Introduction to ARM Microcontrollers and IDEs

Introduction:

This laboratory will require you setting up and using STM32CubeIDE and logic analyzer software. It will involve experimenting GPIO on STM32L476VG-DISCO board.

The activities for this first laboratory are set out in a step-by-step manner in the lecture. Future laboratories will assume familiarity with the system so remember the steps for setting up steps or refer to these notes in future. The exercise centres on building a simple LED flashing program that uses an on-board LED and joystick, so no breadboarding is needed. A flashing LED exercise is seen as the "to go to" first program a programmer writes on any new embedded system and is the equivalent of a programmer's first "Hello World!" high-level language program.

You are required to keep laboratory **logbook**. It is for keeping notes, results, analysis other work and underlying info. This includes a laboratory **worksheet** that should be completed along with the logbook. You may also wish to include screen capture of programs and results to clarify your results. Work through the activities at your own pace, recording what you do in your logbook and referring to the worksheet, completing the tasks.

Aim:

To gain familiarity with the use of the STM32CubeIDE, STM32L476VG-DISCO board and Logic Analyzer.

Equipment and sundries:

Hardware:

1- STM32L476VG-DISCO
2- Cable Type A to Mini Type B
3- Logic Analyzer with cables

Software:

1- STM32CubeIDE
2- PulseView

Logbook Entries:

1- Briefly explain the Cortex-M4 architecture and its register along with their purposes (max 500 words).

2- Briefly describe an example of an embedded system (max 200 words).

    a. For example, teardown version of bike computer, fitbit etc.

3- Briefly explain the STM32L476VG-DISCO board with reference to its configuration and user interaction.

    a. Refer to following document:

        i. https://www.st.com/resource/en/user_manual/dm00172179-discovery-kit-with-stm32l476vg-mcu-stmicroelectronics.pdf

4- Identify and explain the STM32CubeIDE GUI components and toolbar buttons.

    a. Refer to following document:

        i. https://www.st.com/resource/en/user_manual/dm00629856-description-of-the-integrated-development-environment-for-stm32-products-stmicroelectronics.pdf
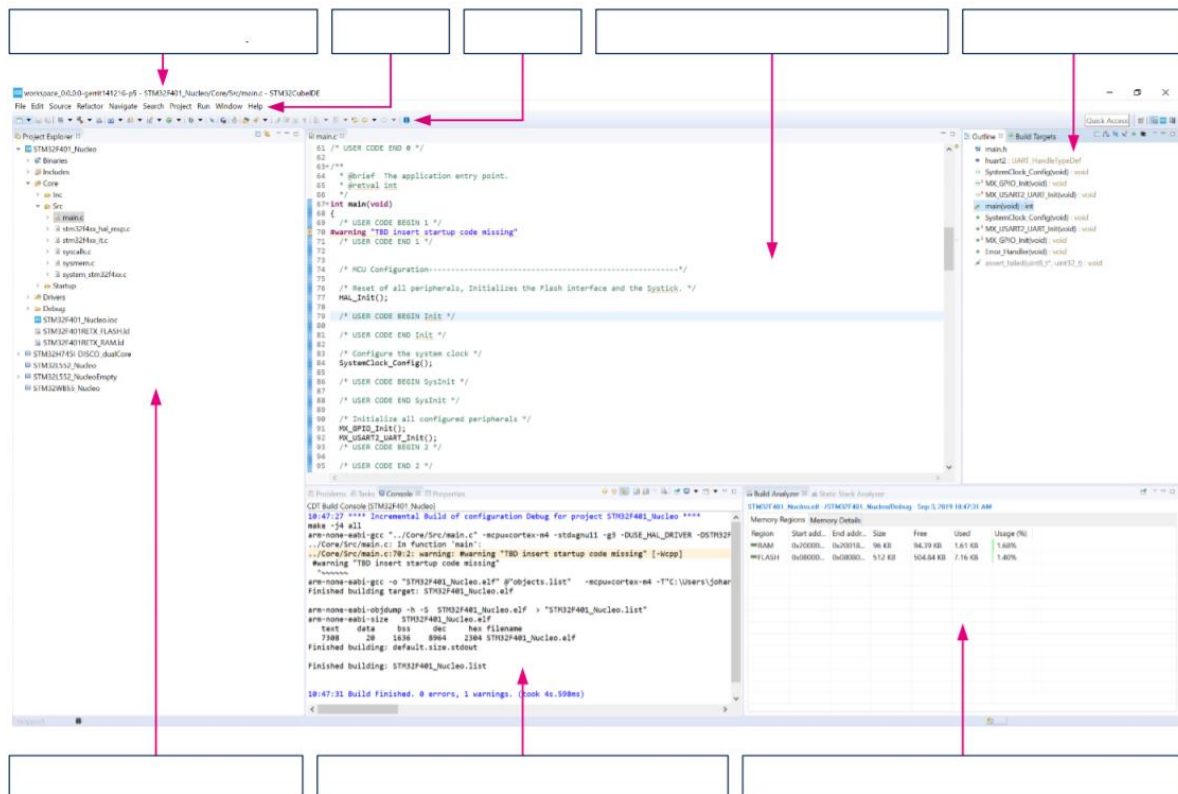

Figure 1: STM32CubeIDE GUI for explaining the task

5- Describe the blink LED build and debug process and GPIO input & output configurations.

6- Todo Task: Create a SOS pattern on LED. Hint

7- What is meant by GPIO Polling in microcontroller? What are its disadvantages.

8- Summaries your work and reflect on your learning.