

MSIA HW #6

1)

	Input	
PS	x=0	x=1
A	A,0	B,1
B	C,1	C,0
C	A,0	B,1
	NS, output	

→ Mealy

	Input	
PS	x=0	x=1
A	B,0	C,0
B	D,1	C,0
C	A,1	D,1
	NS, output	

→ Mealy

	Input	
PS	x=0	x=1
A	A,0	B,0
B	A,1	C,1
C	A,1	D,1
D	A,0	A,0
	NS, output	

→ Moore

2a)

	Input	
PS	x=a	x=b
A	A,0	B,1
B	B,1	C,2
C	C,2	D,3
D	D,3	E,4
E	E,4	F,5
F	F,5	A,0
	NS, output	

A → 0 bs

B → 1b

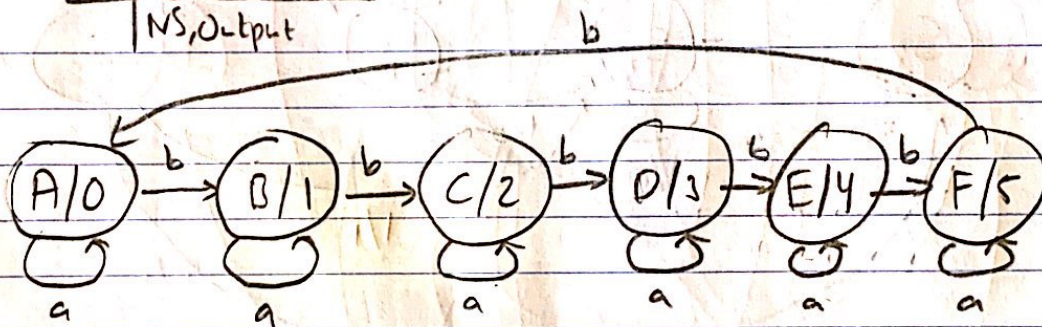
C → 2bs

D → 3bs

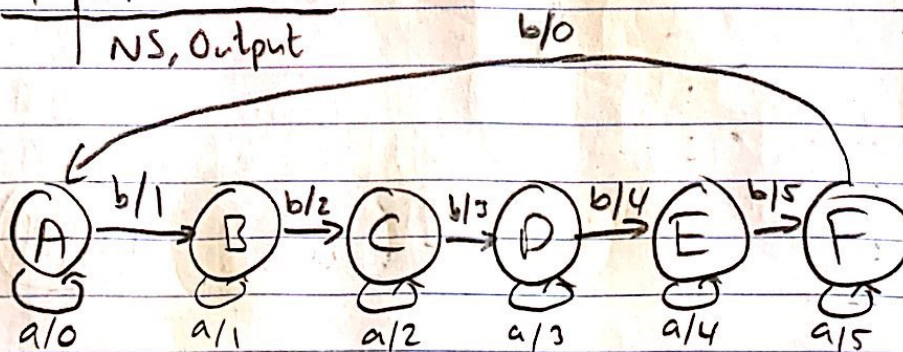
E → 4bs

F → 5bs

2a)	Input	
PS	x=a	x=b
A	A, 0	B, 0
B	B, 1	C, 1
C	C, 2	D, 2
D	D, 3	E, 3
E	E, 4	F, 4
F	F, 5	A, 5
	NS, Output	



2b)	Input	
PS	x=a	x=b
A	A, 0	B, 1
B	B, 1	C, 2
C	C, 2	D, 3
D	D, 3	E, 4
E	E, 4	F, 5
F	F, 5	A, 0
	NS, Output	



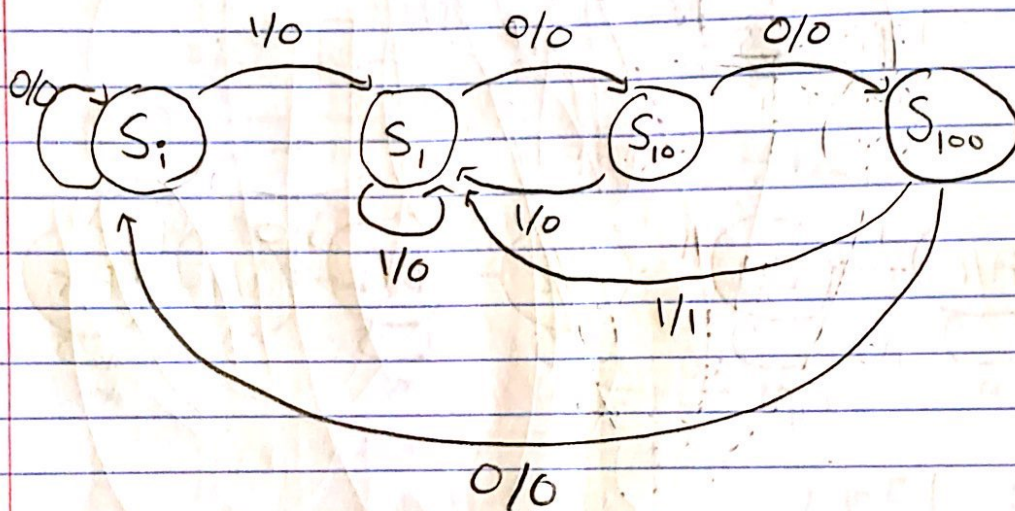
3) Student ID: 305413659

Last Digit: 9 = 1001

$z(t) = 1$ if $x(t-3, t) = 1001$ $x(t) \in \{0, 1\}$

$z(t) = 0$ otherwise

$S_i \rightarrow$ initial, $S_1 \rightarrow 1$ detected, $S_{10} \rightarrow 10$ detected, $S_{100} \rightarrow 100$ detected



4a) State A and B are 2-equivalent \rightarrow False

State C and D are 1-equivalent \rightarrow True

State G and H are 1-distinguishable \rightarrow True

State E and F are 1-equivalent \rightarrow False

46) $P_1 = (ACDH)(BEG)(F)$

	A	C	D	H	B	E	G	F
a	2	2	2	2	1	1	1	1
b	2	2	2	2	2	2	2	2
c	2	3	3	3	2	2	2	1
d	1	1	1	1	3	3	3	2

$P_2 = (A)(CDH)(BEG)(F)$

	A	C	D	H	B	E	G	F
a	3	3	3	3	2	2	2	2
b	3	3	3	3	3	3	3	3
c	3	4	4	4	3	3	3	1
d	2	1	2	1	4	4	4	3

$P_3 = (A)(D)(CH)(BEG)(F)$

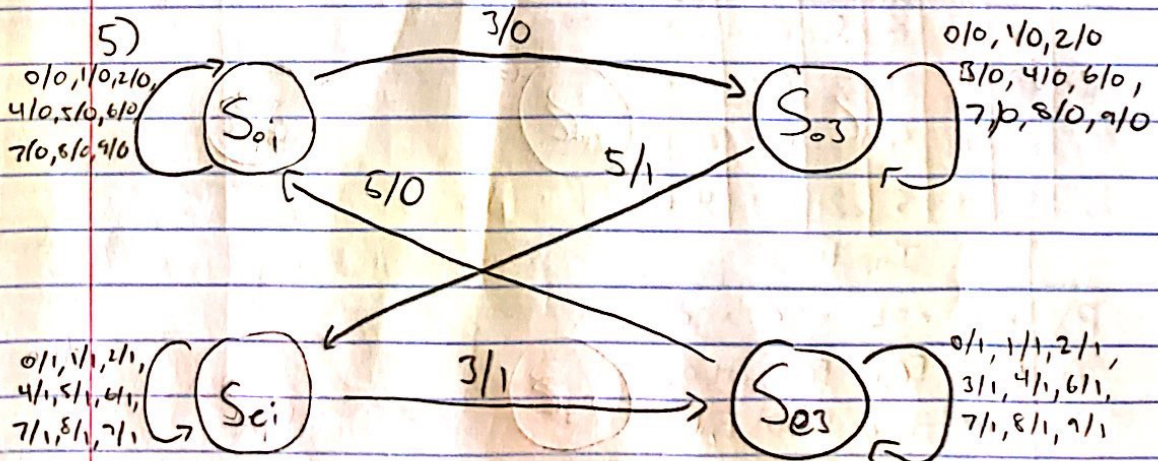
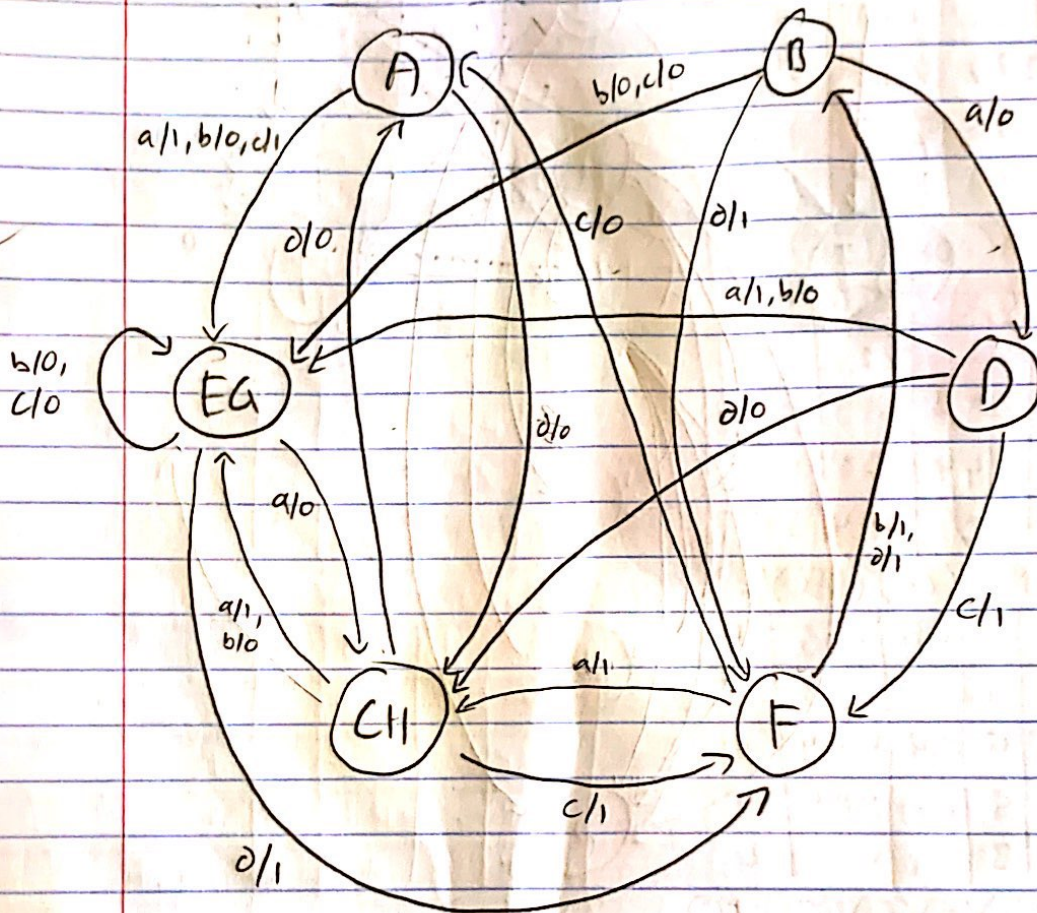
	A	D	C	H	B	E	G	F
a	4	4	4	4	2	3	3	3
b	4	4	4	4	4	4	4	4
c	4	5	5	5	4	4	4	1
d	3	3	1	1	5	5	5	4

$P_4 = (A)(B)(D)(F)(CH)(EG)$

	A	B	D	F	C	H	E	G
a	6	3	6	5	6	6	5	5
b	6	6	6	2	6	6	6	6
c	6	6	4	1	4	4	6	6
d	5	4	5	2	1	1	4	4

	Inputs			
PS	x=a	x=b	x=c	x=d
A	EG,1	EG,0	EG,1	CH,0
B	D,0	EG,0	EG,0	F,1
D	EG,1	EG,0	F,1	CH,0
F	CH,1	B,1	A,0	B,1
CH	EG,1	EG,0	F,1	A,0
EG	CH,0	EG,0	EG,0	F,1
	NS, z			

4c)



$$7b) P_1 = (ACGH)(BDE)(F)$$

	ACGH	BDE	F
a	2222	111	λ
b	1111	333	λ
c	2222	222	λ
d	2333	222	λ

$$P_2 = (A)(CGH)(BDE)(F)$$

	A	CGH	BDE	F
a	X	333	222	X
b	X	112	444	X
c	X	333	333	X
d	X	444	333	X

$$P_2 = (A)(CG)(H)(BDE)(F)$$

	A	CG	H	BDE	F
a	X	44	X	222	X
b	X	11	X	555	X
c	X	44	X	444	X
d	X	55	X	444	X

Input				
PS	x=a	x=b	x=c	x=d
A	BDE,1	CG,0	BDE,1	BDE,1
CG	BDE,1	A,0	BDE,1	F,1
H	BDE,1	CG,0	BDE,1	F,1
BDE	CG,0	F,1	BDE,1	BDE,0
F	CG,1	F,1	BDE,0	H,0
NS, Z				