Zhenming (Mark) Yang

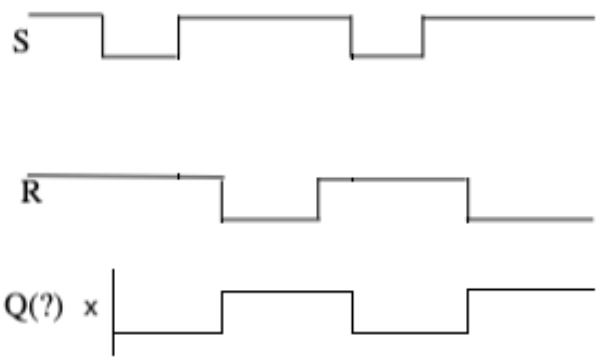
Prof. Z

Embedded System

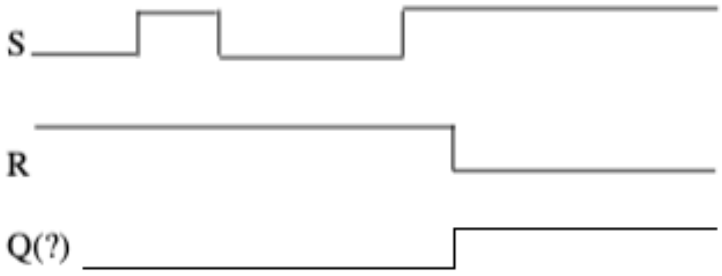
5 October 2023

1.

a.

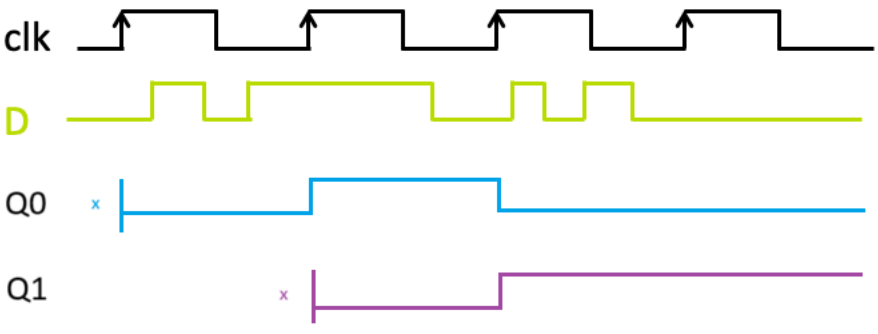


b.



2.

a.



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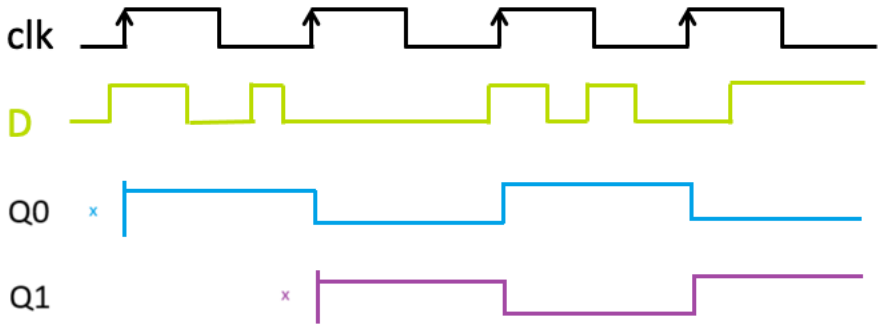
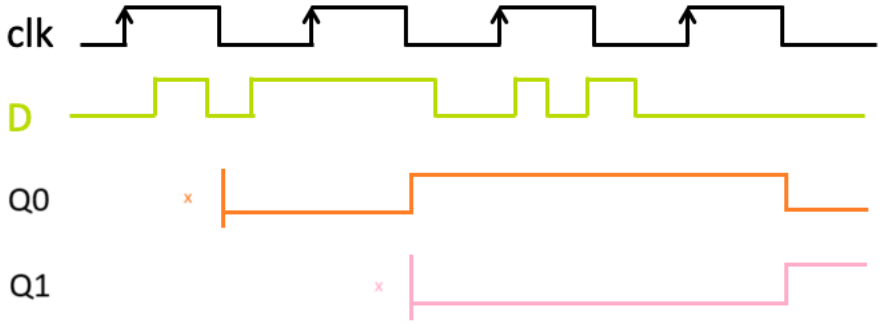
b.

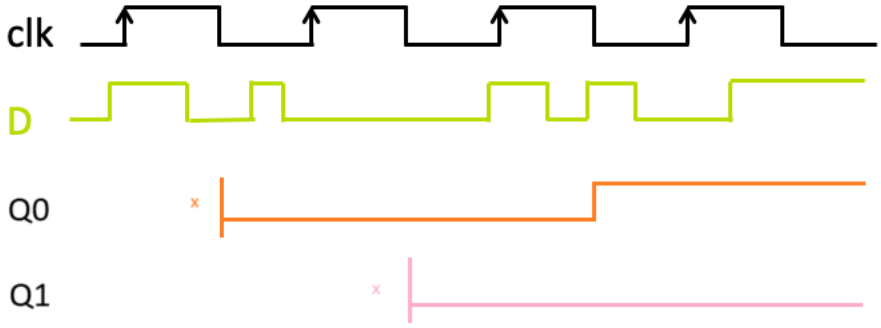


3.

a.



b.



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4.

a.

A = 0001

B = 0010

C = 0100

D = 1000

i	$S[3]$	$S[2]$	$S[1]$	$S[0]$	o	$S'[3]$	$S'[2]$	$S'[1]$	$S'[0]$
0	0	0	0	1	1	0	1	0	0
1	0	0	0	1	0	0	0	1	0
0	0	0	1	0	0	1	0	0	0
1	0	0	1	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1
1	0	1	0	0	0	1	0	0	0
0	1	0	0	0	0	0	0	1	0
1	1	0	0	0	1	0	1	0	0

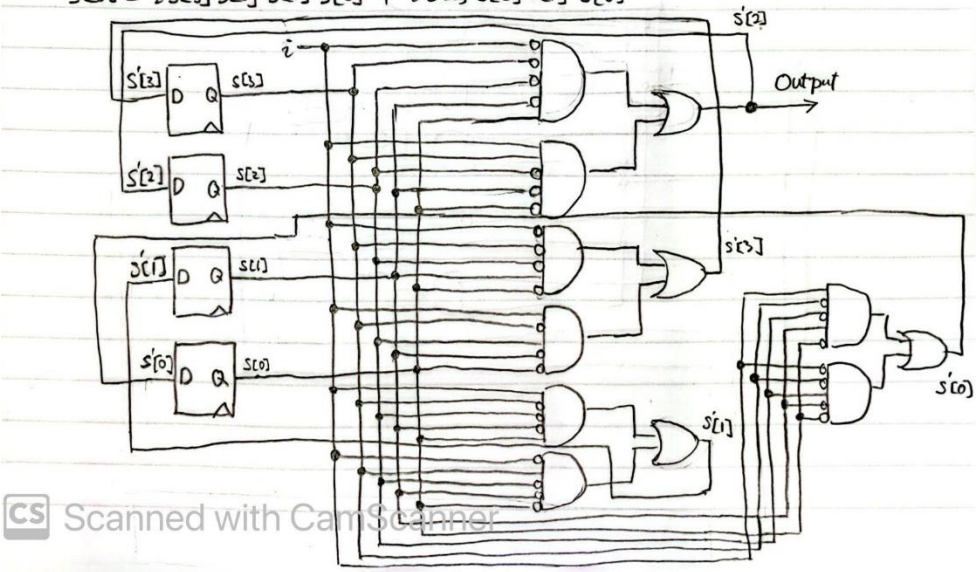
$o = \bar{i}\,S[3]\,\overline{S[2]}\,\overline{S[1]}\,\overline{S[0]} + i\,S[3]\,\overline{S[2]}\,\overline{S[1]}\,\overline{S[0]}$

$S'[3] = \bar{i}\,\overline{S[3]}\,\overline{S[2]}\,S[1]\,\overline{S[0]} + i\,\overline{S[3]}\,S[2]\,\overline{S[1]}\,\overline{S[0]}$

$S'[2] = \bar{i}\,\overline{S[3]}\,\overline{S[2]}\,\overline{S[1]}\,S[0] + i\,S[3]\,\overline{S[2]}\,\overline{S[1]}\,\overline{S[0]} = 0$

$S'[1] = i\,\overline{S[3]}\,\overline{S[2]}\,\overline{S[1]}\,S[0] + \bar{i}\,S[3]\,\overline{S[2]}\,\overline{S[1]}\,\overline{S[0]}$

$S'[0] = i\,\overline{S[3]}\,\overline{S[2]}\,S[1]\,\overline{S[0]} + \bar{i}\,\overline{S[3]}\,S[2]\,\overline{S[1]}\,\overline{S[0]}$



Scanned with CamScanner

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b.

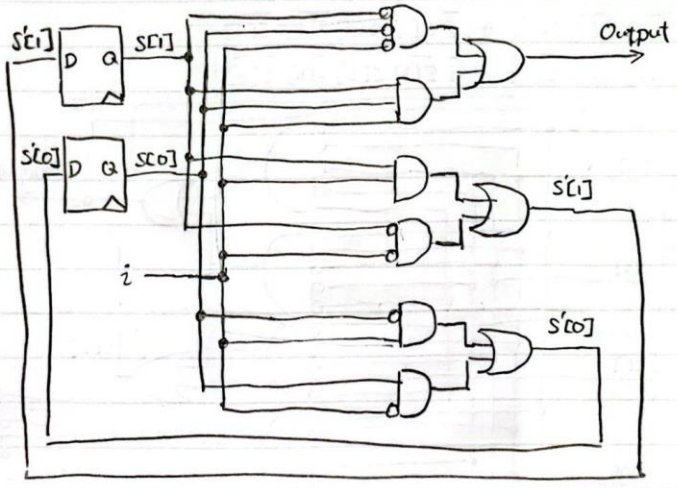
A = 00
B = 01
C = 10
D = 11

i	$S[1]$	$S[0]$	O	$S'[1]$	$S'[0]$
0	0	0	1	1	0
1	0	0	0	0	1
0	0	1	0	1	1
1	0	1	0	0	0
0	1	0	0	0	0
1	1	0	0	1	1
0	1	1	0	0	1
1	1	1	1	1	0

$$O = \bar{i}\,\overline{S[1]}\,\overline{S[0]} + i\,S[1]\,S[0]$$

$$S'[1] = \bar{i}\,\overline{S[1]}\,\overline{S[0]} + \bar{i}\,\overline{S[1]}\,S[0] + i\,S[1]\,\overline{S[0]} + i\,S[1]\,S[0] = \bar{i}\,\overline{S[1]} + i\,S[1]$$

$$S'[0] = \bar{i}\,\overline{S[1]}\,\overline{S[0]} + \bar{i}\,\overline{S[1]}\,S[0] + i\,S[1]\,\overline{S[0]} + \bar{i}\,S[1]\,S[0] = i\,\overline{S[0]} + \bar{i}\,S[0]$$



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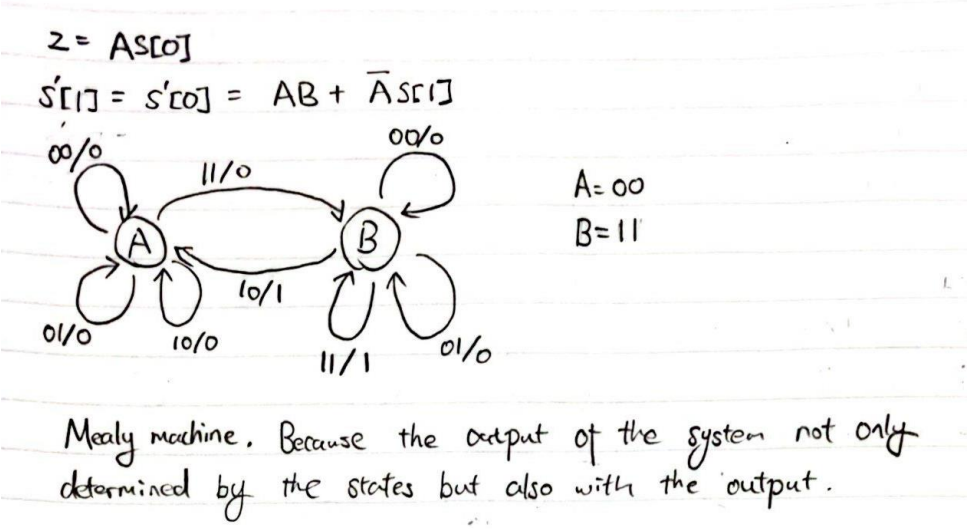
5.



Mealy machine. Because the output of the system not only determined by the states but also with the output.

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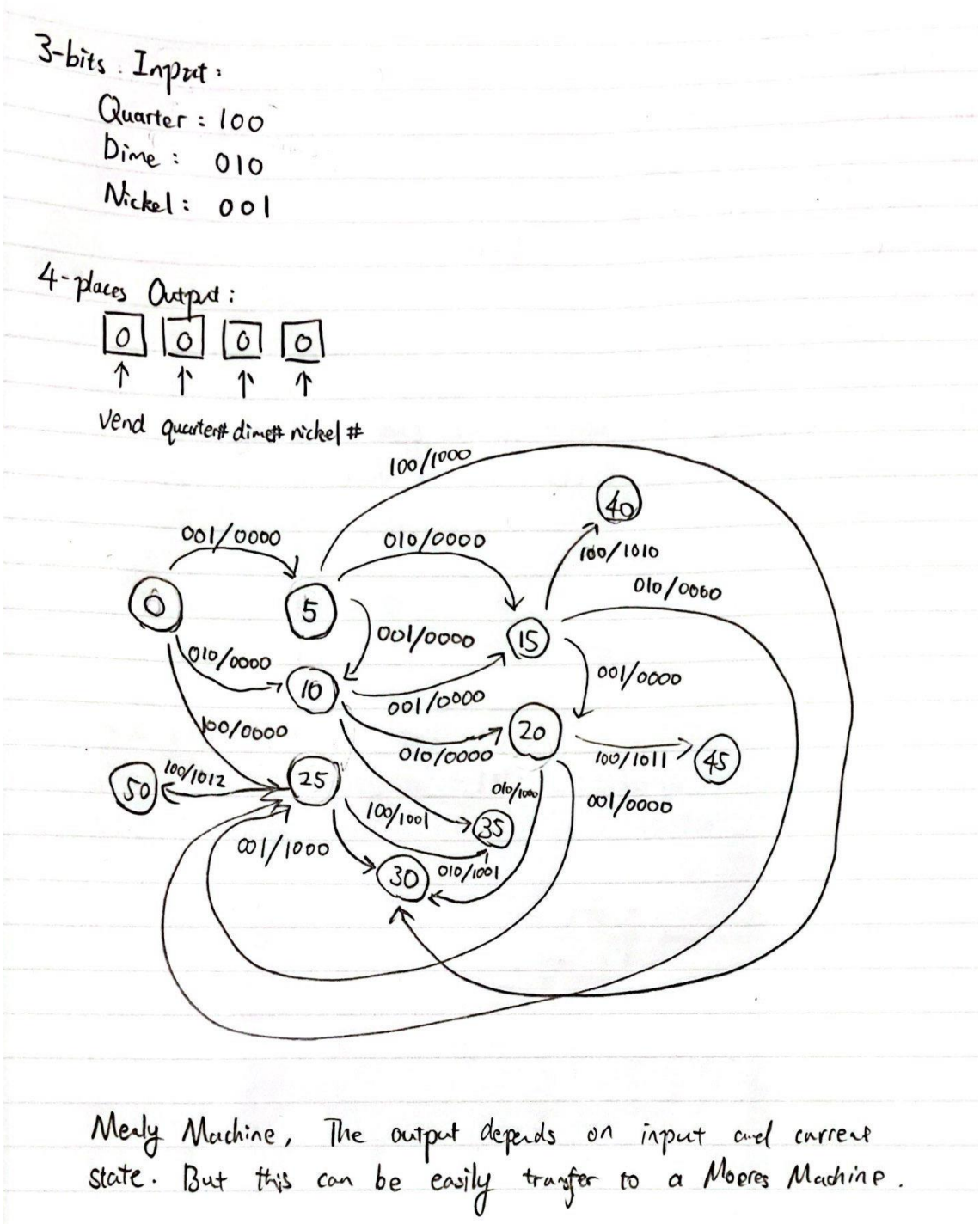
6.