Bu Ali Sina University

Department of Computer Engineering

Synthesis of Digital Systems (SDS2022)

HW# 2

Due date: Sunday, Dec. 12

1. Given is Machine below • (a) Find the minimal machine (in the number of states) that is equivalent to machine M • (b) Draw the triangular table of machine M • (c) Solve the triangular table • (d) Find the maximal compatible groups of states • (e) Solve graphically the covering/closure problem. • (f) Formulate algebraically the binate covering problem. • (g) Realize the machine using JK flipflops and combinational gates.

a	d/-	f/0
b	c/1	h/0
c	d/0	h/0
d	c/0	a/0
e	-/-	f/0
f	e/0	a/0
g	c/1	-/-
h	b/1	a/1

2. (a) Given is machine below. Realize this machine using D flip-flops and the excitation and output functions that would depend on the minimum total number of variables. • (b) If you cannot minimize all these functions, try to minimize at least some and prove that you minimize them by some systematic method. – You do not have to prove that your solution is optimum but you must proceed rationally using the methods shown in class. – While solving this problem think about all FSM optimizing methods discussed in our class. • (c)Using the final schematics demonstrate that you indeed minimized the number of arguments of some functions. Write specifically which ones. Prove with your comments that you understand the principles of state assignment and not only the procedure.

a	d/-	f/0
b	c/1	h/0
c	d/0	h/0
d	c/0	a/0
e	-/-	f/0
f	e/0	a/0
g	c/1	-/-
h	b/1	a/1

You must send your homework files as attachment of an email to ma1358@gmail.com.

Subject: Synthesis 2022-Homework2-{YourName}