28-02-2013

FORMAL LANGUAGES & AUTOMATA
QUIZ-1

Q1) 8 bit registers of A and B contain 2 integers. Design an ASM which will check whether A-B is equal to "1" or not. The machine will start when the control signal S is set to "1" and A and B will be initialized. When the machine completes execution, F register will contain "1" if A-B=1, "0" if A-B≠1. Assume that you are given an addition circuit and a complementation circuit. Sketch the ASM diagram of the machine you design. For this question, you do not need to design the controller and data units.

Q2) State table of a finite state machine is given in the Moore model below. Convert the table into the Mealy model.

	0	**1**	**Output**
A	G	F	1
B	B	E	0
C	B	C	1
D	F	A	1
E	F	G	1
F	A	F	0
G	A	F	1

Duration: 20 mins

SOLUTIONS

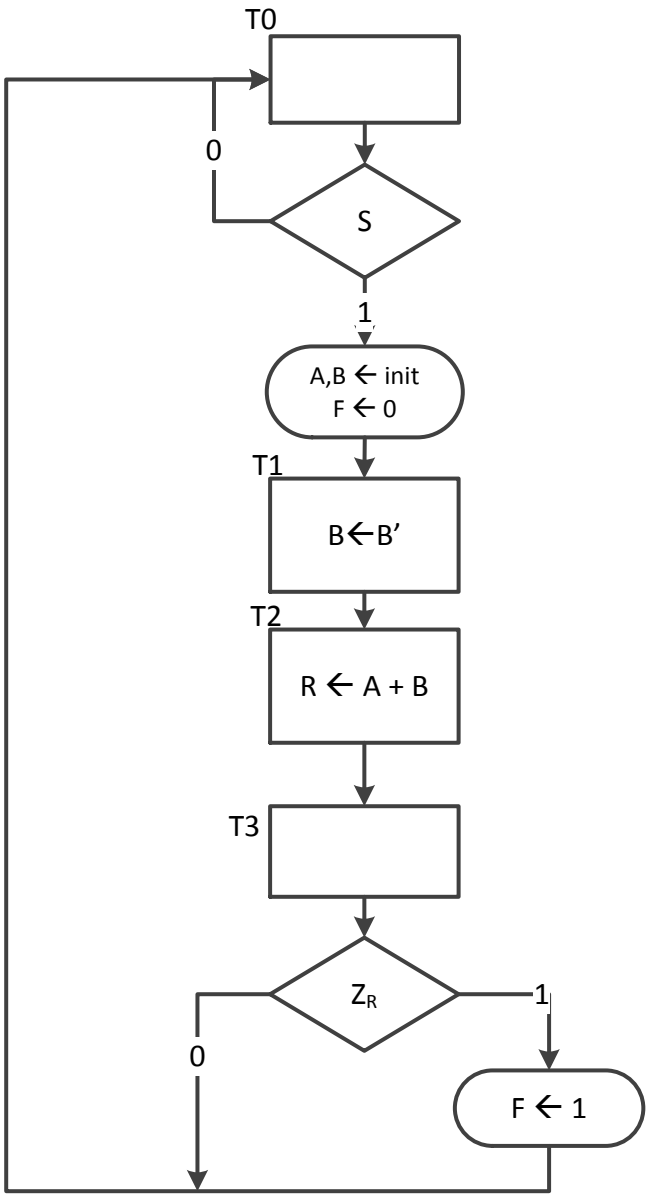
1) $A - B \overset{?}{=} 1 \rightarrow A - B - 1 \overset{?}{=} 0$

$R = A - B - 1 = A + (B' + 1) - 1 = A + B'$ where B' is 1's complement of B

$R = 0 \Rightarrow F = 1$

$R \neq 0 \Rightarrow F = 0$

ASM Diagram:



2) Conversion from the Moore model to the Mealy model:

	0	**1**
A	G/1	F/0
B	B/0	E/1
C	B/0	C/1
D	F/0	A/1
E	F/0	G/1
F	A/1	F/0
G	A/1	F/0