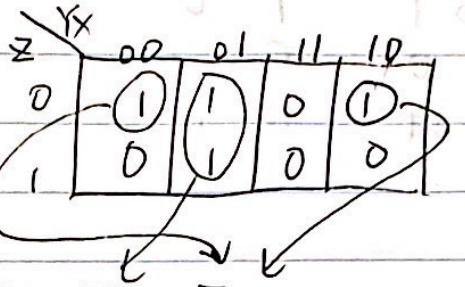
CS4341 Assignment 3

1A. Truth Table

Z	Y	X	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

K-map



$F = \bar{y}x + \bar{z}x$

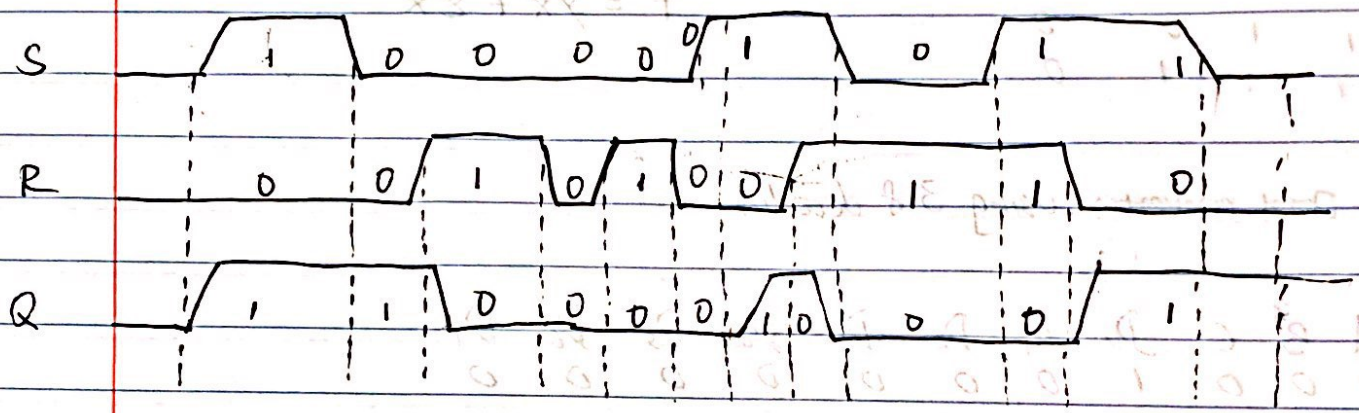
1B Octal converter using 3-8 decoder.

A	B	C	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

[Drawing on the other file.]

2A. Truth Table

S	R	Q	$\bar{Q}$
0	0	X	X
0	1	1	0
1	0	0	1
1	1	0	0



2B.

3. ① 3 states. which are [happy, sad, busy, clueless, asleep]

② 5 states, we have $5^4 = 625$ distinct solutions
(4 student.)

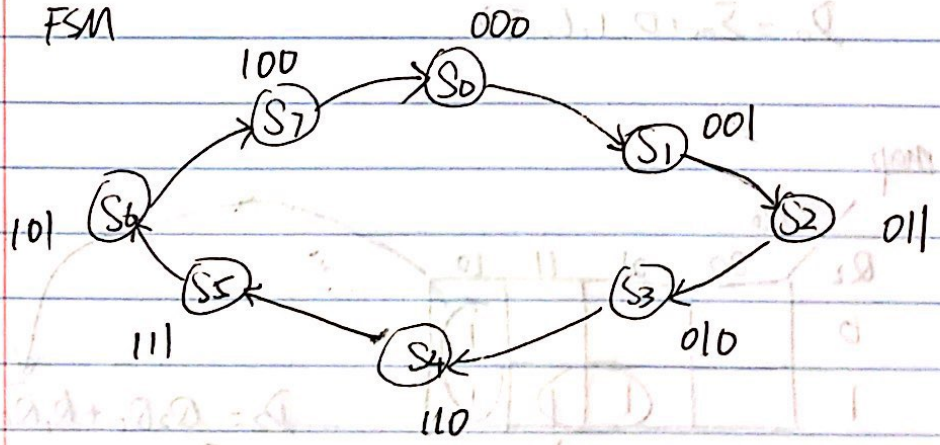
State	binary value
happy	000
sad	001
busy	010
clueless	011
asleep	100

minimum number of bits necessary =

$\lceil \log_2 625 \rceil$

= 10 bits.

4.A.



4B

State transition Table

present State			next state			D-ff		
Q_2	Q_1	Q_0	Q_2'	Q_1'	Q_0'	D_2	D_1	D_0
0	0	0	0	0	1	0	0	1
0	0	1	0	1	1	0	1	1
0	1	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1	0
1	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	0	1
1	0	1	1	0	0	1	0	0
1	0	0	0	0	0	0	0	0

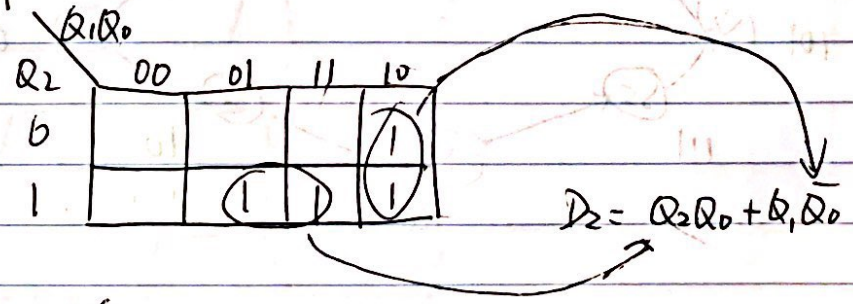
minimum term $D_2 = \sum_m (2,5,6,7)$

$D_1 = \sum_m (1,2,3,6)$

$D_0 = \sum_m (0,1,6,7)$

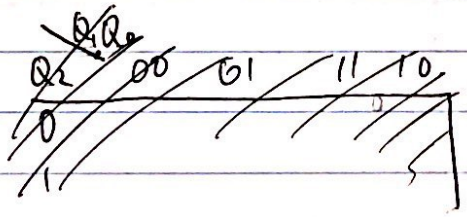
Simplify by k-map

D_2

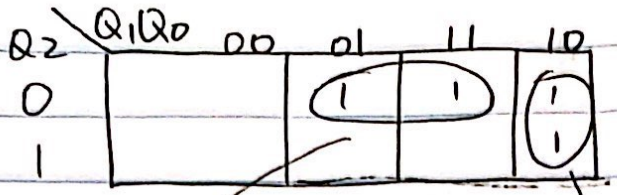


$D_2 = Q_2Q_0 + Q_1\bar{Q_0}$

D_1

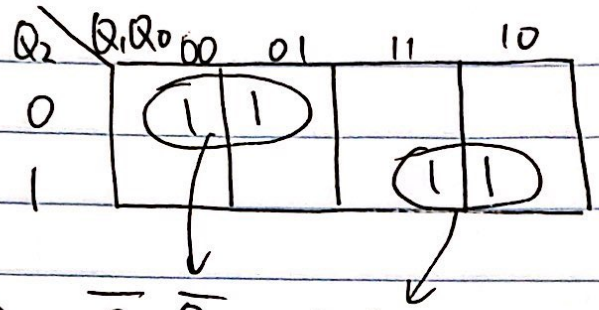


D_1



$$D_1 = \bar{Q}_2 Q_0 + Q_1 \bar{Q}_0$$

D_0



$$D_0 = \bar{Q}_2 \bar{Q}_1 + Q_2 Q_1$$

(drawing circuit on another file)