

Homework 1

Exercise 1:

1. Find the base of each number and their binary equivalents:

$$(710)_? \quad (92)_? \quad (101)_? \quad (AB1)_?$$

2. Find the decimal equivalent of each of the following numbers:

a. $(1100.100)_2$ $(10100)_2$ $(101101101)_2$ $(111100110)_2$

b. $(555)_8$ $(2113)_8$ $(1000)_8$ $(1.43)_8$

c. $(AC5)_{16}$ $(BB8)_{16}$ $(D.C)_{16}$ $(ABC)_{16}$

d. $(123)_4$ $(001)_4$ $(100)_4$ $(30)_4$

3. Convert the following numbers to octal and hexadecimal bases:

$$(80)_{10} \quad (150)_{10} \quad (20.125)_{10} \quad (1020)_{10} \quad (12.75)_{10}$$

4. Convert the following numbers to octal and hexadecimal bases in two ways:

$$(10101111)_2 \quad (101101)_2 \quad (11111.010100)_2 \quad (1011011)_2$$

Exercise 2:

1. Knowing that $(64)_{10} = (40)_b$, determine the value of b ?.
2. Same question for $(554)_{10} = (1052)_b$.

Exercise 3:

$$1100100 + 110111 = ? \quad 11111 + 1101 = ? \quad 1011 * 100 = ? \quad 1010 * 1000 = ?$$

$$10110 - 1100 = ? \quad 1100 - 1011 = ? \quad 1000 - 1111 = ?$$

$$10010 / 10 = ? \quad 101000 / 101 = ? \quad 10110 / 1011 = ?$$

Exercise 4:

1. Convert the following numbers to Gray, BCD, and BCD+3:

$(10101111)_2$ $(101101)_2$ $(11111010100)_2$ $(1011011)_2$

2. Convert the following Gray code to BCD+3:

$(1011)_{Gray}$ $(11111)_{Gray}$ $(1111000)_{Gray}$ $(10101100)_{Gray}$

Exercise 5 :

Make these operations in BCD and BCD+3:

$123+56=?$ $255+69=?$

Exercise 7:

Represent the following signed integers using One's Complement and two-way complement:

(-160) , (-30) , (-100) , (-5)

Exercise 6:

1. Find the IEEE 754 single-precision representation of the numbers $(-15.75)_{10}$, $(A2.B)_{16}$
2. Find the floating numbers with the following IEEE754 representations:

| | | |
|---|----------|--------------------------|
| 0 | 10000010 | 011010000000000000000000 |
|---|----------|--------------------------|

| | | |
|---|----------|--------------------------|
| 1 | 10000001 | 011010000000000000000000 |
|---|----------|--------------------------|