

# Academy Task Number2

## Program Explantation

### *Low Voltage*

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Mechanical push buttons generate a noisy signal when pressed or released, a problem known as bouncing. Without filtering, the microcontroller may interpret a single press as multiple inputs. To solve this, the program implements debouncing using a counter method instead of a simple delay.

In this approach, the program samples the button input periodically (every 1 ms). A counter variable is used to verify signal stability:

- If the button state remains the same across several consecutive samples (for example, 5 ms), the counter is incremented.
  - If the counter reaches the defined threshold, the new state is confirmed as valid.
  - If the state changes before the threshold is reached, the counter is reset.

This ensures that only stable transitions are accepted as real button presses or releases. In the program, when a stable press is detected, the LED state is toggled (ON ↔ OFF). The LED remains in that state until the next valid press.

This counter-based method is more efficient than a fixed delay because the microcontroller does not waste time waiting in blocking functions. Instead, it continuously checks the input and responds quickly while still filtering out bouncing noise.