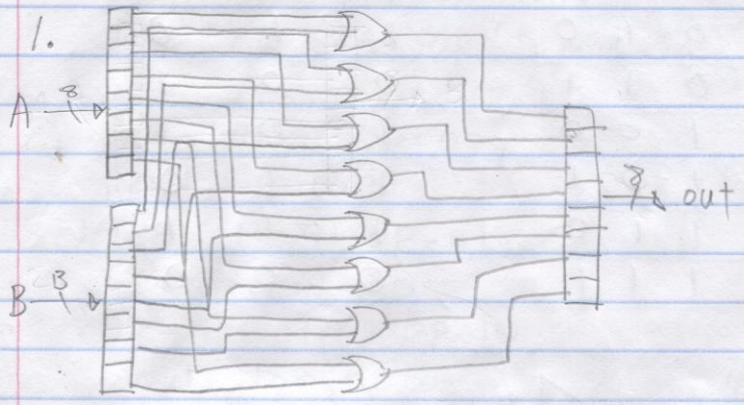
collab bro = Tim, Basil

Jun ho Lim

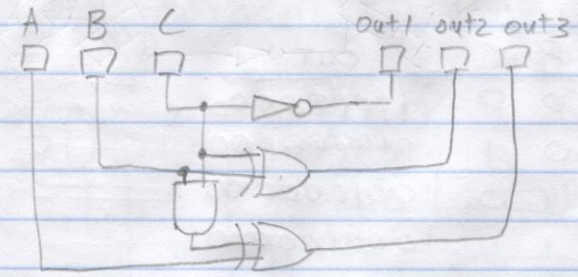
Digital Logic HW

Chapter 3.

1.



2.



3. $out1 = (\bar{A}\cdot\bar{B}\cdot\bar{C}) + (\bar{A}\cdot B\cdot\bar{C}) + (A\cdot\bar{B}\cdot\bar{C}) + (A\cdot\bar{B}\cdot C) + (A\cdot B\cdot\bar{C})$

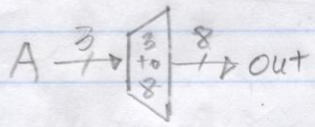
$out2 = (\bar{A}\cdot\bar{B}\cdot C) + (\bar{A}\cdot B\cdot\bar{C}) + (A\cdot\bar{B}\cdot C) + (A\cdot B\cdot\bar{C})$

$out3 = (\bar{A}\cdot B\cdot C) + (A\cdot\bar{B}\cdot\bar{C}) + (A\cdot B\cdot\bar{C})$

4.

A	B	C	out1	out2	out3
0	0	0	1	0	0
0	0	1	0	1	0
0	1	0	1	1	0
0	1	1	0	0	1
1	0	0	1	0	1
1	0	1	1	1	0
1	1	0	1	1	1
1	1	1	0	0	0

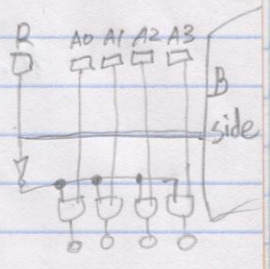
5.



6.

A	B	C	out
0	0	0	10000000
0	0	1	01000000
0	1	0	00100000
0	1	1	00010000
1	0	0	00001000
1	0	1	00000100
1	1	0	00000010
1	1	1	00000001

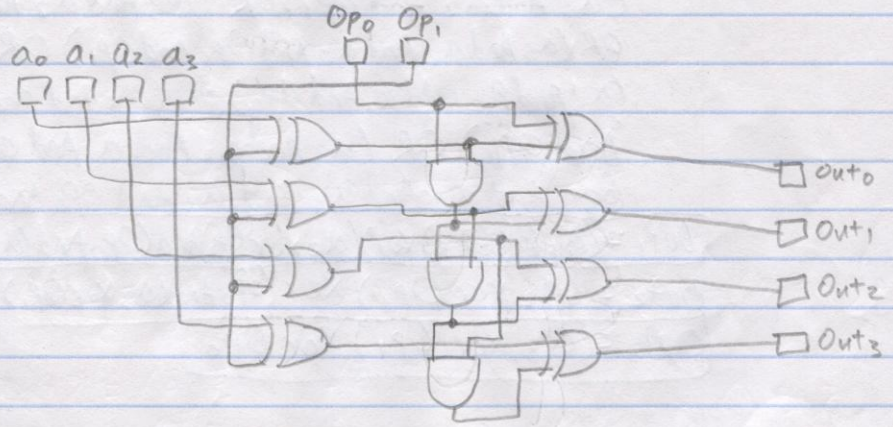
7. out1 = ($\bar{R}$ And A0) OR (R And B0)
out2 = ($\bar{R}$ And A1) OR (R And B1)
out3 = ($\bar{R}$ And A2) OR (R And B2)
out4 = ($\bar{R}$ And A3) OR (R And B3)



8. a) K = 10110111 OP = 00
out = 10110111
b) K = 10110111 OP = 01
out = 10111000
c) K = 10110111 OP = 10
out = 01001000
d) K = 10110111 OP = 11
out = 01000111

10111000

9.



$(a_0 \text{ Xor } Op_1) \text{ Xor } (a_1 \text{ Xor } Op_1) \text{ And } (a_2 \text{ Xor } Op_1) \text{ And } (Op_0 \text{ And } (a_3 \text{ Xor } Op_1))$

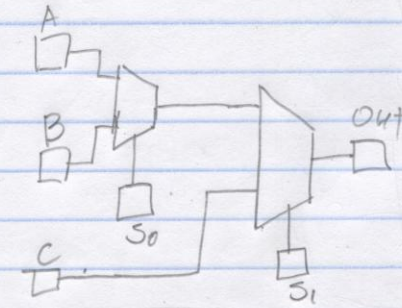
10. $Out_0 = (a_0) \text{ OR } (Op_1) \text{ OR } (Op_0) \text{ OR } (a_0 \text{ And } Op_1 \text{ And } Op_0) \text{ OR } (a_1 \text{ And } Op_1) \text{ OR } (a_1 \text{ And } Op_0) \text{ OR } (a_1 \text{ And } a_0) \text{ OR } (a_1 \text{ And } a_0 \text{ And } Op_1 \text{ And } Op_2) \text{ OR } (a_2 \text{ And } Op_1) \text{ OR } (a_2 \text{ And } Op_0) \text{ OR } (a_2 \text{ And } a_0) \text{ OR } (a_2 \text{ And } a_0 \text{ And } Op_1 \text{ And } Op_0) \text{ OR } (a_2 \text{ And } a_1 \text{ And } Op_0) \text{ OR } (a_2 \text{ And } a_1 \text{ And } Op_1) \text{ OR } (a_2 \text{ And } a_1 \text{ And } a_0) \text{ OR } (a_2 \text{ And } a_1 \text{ And } a_0 \text{ And } Op_0 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } Op_0) \text{ OR } (a_3 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_0) \text{ OR } (a_3 \text{ And } a_0 \text{ And } Op_0 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_1 \text{ And } Op_0) \text{ OR } (a_3 \text{ And } a_1 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_1 \text{ And } a_0) \text{ OR } (a_3 \text{ And } a_1 \text{ And } a_0 \text{ And } Op_0 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_2 \text{ And } Op_0) \text{ OR } (a_3 \text{ And } a_2 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_0) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_0 \text{ And } Op_0 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_1 \text{ And } Op_0) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_1 \text{ And } Op_1) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_1 \text{ And } a_0) \text{ OR } (a_3 \text{ And } a_2 \text{ And } a_1 \text{ And } a_0 \text{ And } Op_0 \text{ And } Op_1)$

$Out_1 = (a_1 \text{ Xor } Op_1) \text{ Xor } (a_2 \text{ Xor } Op_1) \text{ And } (Op_0 \text{ And } (a_3 \text{ Xor } Op_1))$

$Out_2 = (a_2 \text{ Xor } Op_1) \text{ Xor } (Op_0 \text{ And } (a_3 \text{ Xor } Op_1))$

$Out_3 = (a_3 \text{ Xor } Op_1) \text{ Xor } Op_0$

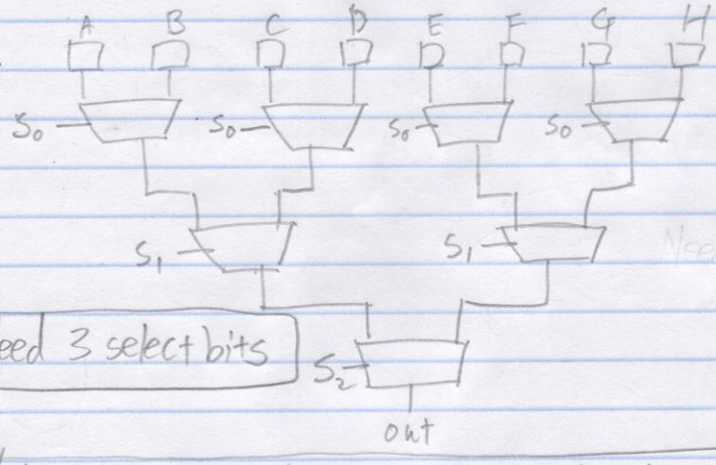
11.



A	B	C	S_0	S_1	out
1	0	0	0	0	1
0	1	0	1	0	1
0	0	1	0	1	1

Need 2 select bits

12.



Need 3 select bits

changing select bits to 3 in decoder component.