Faculty of Electrical & Electronics Engineering
BEE 1213 DIGITAL ELECTRONICS

ASSIGNMENT/PROJECT

Mapping CO, PO, Domain, KI: CO5, PO10
CO5, PO10 - Conduct independent readings and research in designing digital electronic problems using engineering software. (A3, LLL2)

Abstract

A digital systems consist of both combinational circuits and memory elements. A block diagram of a general digital system that combines combinational logic gates with memory devices as shown in **Figure 1**. The combinational portion such as binary adders, decoders, multiplexers, etc., accepts logic signals from external inputs and from the outputs of the memory elements. The combinational circuit operates on these inputs to produce various outputs, some of which are used to determine the binary values to be stored in the memory elements such as registers, counters etc. The outputs of some of the memory elements, in turn, go to the inputs of logic gates in the combinational circuits. This process indicates that the external outputs of a digital system are functions of both its external inputs and the information stored in its memory elements.

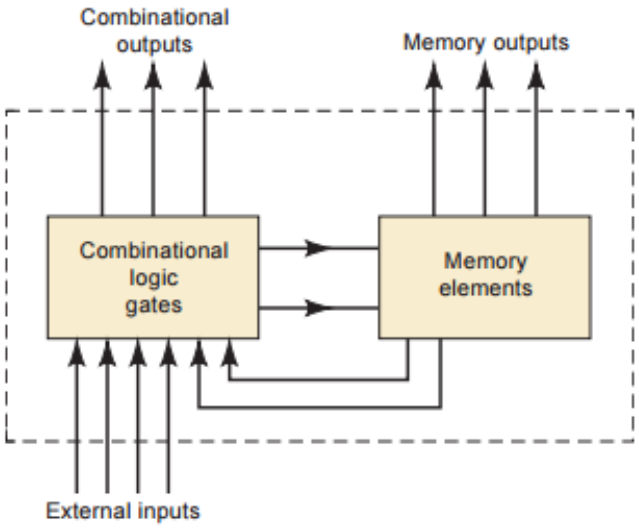

Figure 1: A block diagram of a general digital system

Instructions (Maximum 3 student per group):

1. Design a digital system logic circuit to solve your problem. Identify all the inputs and outputs; use all the methods that you have learned in class including combinational and sequential logic.
2. Simulate your design in simulation software, and produce the result required.
3. Prepare your presentation as instructed for assessment.
4. Presentation timing will be decided by your lecturer.

Presentation

1. Prepare your slide presentation not more than 10 slides. Presentation cover on:
   - Method (Block diagram/flowchart of the system, operation of the system. What gates, flip flops, MSI circuit, etc used, why?)
   - Results Produces: Simulation of the system to show your results
   - Discussion (Compare your result with theoretical, result's analysis)
   - Conclusion
2. Run your simulation at the end of your presentation.
3. Marks will be given based on:
   - Success of your system
   - Understanding on the design of your system
   - Efficiency.
   - Plagiarism will not be accepted. Lecturer has the right to determine your final marks.

Example of a digital system (you can't choose the same project as this)

Digital 12-Hour Clock

Digital clocks are usually set up to start at 12:00, and they count 12:01, 12:02, 12:03, 12:04, 12:05, 12:06, 12:07, 12:08, 12:09, 12:10, and eventually the clock gets to 12:58, 12:59, 1:00, and so on. The one's place of the minutes (the right-most digit) counts 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and then repeats, and a circuit that counts in this way is called a mod-10 counter. The ten's place of the minutes (second digit from the right) counts 0, 1, 2, 3, 4, 5, and then repeats, which is called a mod-6 counter. The hour counter counts 12, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and repeats. Figure 2 shows the design of the digital 12-hour clock.

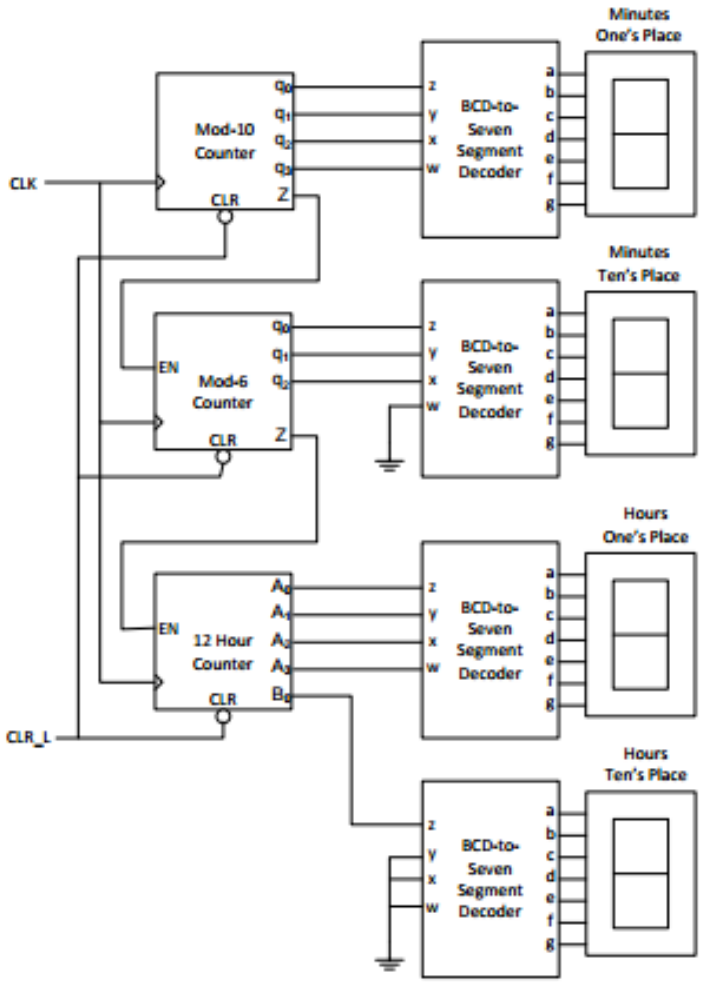

Figure 2: A Digital 12-Hour Clock Schematic Design

**** This project has both combinational and sequential logic circuits****
**** Both input and output has been clearly clarified****