BLG 311E – FORMAL LANGUAGES AND AUTOMATA
SPRING 2016
HOMEWORK 1

1. Reduce the states of the incompletely specified Mealy machine below using complete cover and draw the state transition table of the reduced machine in Moore model.

	00	01	11	10
a	a/0	b/0	c/0	d/1
b	b/0	-/-	c/0	-/-
c	a/0	f/0	c/0	-/-
d	d/1	-/-	e/0	a/0
e	e/0	g/0	d/1	b/0
f	-/-	f/0	-/-	a/0
g	-/-	g/0	d/1	c/0

2. Reduce the states of the Moore machine given below. Then, draw the state transition table of the reduced machine in Mealy model.

	0	1	Output
a	a	d	0
b	a	b	0
c	e	c	0
d	a	d	0
e	a	d	1
f	e	c	0

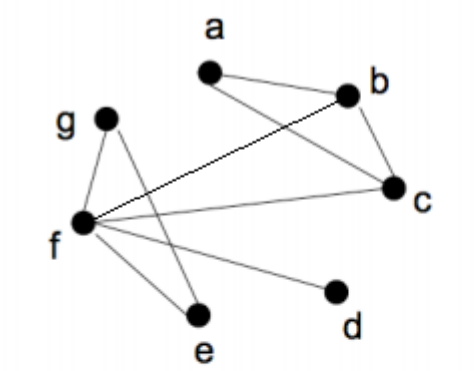
IMPORTANT: You must do this homework **by hand** and **submit it using the box in the department secreteriat**.

SOLUTIONS

1.

	a					
b	✔	b				
c	(b,f)✔	(b,a) ✔	c			
d	XXXX	XXXX	XXXX	d		
e	XXXX	XXXX	XXXX	XXXX	e	
f	XXXX	✔	✔	✔	(a,b),(f,g) ✔	f
g	XXXX	XXXX	XXXX	XXXX	(b,c) ✔	(a,c) ✔

Dependency graph:



Complete cover:

{a,b,c}
{e,f,g}
{b,c,f}
{f,d}

{a,b,c} - S1
{e,f,g} - S2
{b,c,f} - S3
{f,d} - S4

S1/0 - α
S2/0 -β
S3/0 - γ
S4/1 - δ

Mealy State Transition table:

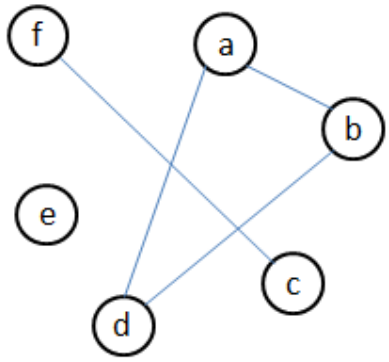
	00	01	11	10
S1	S1/0	S3/0	S3/0	S4/1
S2	S2/0	S2/0	S4/1	S1/0
S3	S1/0	S3/0	S1/0	S1/0
S4	S4/1	S2/0	S2/0	S1/0

Moore State Transition table:

	00	01	11	10	Output
α	α	γ	γ	δ	0
β	β	β	δ	α	0
γ	α	β	α	α	0
δ	δ	β	β	α	1

2.

	a	**b**	**c**	**d**	**e**
b	(b-d) OK				
c	(a-e)(c-d) X	(a-e) X			
d	OK	OK	(a-e) X		
e	X	X	X	X	
f	(a-e)(c-d) X	(a-e)(b-c) X	OK	(a-e)(c-d) X	X



Equivalence class: ({a, b, d}, {c, f}, {e})

{a, b, d} → A

{c, f} → B

{e} → C

Moore transition table:

	0	1	Output
A	A	A	0
B	C	B	0
C	A	A	1

Mealy transition table:

	0	1
A	A/0	A/0
B	C/1	B/0
C	A/0	A/0