Chapter 1

1. a) $D_0 = \dfrac{PW}{T} \times 100\%$

   $= \dfrac{1}{2} \times 100\% = 50\%$

   $D_1 = \dfrac{PW}{T} \times 100\%$

   $= \dfrac{2}{4} \times 100\% = 50\%$

   $D_2 = \dfrac{PW}{T} \times 100\%$

   $= \dfrac{4}{8} \times 100\% = 50\%$

   $D_3 = \dfrac{PW}{T} \times 100\%$

   $= \dfrac{8}{16} \times 100\% = 50\%$

   b) D_0 : 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

   D_1 : 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1

   D_2 : 0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1

   D_3 : 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1

   The sequence of numbers represent data that can be interpreted as a number, location, shifts for a registrar or etc.

2. X: _____⌐

3. a) total bitrate

$$\frac{1}{4MHz} = 4\ \text{micro sec}$$

   b) $4(4) = 16\ \text{micro sec}$

cont. Chapter 2

4. a) 8 bit changes
   b) Final gray code: 1100
   c) $2^4 = 16$ possible distinct angles
       $360/16 = 22.5°$ the anquar precision
   d) $2^8 = 256$
       $360/256 = 1.4°$ the anquar precision

Chapter 4

Karnaugh Map

2. a)

C \ AB	00	01	11	10
0	0	0	0	0
1	1	0	0	1

expression:

$$\bar{A}\bar{B}C + A\bar{B}C$$

b)
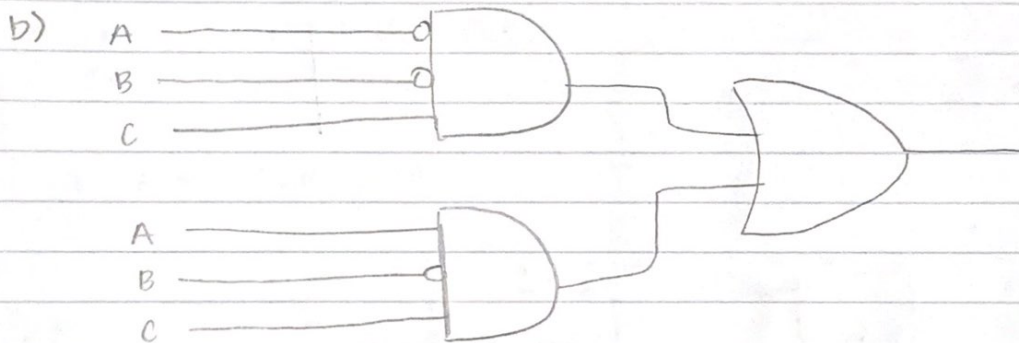
1. a) $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + ABCD + ABC\bar{D}$

b)

CD \ AB	00	01	11	10
00	1	0	0	0
01	1	0	0	0
11	0	0	1	0
10	0	0	1	0

→ $X = \bar{A}\bar{B}\bar{C} + ABC$

c) appears that D is irrelevant to the state of the portfolio.

Chapter 5

1.

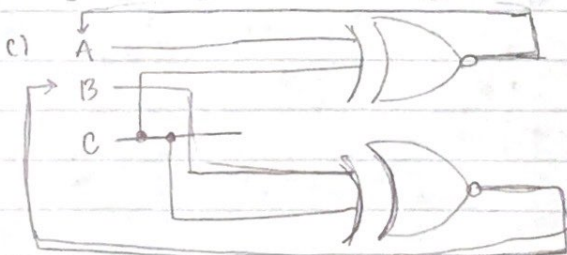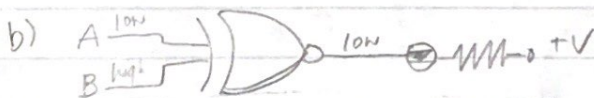A ———————————————— high ——————————
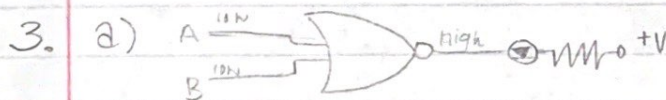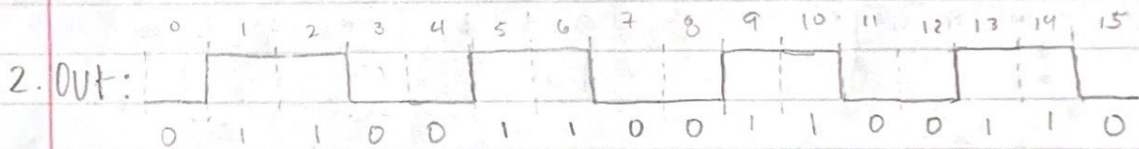B — low ▷◦ high ——————————————— high ——
C — low ▷◦ high ——
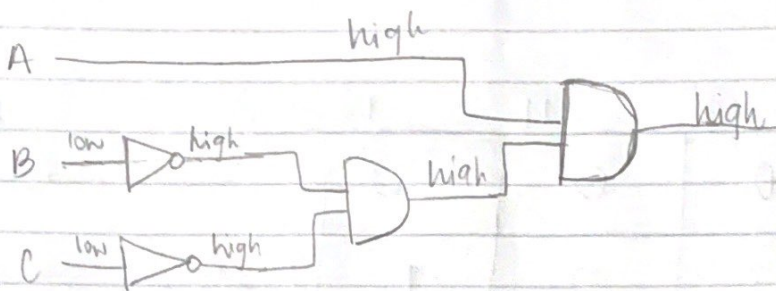
Chapter 3

a=1
b=1

1. Simplified logic expression:

$$=\left(\overline{[\overline{(a\overline{b})a}][\overline{(ab)b}]}\right)\left(\overline{[\overline{(\overline{a}b)a}][\overline{(\overline{a}b)b}]}\right)$$

$$=\left(\overline{\overline{[\overline{(a\overline{b})a}][\overline{(a\overline{b})b}]}}+\overline{\overline{[\overline{(\overline{a}b)a}][\overline{(\overline{a}b)b}]}}\right)$$

$$=\left([\overline{(a\overline{b})a}][\overline{(a\overline{b})b}]\right)+\left([\overline{(\overline{a}b)a}][\overline{(\overline{a}b)b}]\right)$$

$$=\left([\overline{a\overline{b}}+\overline{a}][\overline{a\overline{b}}+\overline{b}]\right)+\left([\overline{\overline{a}b}+\overline{a}][\overline{\overline{a}b}+\overline{b}]\right)$$

$$=\left([ab+\overline{a}][ab+\overline{b}]\right)+\left([ab+\overline{a}][ab+\overline{b}]\right)$$

$$=\left(ab+\overline{a}\overline{b}\right)+\left(ab+\overline{a}\overline{b}\right)$$

$$=\left(ab+\overline{a}\overline{b}\right)$$

A	B	OUT
0	0	1
1	1	1
0	1	0
1	0	0

• generate XOR-gate

2. Out:

0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0

3. a)

b)

c)

Chapter 2

4. a) 8 bit changes

b) 1100

c) $2^4 = 16$ distinct angles

$360/16 = 22.5°$

d) $2^8 = 256$

$360/256 ≈ 1.4°$

1. a) 1024

$2^{10} = 1024$

1000 0000 000

b) 0xBBBB

B = 11

1011 1011 1011 1011

c) -2048 $2^{11} = 2048$

1000 0000 0001

(w/ sign bit at the beginning)

2. a) 65535

$$16\overline{)65535}$$
4095

64

158

144

95

80

25_5 $\frac{15}{}$ — F (0)

$16\overline{)4095}$

32

89

80

95

80

$\frac{15}{}$ — F (1)

$16\overline{)255}$

(15) — F (3)

16

95

80

15 — F (2)

so $\boxed{FFFF_{16}}$

b) 1000 1000 1000 1000

1000 = 8

$\boxed{8888_{16}}$

3. 1024

$$8\overline{)1024}$$
128

8

22

16

64

64

0 → (0)

$8\overline{)128}$
16

8

48

48

0 ← (1)

$8\overline{)16}$
2 ← (3)

16

0 (2)

so $\boxed{2000_8}$