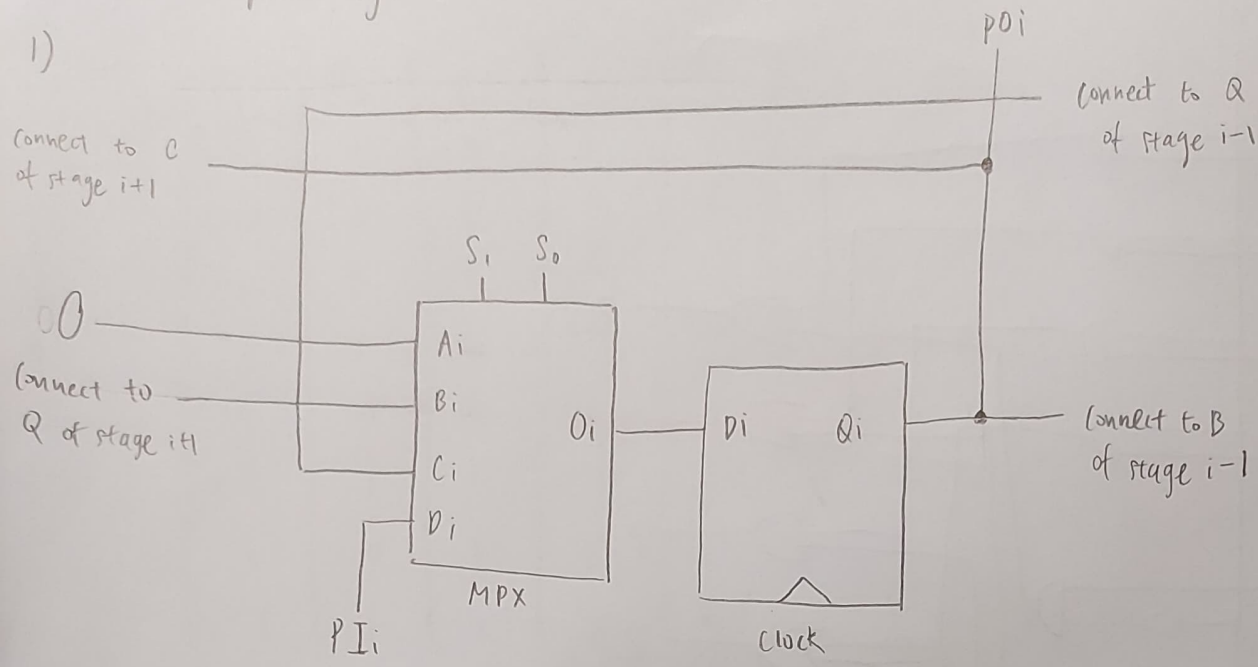
Intro to computer systems coursework 3: Registers

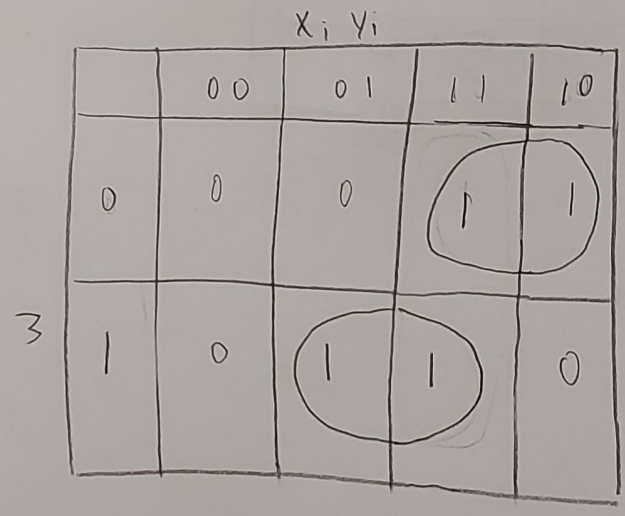
1)



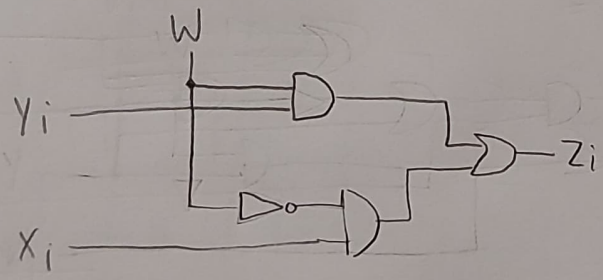
Stage i

2)

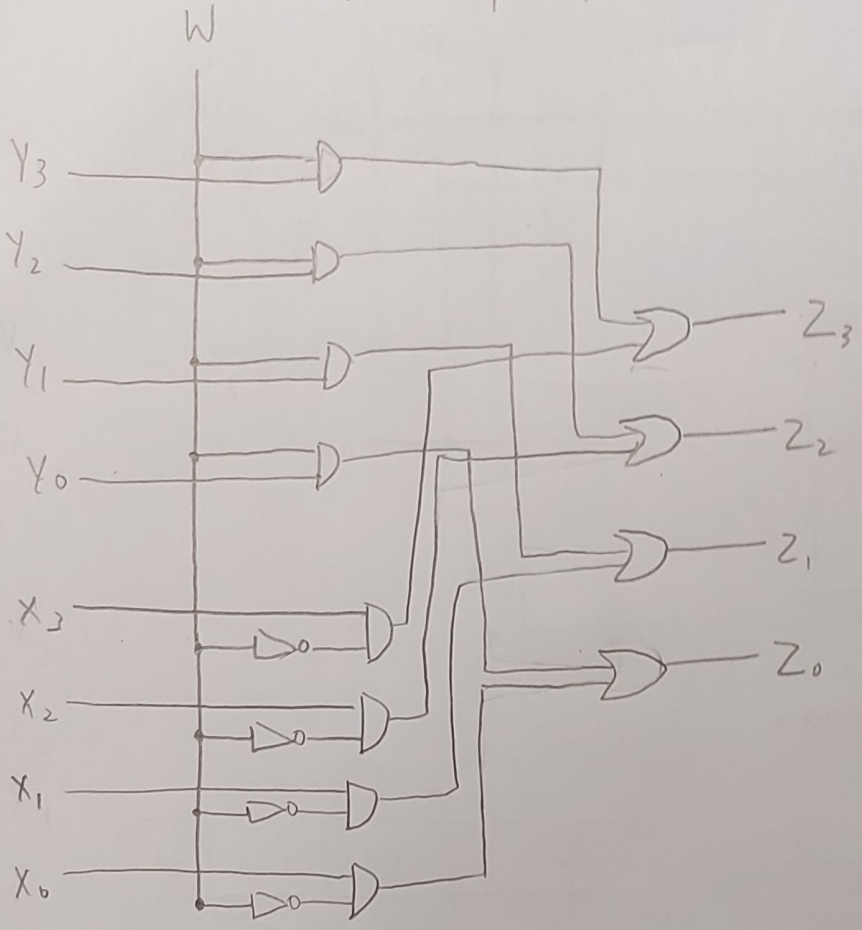
W	X_i	Y_i	Z_i (output)
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1



$$Z_i = W' \cdot X_i + W \cdot Y_i$$

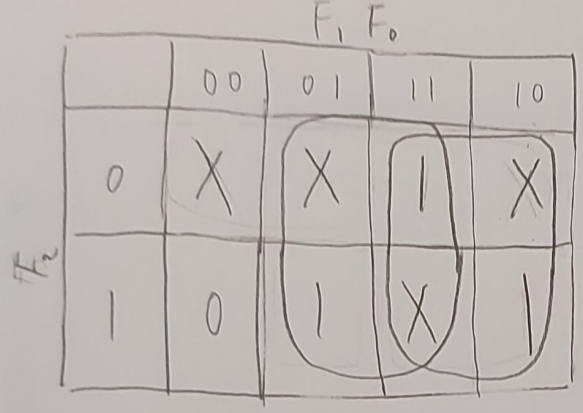


2) cont. 'Select' block circuit implementation:



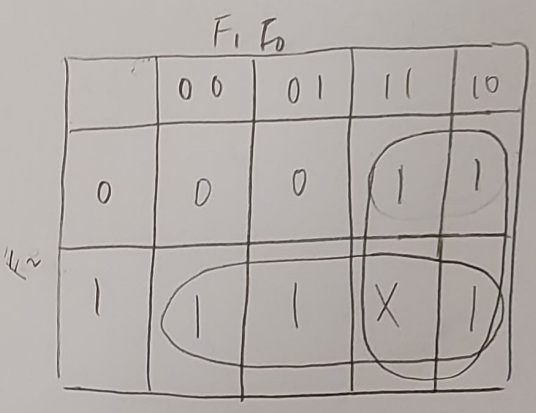
3)

F_2	F_1	F_0	G_3	G_2	G_1	G_0
0	0	0	X	0	0	1
0	0	1	X	0	1	1
0	1	0	X	1	0	1
0	1	1	1	1	1	1
1	0	0	0	1	1	1
1	0	1	1	1	1	1
1	1	0	1	1	1	1
1	1	1	X	X	X	0



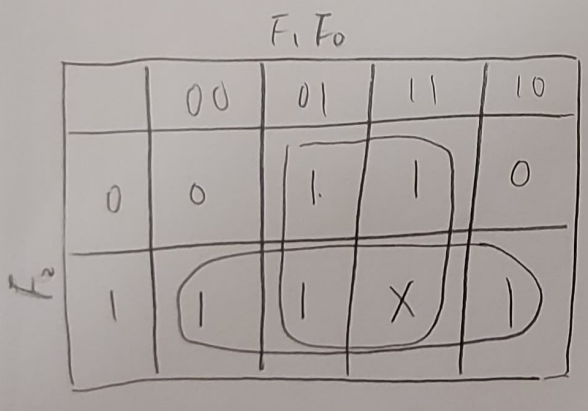
output: G_3

$G_3 = (F_2 \cdot F_1' \cdot F_0')' = F_2' + F_1 + F_0$



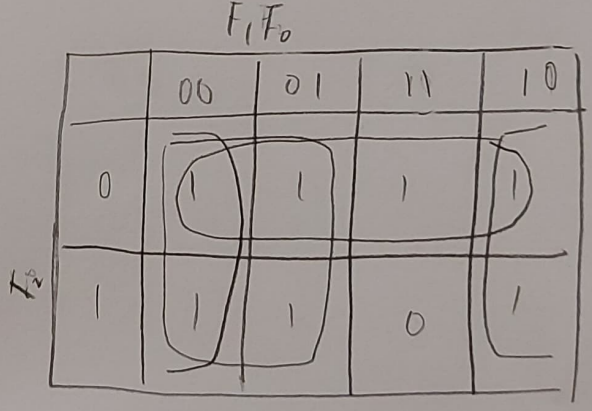
output: G_2

$G_2 = F_2 + F_1$



output: G_1

$G_1 = F_2 + F_0$



output: G_0

$G_0 = (F_2 \cdot F_1 \cdot F_0)'$

3) cont.

'control' block circuit implementation: