Spring 2016

İSTANBUL BİLGİ UNIVERSITY,
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EEEN 222 Digital System Design
Homework 03

Due : 14-May-2016
Monday 17:00

Problem 1) Implement a full adder using a 3-to-8 line decoder and external gates if necessary.

Problem 2) Draw a PLA circuit to implement the functions

$$F_1(A,B,C) = (AC + AB + BC)'$$
$$F_2(A,B,C) = A'B + AC + A'BC'$$

Problem 3) The following is a truth table of a three-input, four output combinational circuit;

x	*y*	*z*	A	B	C	D
0	0	0	0	1	1	0
0	0	1	0	1	1	1
0	1	0	1	0	0	1
0	1	1	0	0	0	1
1	0	0	1	1	1	0
1	0	1	0	1	0	1
1	1	0	1	0	1	1
1	1	1	0	1	1	0

Tabulate PAL programming for the circuit and mark the fuse map.

Problem 4) A sequential circuit with two D flip-flops *A* and *B*, two inputs, *x* and *y*; and one output *z* is specified by the following next-state and output equations

$$A(t+1) = xy' + xB$$
$$B(t+1) = xA + xB'$$
$$z = A$$

a) Draw the logic diagram of the circuit.
b) List the state table for the sequential circuit.
c) Draw the corresponding state diagram.

Problem 5) Design a sequential circuit that counts even numbers including 0, from 0 to 14. (Eg. 0,2,4,6,8,10,12,14,0,2,4…). Use JK flip flops.

a) List the state table for the sequential circuit.
b) Draw the corresponding state diagram.
c) Draw the logic diagram of the circuit.