ELC 343 - TERM PROJECT #1

In this design project the students are to design and implement on the C Stamp BOL microcontroller evaluation board the following traffic light controller.

Specifications:

1. This controller will be designed to control the traffic at an intersection of 2 major roads N-S and E-W.

2. The sequence of the traffic lights is the usual

    a. N-S green, E-W red

    b. N-S Yellow, E-W red

    c. N-S red, E-W red

    d. N-S red, E-W green

    e. N-S red, E-W Yellow

    f. N-S red, E-W red

    g. N-S green, E-W red

3. This sequence then repeats indefinitely.

4. The time spent in each phase of the sequence is different, with the green time longer than the yellow time, etc.

5. There are left turn signals at each of the streets. These also have green and yellow control arrows.

6. There are sensors embedded in the roadways to detect cars stopped and waiting at the red lights.

7. With the sensors in # 5 above you don't have to switch one street from green to red if there is no one waiting on the other street.

8. Also you can make the green light stay on much longer in one direction if there is no traffic waiting on the cross street.

9. The inputs are the sensor outputs (8).

10. The outputs are the 20 traffic lights, which of course will be LEDs.

11. Make sure your board has enough pins for the proper connections.

You are to:

1. Write the program in Assembly language, with appropriate comments.

2. Build the program.

3. Produce a .lst file for review.

4. Download the .HEX file.

5. Debug the program very carefully; include portions of the debug in your report.

6. Demonstrate the operational program to the instructor.

7. Prepare and produce a fully documented technical report.

8. The report is to include, but not limited to the following:

    a. Introduction.

    b. Discussion of results including development of any equations, detailed graphs and schematics, oscilloscope pictures, and any other component that you think helps you to explain what, why and how you did what you did.

    c. The report must be understandable to another engineer or supervisor not working on this project.

    d. A conclusion of your results and discussion of anything you found especially interesting or not expected from you work on this project.

9. This report is a team report and is due to me no later than the period of the scheduled final

10. The team must make a 20 minute technical presentation to the class the period of the scheduled final. You can use any of the presentation technologies you want. Your presentation slides must be part of the final report.

REPORT FORMAT: Free form, but it must comply with the following:

a. One report per team

b. Have a cover sheet with identification: Title, Class, Your Names, etc.

c. Include all the deliverables previously mentioned.

d. COMPLETELY word-processed

e. Double spaced

f. 12 pt Times New Roman font

g. Fully justified (optional)

GRADING:

1. Your report will be graded as to clarity, spelling, grammar and organization. The basic requirements are the same as for the technical reports already completed.

2. Whether the system works according to the specifications or how well the system works and how well it was designed.

3. Adherence to standard programming techniques such as using subroutines where possible is required.

4. Your presentation will be graded by your peers, possible some invited guests and I.