Digital Combination Lock System

To build a **digital combination lock** using push buttons, LEDs, and a buzzer. The system should only unlock (green LED ON or buzzer beep) when the correct sequence of button presses is entered. If the wrong sequence is entered, an error indication (red LED or buzzer alarm) will activate.

Components Required (from your list)

- Arduino Uno R3 – **1**
- Breadboard – **1**
- Jumper wires – as needed
- Push buttons (tactile switches) – **3 to 4**
- Resistors (220Ω, 10KΩ) – a few
- Red LED – **1**
- Green LED – **1**
- Piezo buzzer – **1**

Project Description

Students will design a small **security system** that simulates how locks work:

1. **Input**:
    - Multiple push buttons represent digits in a passcode.
    - Example passcode: Button 1 → Button 2 → Button 3.
2. **Validation**:
    - If the entered sequence matches the predefined code → green LED ON + buzzer short beep (unlock).
    - If the sequence is wrong → red LED ON + buzzer long alarm.
3. **Reset**:
    - After each attempt (correct or wrong), the system resets to allow re-entry.

Step-by-Step Instructions

Step 1: Circuit Setup

1. Place the Arduino and breadboard.
2. Connect **3–4 push buttons** on the breadboard.
    - Each button should connect to Arduino inputs.
    - Use **pull-down resistors** to avoid false signals.

3. Connect a **green LED** (unlock indicator) through a resistor.
4. Connect a **red LED** (error indicator) through a resistor.
5. Connect a **buzzer** for feedback sounds.
6. Ensure all grounds are connected to Arduino GND and power from 5V pin.

Step 2: Programming Logic

1. Define a passcode sequence (e.g., [1, 2, 3]).
2. Store button presses in an array as the user inputs them.
3. Compare user input with stored passcode:
    - If all match → unlock sequence (green LED + buzzer short beep).
    - If wrong → error sequence (red LED + buzzer long alarm).
4. Reset the system after each attempt.

Step 3: Testing the System

1. Run the program and try pressing the correct button sequence → system should unlock.
2. Try a wrong sequence → red LED and buzzer alarm should activate.
3. Try multiple attempts → verify reset works correctly.