CPE-342 Microprocessor Systems and Interfacing

Min Project 1 (Group assignment. Maximum group size is 2)

Task 1: Controlling a 7-Segment display using a single I/O pin

Your task is to display numbers 0 to 9 with a delay of 2 seconds (approximate) between each number on a 7-segment display. You must only use a single I/O pin of the microcontroller to send data to the display. You will need to use additional circuitry to make this possible. You will do research to find a solution, test it in simulation using Proteus, then implement it in hardware on a bread board.

Restrictions:

You must only use a single I/O pin of the microcontroller to send data to the display. Other pins for control purposes my be used.

Task 2: Controlling four 7-segment displays using a single data bus

Your task is to display an arbitrary four-digit number on a set of four 7 – Segment displays. You must ***not use more than 10 I/O pins*** of your microcontroller for this task. You will do research to find a solution, test it in simulation using Proteus, then implement it in hardware on a perforated board (vero-board).

Restrictions:

- You may use up to 10 I/O pins of your MCU.
- 7-Segment display driver ICs are not allowed.

Deliverables:

- Proteus simulation of your designs for tasks 1 and 2. **(3 marks)**
- Code for the two tasks. **(2 marks)**
- Breadboard based hardware implementation for task 1. **(5 marks)**
- Vero-board based hardware implementation for task 2. **(5 marks)**
- A video showing the close-up of you soldering the vero-board. **(2 marks)**
- A report detailing your designs (including component selection), for tasks 1 and 2, the research you did to come up with solutions, and the problems you faced simulating and implementing them. **(3 marks)**

Submission Deadline: Thursday 18th March 2021

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