CDA 4203 Sec 001 Spring 2015

Computer System Design

Instructor: Dr. Srinivas Katkoori

**Homework 3**

*Handed out on Monday, 30th March*

*DUE: 11:59PM,* ***Saturday, 4th April***

*NOTE: The due date is on a Saturday. No late homework will be accepted.*

Note:

1. Recommended submission is by Blackboard.
2. If you handwrite the answers, you may want to scan and upload to Blackboard.

**Your Name: Your U#:**

1. **(10 pts.)** Design a sequential circuit which produces an output z =1 whenever any of the following input sequences occur: 1100, 1010, or 1001. The circuit resets to its initial state after a 1 output has been generated.
   1. (5 pts) Show the state diagram or table.
   2. (5 pts) Implement the state machine (i.e., perform state assignment and derive next state and output functions)
2. **(5 pts.)** What is the difference between a Moore and a Mealy machine?
3. **(15 pts.)** Consider the following state machine:

|  |  |  |
| --- | --- | --- |
| PS | NS, z | |
| X=0 | X=1 |
| A | B,1 | H,1 |
| B | F,1 | D,1 |
| C | D,0 | E,1 |
| D | C,0 | F,1 |
| E | D,1 | C,1 |
| F | C,1 | C,1 |
| G | C,1 | D,1 |
| H | C,0 | A,1 |

* 1. (5 pts) Minimize the machine by finding equivalent states.
  2. (5 pts) Show a ***standard form*** of the corresponding reduced machine.
  3. (5 pts) Find a minimum-length sequence that distinguishes state A from state B.

1. **(10 pts.)** Brieflyexplain the following with the help of a diagram
   1. Port based IO
   2. Memory Mapped IO
   3. Standard Bus based IO
2. **(5 pts.)** What is the difference between fixed and vectored interrupts? What are their advantages?
3. **(5 pts.)** Compare and contrast priority arbitration and daisy chain arbitration schemes.
4. **(10 pts.)** Briefly explain the operation of the following memory types of memory and compare them with respect to the storage permanence and writeability.
   1. OTP ROM
   2. EPROM
   3. EEPROM
   4. Flash Memory
   5. SRAM
   6. DRAM
5. **(10 pts.)** Compose 1K x 8 ROMs into a 2K x 16 ROM.