Assignment – Switch Based Programming

Platform: STM32F407G-DISC1
IDE: STM32CubeIDE
Programming Type: Bare-Metal (Register Level)

Assignment 1: User Switch Controlled LED (Basic GPIO Input)

Objective

To understand GPIO input configuration and control an LED using a switch.

Problem Statement

- Configure the **USER switch (PA0)** as input.
- Configure the **Green LED (PD12)** as output.
- When the switch is **pressed**, the LED should **turn ON**.
- When the switch is **released**, the LED should **turn OFF**.

Requirements

- Use **bare-metal (register-level) programming**.
- Enable GPIO clocks using **RCC registers**.
- Use **multiple source files**:
  - `main.c`
  - `gpio.c`
  - `gpio.h`

Assignment 2: Toggle LED Using User Switch (Debouncing)

Objective

To implement switch debouncing and LED toggling logic.

Problem Statement

- Use **USER switch (PA0)** as input.
- Use **Red LED (PD14)** as output.
- Each **single press** of the switch should **toggle the LED state**:
  - OFF → ON
  - ON → OFF
- The LED should **not toggle continuously** while the switch is held down.

Assignment 3: Switch-Based LED Sequence (Logic Implementation)

Objective

To implement logic and state-based LED control using a switch.

Problem Statement

- Use **USER switch (PA0)** as input.
- Use the following LEDs as output:
    - **Green LED (PD12)**
    - **Blue LED (PD15)**
- Implement the following LED sequence on each switch press:

Switch Press Count	LED Behavior
1st Press	Green LED ON
2nd Press	Blue LED ON
3rd Press	Both LEDs OFF
Repeat	Cycle repeats