks the door after a specified period of time.

Here is a detailed description of the project:

Components:

1. Arduino UNO
2. Keypad
3. Servo Motor
4. LCD Display
5. Jumper wires
6. Battery (9V)

Working Principle:

1. Initialization: The Arduino UNO is connected to the keypad, servo motor, and LCD display (if used). The necessary libraries are included, and the pins for each component are defined.
2. Keypad Input: When a user presses a button on the keypad, the Arduino UNO detects the corresponding button press and records the input.
3. Code Validation: The system compares the entered code with a predefined code stored in the Arduino UNO's memory. If the entered code matches the stored code, the system proceeds to unlock the door.
4. Servo Motor Control: Upon successful code validation, the Arduino UNO sends a signal to the servo motor to rotate and unlock the door. The servo motor moves a mechanical mechanism to physically unlock the door.
5. Access Granted: The system displays a message on the LCD display (if used) to indicate that access has been granted. The door remains unlocked for a specific duration to allow the user to enter or exit.
6. Automatic Locking: After the specified duration, the Arduino UNO sends another signal to the servo motor to rotate and lock the door again. This ensures that the door remains secure even if the user forgets to lock it manually.
7. Access Denied: If the entered code does not match the stored code, the system displays an error message on the LCD display (if used) and denies access. The door remains locked, and the user can enter a new code to try again.

Applications:

1. Home Security: The system can be implemented on the main entrance door of a house to provide secure access control and prevent unauthorized entry.
2. Office or Workspace: It can be used to restrict access to sensitive areas within an office or workspace, ensuring only authorized personnel can enter.
3. Schools or Institutions: The system can be employed in schools or institutions to control access to certain areas, such as laboratories or storage rooms.
4. Electronic Lockers: The automatic door lock system can be adapted for electronic lockers to provide a secure storage solution for personal belongings.

Overall, the Automatic Door Lock System using Keypad and Arduino UNO offers a cost-effective and customizable solution for implementing access control with added convenience and security.