SOFE 4590U:
Embedded Systems

Lab #5: Friendly ARM Environment

Objectives

- Dealing with STM32 boards
- Getting hands-on using STM32CubeIDE
- Setup boards and running blinking LED example
- Interfacing LCD16X2

Important Notes

- Work in groups of **Five** students
- All reports must be submitted as a PDF on Canvas; if source code is included, submit your report as PDF and source files as an archive (e.g. zip, tar.gz)
- Save the submission as <lab_number>_<first student's id> (e.g. lab1_100123456.pdf)
    - If you cannot submit the document on Canvas then please contact the lab instructor/TA with your submission:
        - **Leon wu** **Leon.wu@uoit.ca/**
        - **Abdelrahman Elewah** **abdelrahman.elewah@ontariotechu.net**

Introduction

In this lab, we will discover a Friendly ARM environment, The STM32 family of 32-bit microcontrollers based on ARM architecture.

This link here is for the lecture that contains steps on downloading the IDE and task1 to set up every required part smoothly.

Task1 (Hello World program)

As in any programming language we use to run hello world code in the embedded systems world, we run a blinking LED program to ensure we correctly set up the board, IDE, and board driver.

Task1: In this lecture here, run the blinking code two times by changing the blinking frequency. For instance, use 1 Hz one time, and the second time, use 5 Hz.

Interfacing Liquid Crystal Display (LCD 16xN/ 20xN)

LCD 16x2 is commonly used in embedded systems

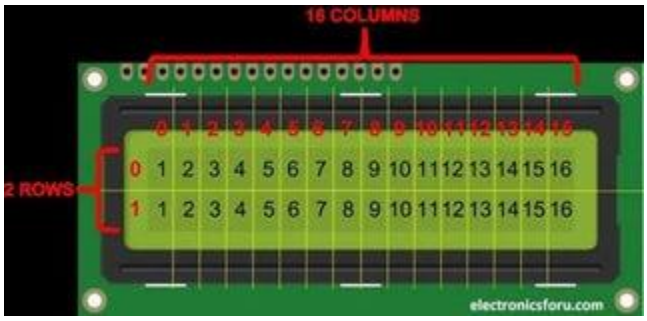

Figure 2 16 columns X 2 Raw

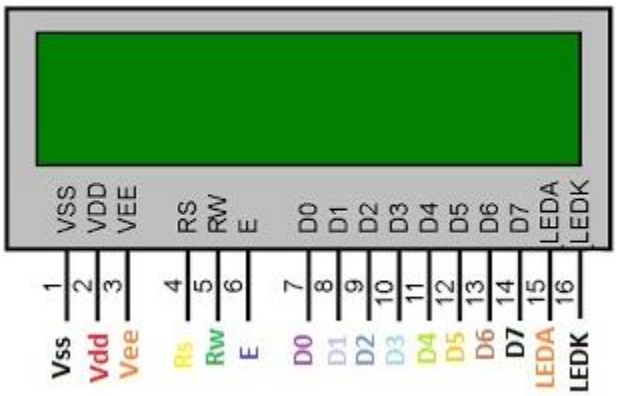

Figure 1 LCD pinout

Task2 (get started with LCD)

This link here is for LCD16xN/ 20Xn driver and the blog posted here shows how to interface the LCD with Nucleo-F401RE. You can follow this blog to see how to interface with the board.

The attached project here is for a simple code that displays Lab5 in line 1-, and the second line displays.

In Task 2: connect the board and correctly print your group number and make it move from left to right in the first line and then from right to left in the second line.

the listed screenshots below show how to import the attached project

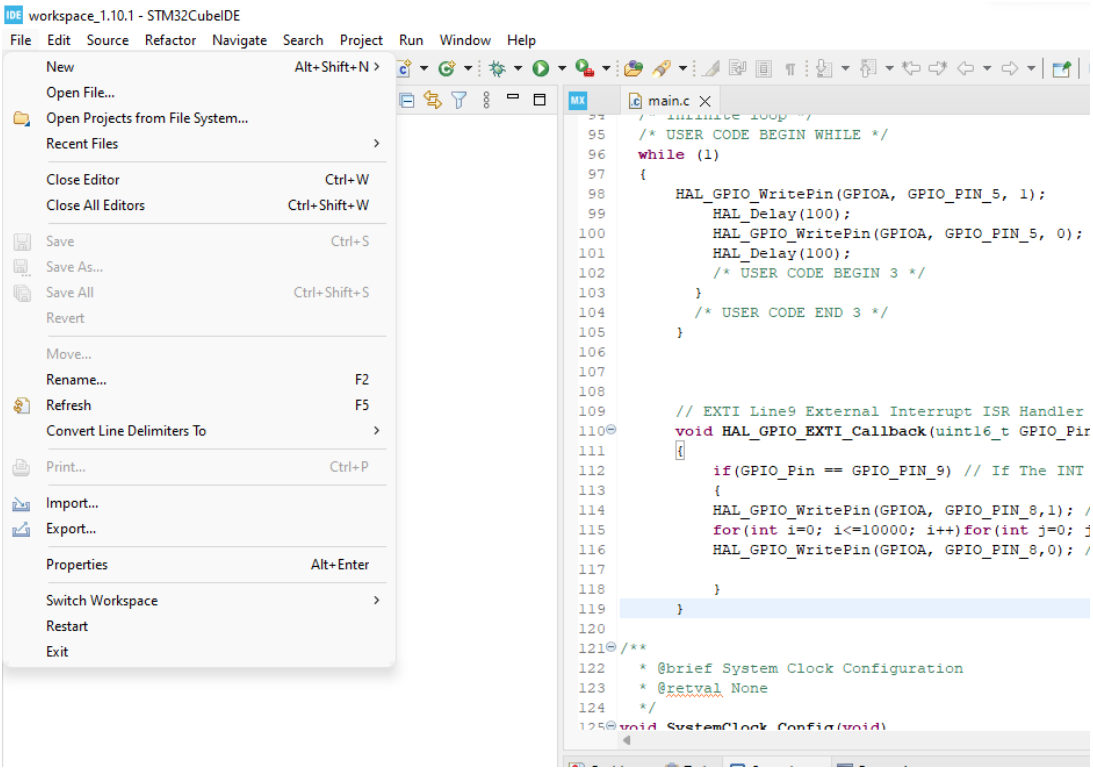

Figure 3 how to import a project

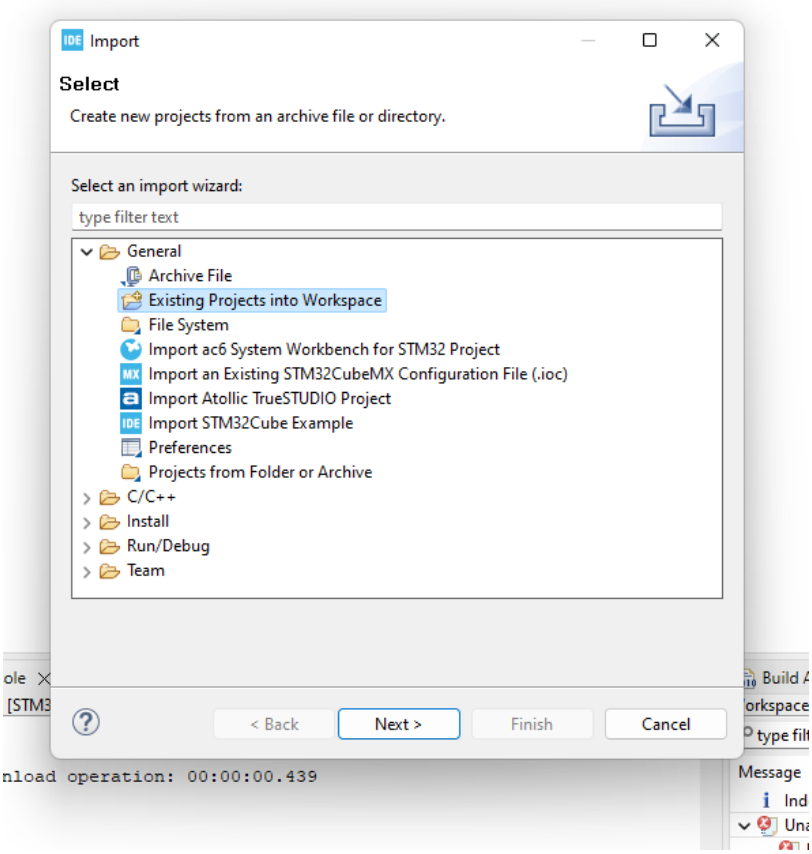

Figure 5 after uncompressed the project import it as existing projects

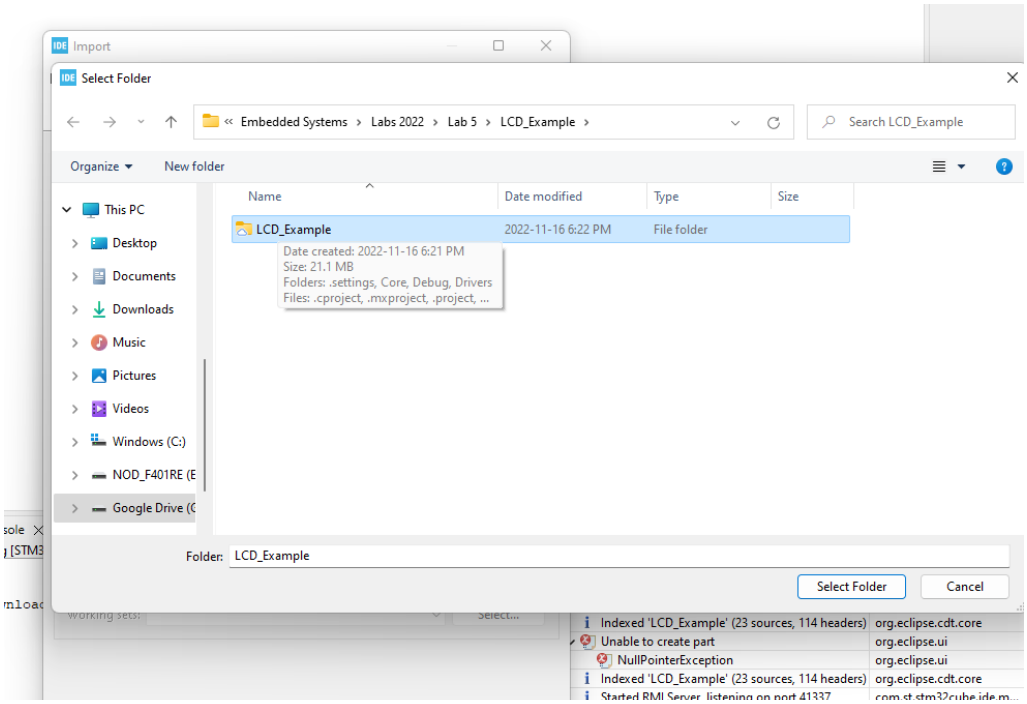

Figure 4 Select the root folder to correctly import the project

Task3 (get started with LCD)

In Task 3: print the first names of groups members in the middle of the first line and the second names of groups members on the second lines one by one. Each member name should be displayed for a few seconds

Deliverables

1. Report contains explanations, Screenshots, and URLs for videos of your tasks.
2. The exported Projects, task 1, task 2, and task3 in rar/zip format.