Embedded Systems

7-Segment Manipulation

In this project, we learn about the connection and interfacing to an external circuit board containing a multiplexer and BCD to seven segment display driver by using GPIO. Connect the provided MET1155 PCB to the PORTE/H header on the bottom right of the board. Ensure all switches on the MET1155 PCB are set to OFF (down position).

**Objective 1:**

Draw the schematic diagram showing the interface between the MET1155 PCB and the STM32 PCB. Label each wire with the specific GPIO pin name. Designate each pin as an INPUT or OUTPUT using an arrow to show data direction. Rewrite the truth table from the MET1155 datasheet using the GPIO pin names from the STM32.

**Objective 2:**

Using the C language, write a program to output a number to one of the seven segment displays on the MET1155. This number should be stored in a variable to allow modification and not be hard-coded.

**Objective 3:**

A picture containing graphical user interface

Description automatically generatedUsing the PORTA push button PA0, toggle the multiplexer select line to move the number between the left and right display. Transition on the falling edge (button released).

**Objective 4:**

Use PD0 to increment the number being displayed. Use PD4 to decrement the number being displayed. Increment or decrement on the rising edge (button pressed).

**Bonus Objective 1:**

Rewrite Objective 3 in the Assembly language.

**Bonus Objective 2:**

When pressing PA0 to switch between segments, display a number such that the sum of the two digits equals ten. Example: if the displayed number is 7, pressing PA0 will display 3 on the other display.

Follow proper coding practice and add a program heading to your program with your name, date submitted, course number, description of the project in your own words (not the given description, description of every function, or major part of the program), how the program can be used by a user, and include meaningful comments for instructions or actions and the functions used as necessary. This has to be done for all programs that you submit throughout the semester.