Bangladesh University of Engineering and Technology
Department of Computer Science and Engineering

Course: CSE 206: Digital Logic Design Sessional

Experiment No. 1

Topic: Implementing circuit with basic gates.

Problem 1: (10)

Implement the following logical equation using basic gates only:

$$F(X,Y,Z) = X'+Y'+Z'$$

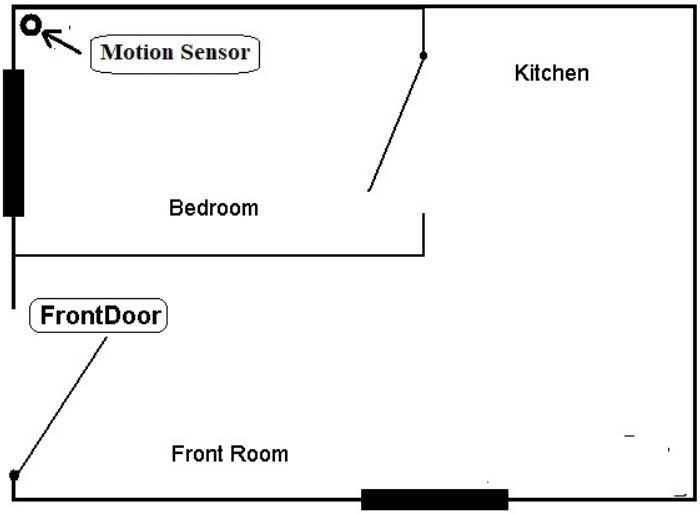
Problem 2:

A house has an alarm system with two sensors:

- FrontDoor (F)
- Motion Sensor (M)

and two state variables:

- Armed: alarm system is on when Armed = 1
- Away: no one is home when Away = 1



This alarm system works as follows:

- If the system is Armed and you are Away, then a signal from any of the two sensors will cause an alarm.
- If you are Home, then only a signal from the front door will cause an alarm.
- If the system is not armed, then there will never be an alarm.

Answer the following questions: (2 + 8 + 2 + 8)

A. How many input variables will be there in the alarm system?
B. Find the logical equation to generate alarm in the system based on the conditions mentioned above.
C. 2 marks are allocated if you can do it intelligently without using a complete truth table. Explain your intelligent idea.
D. Implement the circuit with basic gates.

Lab sheet: For each of the problems/questions, your lab sheet should cover:

- Required IC chips
- Truth table
- Circuit diagram

Answer the following question:

1. A brief discussion on how you can construct AND, and OR gates using universal NAND, and NOR gates.