EET-260-D01   Exam #1   Spring 2020   Name<u>   </u>

Show all work - No work, No credit!!!   Grades: Part #1<u>   </u>   **Part #2**<u>   </u>   **Part #3**<u>   </u>

Total Grade <u>   </u>

This is a take home exam. It is due on or before 11:30 a.m. on Friday, March 13, 2020. You may "brain storm" with other students, but each student must submit his/her own documented work and each student must demonstrate the operation of their program individually.

When you begin this exam, create a post in the form of a Reply to the EET-260 Lecture *Exam #1 Information* Topic on the *cset.stcc.edu/forums* 2020 Spring Forums.   When you have completed your exam, have had its operation verified by your instructor and you have submitted both hard and electronic copies of your exam, edit your post to add that you have completed the exam. Good Luck.

PROBLEM: Use your Board of Education to create a 4-Way intersection Red-Yellow-Green traffic stop light signal.

DESCRIPTION: You will use one set of RYG LEDs for each direction. That is, NORTH-SOUTH uses one set of RYG LED signals, and EAST-WEST uses another set of RYG LED signals. This means that the NORTH & SOUTH lights would work together and the EAST & WEST lights would work together.

PROGRAM REQUIREMENTS: The following are the functions your program should include.

1.)   Operate as a 4-Way Traffic Signal using a total of 6 LEDs: 2-Reds, 2-Yellows, 2-Greens. You should choose timing delays appropriate for the demonstration, which can be shorter than a typical traffic light. This is the basic part of the program and it's suggested you fully complete this part first, before implementing steps 2 & 3.

                                            (Maximum score with proper documentation: 65 pts.)

2.)   Incorporate a "Cross Walk Switch" which when pressed will allow the traffic lights to finish their current cycle, Turn on the RED lights for all 4 directions, flash an additional ORANGE LED as a cross-walk signal at a frequency between 1 to 3 Hz while a 7-segment LED display lights segments *a, g & d* successively for 3 seconds each. You should fully complete this part before proceeding to step #3. **EXTRA CREDIT** (+10 pts.): *For those looking for an additional challenge, have the 7-segment display count down from 9 to 0 during the cross-walk sequence. Additional chips and/or BS2 will be required.*

                                            (Additional points with proper documentation: 20 pts.)

3.)   Incorporate an additional "Default Mode Switch" which when pressed will light a BLUE LED, cause the NORTH-SOUTH lights to flash their YELLOW lights and the EAST-WEST lights to flash their Red lights. When in this mode, the "Cross Walk Switch" should still function as specified in step #2 above. Pressing the "Default Mode Switch" a second time should restore normal operation as outlined in step #2.

                                            (Additional points with proper documentation: 15 pts.)

MATERIALS: You can get additional Resistors & LEDs from you instructor, if needed. If you prefer to build your circuit on a separate proto-board to keep your BoE board available for other EET-250 & EET-260 projects, see your instructor.

ADVICE: You should write the flowcharts BEFORE beginning your programming. I will be willing to help you through problems you encounter, but for programming related questions I MUST SEE a flowchart (hand-drawn acceptable) before I can assist you with your program. For any hardware questions, I need to see a schematic diagram (hand-drawn acceptable) before I can recommend courses of action. Your final paper submission, however, MAY NOT use hand-drawn diagrams. They must be electronically created.

WHAT TO SUBMIT:

1.) Three flow-charts representing steps 1, 2 & 3 respectively. Each flow chart should be created using MS-Visio or some other electronic format. These flowcharts should be submitted in both hard copy and electronic format. Electronic format to be specified in #5 below.

2.) You should submit three versions of your program listing representing steps 1, 2 & 3 respectively. Your program should be heavily documented with appropriate comment lines which correspond to its respective flowchart. These programs should be submitted in both hard copy and electronic format.

3.) Submit a schematic diagram showing the wiring connections for all components and BS2 ports used. You only need to create one schematic to cover all 3 programs. You can create this schematic in Visio or whichever program you prefer, as long as you can save it as a pdf. You will submit both a hard copy and electronic copy of your schematic diagram.

4.) Organize your hard copy printouts into a neat and orderly report. This exam sheet should serve as the cover page for your report. If you have any additional work, calculations or supporting documentation, feel free to include that with the required documentation at the end of the report in the form of an Appendix.

5.) Electronic Submission: You should submit a total of 8 electronic documents: 3 Flow-charts (either in Visio native format or as a pdf), 3 Program Listings (either in native MSWord format or as a pdf) & 1 schematic diagram (in pdf form only), and one document which will look like your complete submitted written report. You should "zip" all of these files into one, and e-mail that single zipped file to your instructor.

6.) Remember to edit your original post on the Forums stating that you have completed all aspects of this exam.