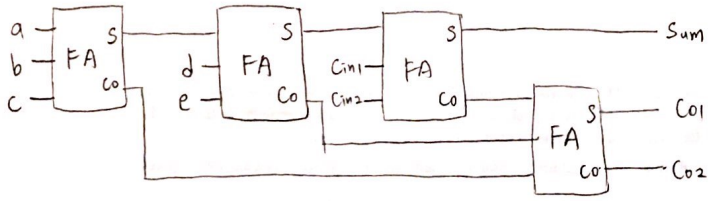
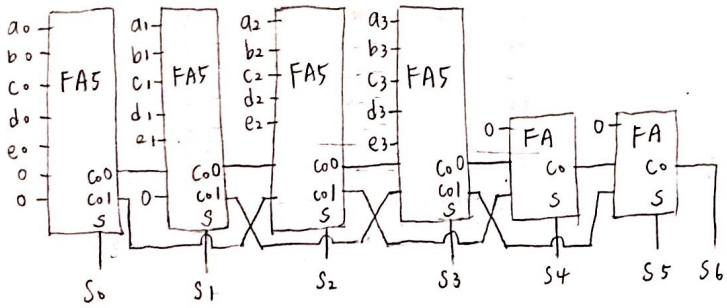
1.1 (a) inputs: a, b, c, d, e,
carry-ins: Cin1, Cin2



1.1 (b) 12 t_{pd}

1.2 (a) $max = 5 \times (1111)_2 = 75 = (1001011)_2$
Thus, it requires 7 bits

1.2 (b)



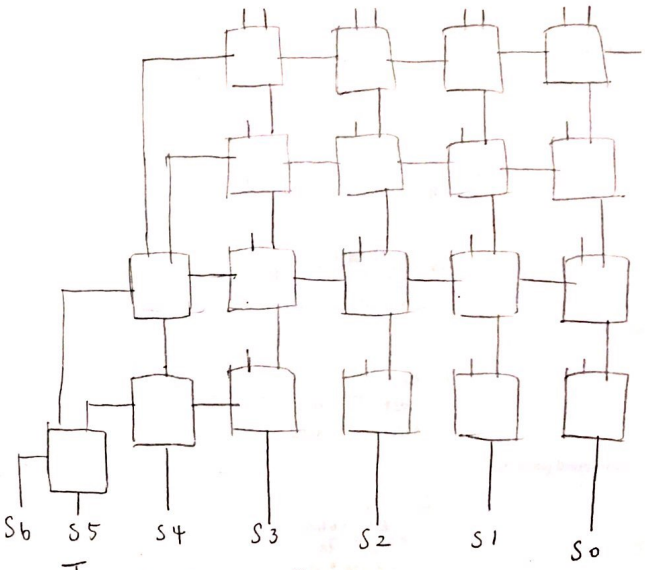
1.2 (c) $T_{pd} = (4 \times 12) + (2 \times 3) = 54\ t_{pd}$

FA blocks = $(4 \times 4) + 2 = 18$ FA blocks

1.2 (d) # FA blocks = $4 + 5 + 6 + 6 = 21$ FA blocks

$T_{pd} = 21 \times 3 = 63\ t_{pd}$

1.3



$T_{pd} = 9 \times 3\ t_{pd} = 27\ t_{pd}$

2.1(a) E=0

A_1A_0 \ B_1B_0	00	01	11	10
00	0	1	1	1
01	0	0	1	1
11	0	0	0	0
10	0	0	1	0

E=1

A_1A_0 \ B_1B_0	00	01	11	10
00	1	1	1	1
01	0	1	1	1
11	0	0	1	0
10	0	0	1	1

prime implicants (essential prime implicants)

$\bar{A}_1\bar{A}_0E$, $\bar{A}_1B_0E$, B_1B_0E, $\bar{A}_0B_1E$, $\bar{A}_1B_1$, $\bar{A}_0B_1B_0$, $\bar{A}_1\bar{A}_0B$

2.1(b) $E(\bar{A}_1(\bar{A}_0 + B_0) + B_1(B_0 + \bar{A}_0)) + \bar{A}_0B_0(B_1 + \bar{A}_1) + \bar{A}_1B_1$

$= E(\bar{A}_1 + B_1)(\bar{A}_0 + B_0) + \bar{A}_0B_0(B_1 + \bar{A}_1) + \bar{A}_1B_1$

2.1 (c) Yes. no possible bit flips within a prime implicant

2.2 (a) E=0

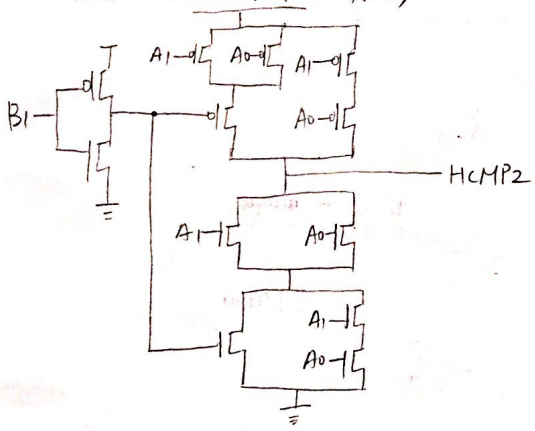
A_1A_0 \ B_1B_0	00	01	11	10
00	X	1	1	1
01	0	X	1	1
11	0	0	X	0
10	0	0	1	X

E=1

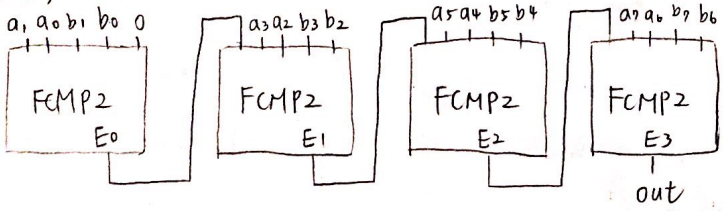
A_1A_0 \ B_1B_0	00	01	11	10
00	X	1	1	1
01	0	X	1	1
11	0	0	X	0
10	0	0	1	X

2.2 (b) $HCMP2 = \overline{A_1}\,\overline{A_0} + \overline{A_1}B_1 + B_1\overline{A_0}$

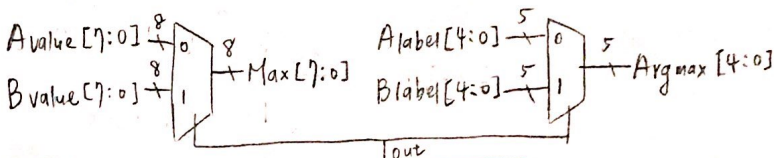
2.2 (c) $\overline{HCMP2} = (A_1+A_0)\cdot(\overline{B_1}+A_1A_0)$



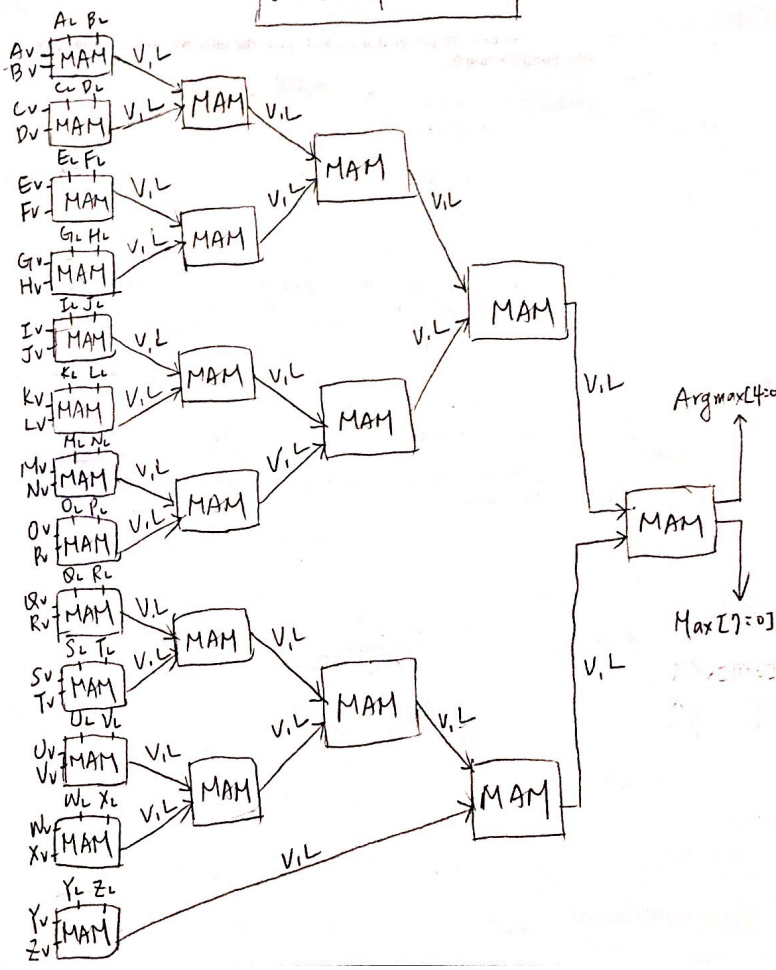
2.3 (a)



2.3 (b)



2.3 (c)



3.1(a)

32 rows, 7 columns

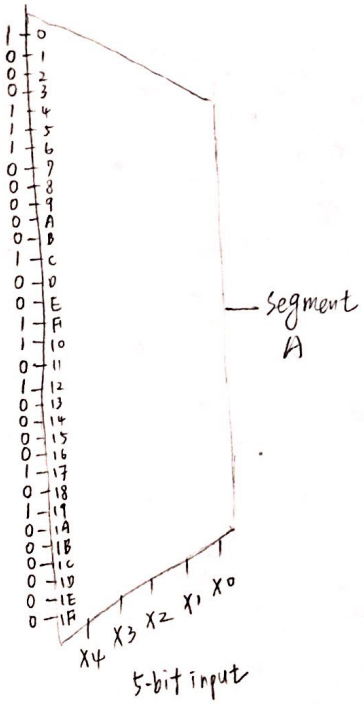
3.1(b)

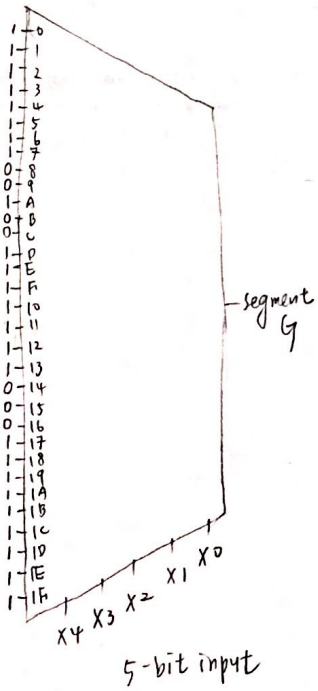
Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Data	77	7C	58	5E	79	71	6F	76	6	1E	78	38	15	54	5C	73

Address	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
Data	67	50	6D	46	3E	1C	2A	49	6E	5B	40	40	40	40	40	40

3.2(a) 32-1 mux

3.2(b)





3.2(c)

5 muxes < 4 × 8-1 mux
1 × 4-1 mux

3.2(d)