

## **Digital Logic Design Assignment**

### **GENERAL INFORMATION**

- In this assignment students are required to design logic circuits and implement the design on hardware.
- You have to use the digital logic circuits learned in EEN1036. Microcontroller and microprocessor based projects are **NOT** allowed.
- A group assignment (**min 2, max 3 students per group**)
- Date release: Week 4
- Mode of Submission: hardware + presentation + report
- Each student has to submit report
- Assessment Marks: 15%

### **DATELINES**

- Each team must send the student ID, names and course major of group members before: **12pm, Thursday, 10 November 2011 (Week 4) – submit to Ms Lim Sin Liang via email at: [lim.sin.liang@mmu.edu.my](mailto:lim.sin.liang@mmu.edu.my).**
- Report deadline: **12pm, Thursday, 29 December 2011 (Week 11)** [Late submission: minus 3 marks per day] – submit hardcopy to lecturer in charge on the group. More information on the report submission will be announced on MMLS.
- Presentation/Demonstration: Week 12 – Dates will be announced on MMLS.

## **OBJECTIVES**

- To design and construct a prototype for digital logic circuit applications.
- To apply and integrate the digital logic circuit principles taught in EEN1036.
- To gain experience of hardware construction.
- To appreciate the importance of coordinated teamwork and project management.
- To appreciate the nature of systems design.

## **ASSIGNMENT TOPIC**

### **Traffic light system**

Design a digital logic circuit for a traffic light system. You are free to choose the traffic light arrangements and operations. An example of traffic light system is shown at a two dual-carriage roads meet at a T junction, as shown in Figure 1. Three traffic lights (E, W and S) placed at this junction are to be set up and controlled by a digital logic system.

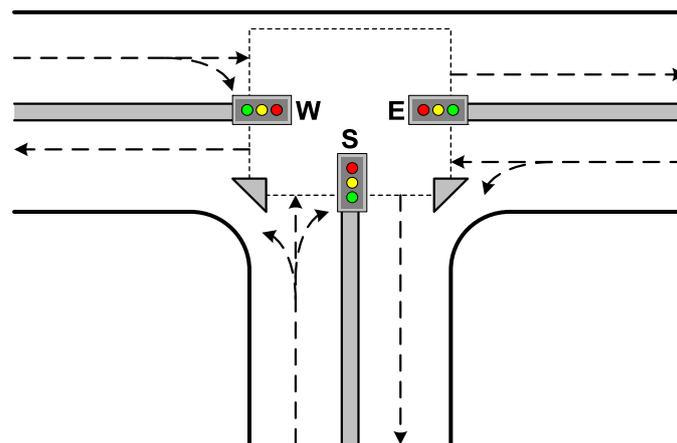


Figure 1. Arrangement of the traffic lights

## **MARK DISTRIBUTION**

- Hardware demonstration: 50%
- Report: 50%

## **HARDWARE DEMONSTRATION**

- All the components can be soldered on the vera/strip board or you can use the breadboard.

- The arrangement of components and wirings should be neat.
- The prototype **MUST** have all the basic hardware listed in your report.
- All group members **MUST** be present during demonstration.
- The group **MUST** to demonstrate the functionality of the prototype and attend to the Q&A.
- The prototype **MUST** be working!

### **REPORT GUIDELINES**

Each student in the group is required to submit a detailed technical report. The report **MUST** not be more than 15 pages of A4 paper. The report should be neat, readable, and concise. You should include adequate references and/or background materials if necessary.

You should adhere to the following format (type and paginate your report properly):

1. **Introduction:** An introduction to the objective and requirement of the assignment.
2. **System design:** This is the main part of your report. It may include the details of the following:
  - i. Timing circuits.
  - ii. Sequential circuits.
  - iii. Combinational circuits.You should include the state transition diagram, state table, truth table, Karnaugh map, circuit diagram, etc., where necessary to enhance readers' comprehension of your report.
3. **System simulation and analysis:** The completed system should be simulated (using any appropriate simulation tool) and analyzed to verify that it performs its tasks correctly. Printouts from the simulation tools must be included and fully described to substantiate your analysis.
4. **Bill of material:** List of components/parts used in your system and their quantity as well as costs.
5. **Hardware design**
6. **References:** Books, websites, etc. (properly annotated).
7. **Appendices:** Supporting material as needed (data sheets etc.).
8. **Group work contribution:** The contribution from each member in the group (use the format shown in the next page).

Your report should also describe in details your contribution to the assignment. For example, if your contribution is in the system simulation and analysis, then you

should explain more on this section compared to your other group members.

The marks distribution for each component of the report is as follow:

- |                             |             |
|-----------------------------|-------------|
| 1. Introduction             | - 2.5 marks |
| 2. System design            |             |
| i. Timing circuits          | - 7.5 marks |
| ii. Sequential circuits     | - 7.5 marks |
| iii. Combinational circuits | - 7.5 marks |
| 3. Simulation and analysis  | - 5 marks   |
| 4. Bill of material         | - 2.5 marks |
| 5. Hardware design          | - 10 marks  |
| 6. References               | - 2.5 marks |
| 7. Appendices               | - 2.5 marks |
| 8. Group work contribution  | - 2.5 marks |
| Total                       | - 50 marks  |

The reports should be printed on A4 papers (single spacing with 12-pt Times New Roman), properly stapled or bound with a cover showing the **report title, name, email, student ID and course major**. Grading of reports will be based upon the correctness of the design and analysis, substantive content and appropriate organization of the report. Multiple errors in grammar and spelling are unprofessional and detract from the clarity of your report and will be graded accordingly.

Please fill in this form and attach this to your report.

<b>Group Work Contribution</b>
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**The purpose of this is to encourage all group members to participate fully. This means planning ahead, sound preparation, giving thought to your contribution and meeting deadlines agreed amongst the group members. Please indicate your individual contribution towards the assignment. Key words or bullet points will suffice.**

Student 1: Contribution:
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Student 2: Contribution:
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Student 3: Contribution:
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**All students in the group must sign the following:**

I agree that the information given by each group member is correct and acceptable		
Student 1:	Student 2:	Student 3:
Date:		