**Assignment 2**

**Task: Debugging with STM32 Nucleo Board**

**Objective:** Debug code on STM32 Nucleo using SWD.

Answer:

**Steps:**

**1. Write blink LED C++ code for STM32:**

#include "main.h"

// Define the LED pin and port, change these according to your specific board

#define LED\_PIN GPIO\_PIN\_5

#define LED\_PORT GPIOA

// Function prototypes

void SystemClock\_Config(void);

static void MX\_GPIO\_Init(void);

int main(void)

{

// Initialize the HAL Library

HAL\_Init();

// Configure the system clock

SystemClock\_Config();

// Initialize all configured peripherals (in this case, GPIO)

MX\_GPIO\_Init();

// Main loop

while (1)

{

// Toggle the LED

HAL\_GPIO\_TogglePin(LED\_PORT, LED\_PIN);

// Insert delay (500ms)

HAL\_Delay(500);

}

}

// System Clock Configuration

void SystemClock\_Config(void)

{

// The system clock configuration will be generated by STM32CubeMX

// and should be placed here

}

// GPIO Initialization Function

static void MX\_GPIO\_Init(void)

{

// GPIO Ports Clock Enable

\_\_HAL\_RCC\_GPIOA\_CLK\_ENABLE();

// Configure GPIO pin : LED\_PIN

GPIO\_InitTypeDef GPIO\_InitStruct = {0};

GPIO\_InitStruct.Pin = LED\_PIN;

GPIO\_InitStruct.Mode = GPIO\_MODE\_OUTPUT\_PP;

GPIO\_InitStruct.Pull = GPIO\_NOPULL;

GPIO\_InitStruct.Speed = GPIO\_SPEED\_FREQ\_LOW;

HAL\_GPIO\_Init(LED\_PORT, &GPIO\_InitStruct);

}

**2. Set up SWD, connect to Nucleo(User RaspPi):**

- Connect the STM32 Nucleo board to your computer using a USB cable.

- Ensure the ST-LINK driver is installed on your computer.

- Use the STM32CubeIDE or any preferred IDE to set up the project for your STM32 Nucleo

board.

- In the IDE, configure the debug settings to use SWD (Serial Wire Debug) interface.

**3. Debug using GDB, observe LED behavior:**

- Open a terminal and navigate to your project directory.

- Launch GDB and connect to the STM32 Nucleo board using OpenOCD:

$ openocd -f interface/stlink.cfg -f target/stm32f4x.cfg

$ gdb-multiarch build/your\_project.elf

- In GDB, connect to the OpenOCD server:

(gdb) target remote :3333

- Load the program onto the STM32 Nucleo board(RaspPi):

(gdb) load

- Set a breakpoint at the beginning of the main function:

(gdb) break main

- Start the program:

(gdb) continue

- Observe the LED behavior and use GDB commands to debug (e.g., step, next, print

variables).

**Output:**



