

Introduction to Computer Science, Winter Semester 2016
Practice Assignment 7

Discussion: 10.12.2016 - 15.12.2016

Exercise 7-1

Convert the following numbers to decimal. Please show your workout.

a) $(1001001)_2$

b) $(12121)_3$

c) $(1032)_4$

d) $(50)_7$

e) $(198)_{12}$

f) $(ABC)_{16}$

Exercise 7-2

Can you convert the following numbers to binary? Show your workout.

a) 0

b) 1

c) 2

d) 22

e) 197

f) 1000

g) 673

Exercise 7-3

Perform the following number system conversions. Please show your workout.

a) $1101011_2 = \dots_{16}$

b) $10110111_2 = \dots_{16}$

c) $F3A5_{16} = \dots_2$

d) $15C_{16} = \dots_2$

e) $101111_2 = \dots_8$

f) $11101_2 = \dots_8$

g) $12122_3 = \dots_9$

Exercise 7-4

Determine whether the following statements are true or false. Please show your workout.

- a) $1001_2 < 5_{10}$
- b) $0111_2 = 111_{10}$
- c) $1001_2 > 1101_2$
- d) $1011_2 = 11_{10}$
- e) $0000_2 < 0_{10}$
- f) $10111_2 < 25_{10}$

Exercise 7-5

Each of the following five numbers has a different base. Which of the six numbers have the same value in decimal? Please show your workout.

- a) $(12011)_3$
- b) $(3312)_4$
- c) $(2022)_5$
- d) $(2A7)_{11}$
- e) $(19A)_{12}$
- f) $(AB9)_{16}$

Exercise 7-6

Given the following decimal representation of an IP address, represent its hexadecimal, binary and its corresponding decimal value. You can check more conversion on the online converter: www.silisoftware.com/tools/ipconverter.php

66.220.159.255

Exercise 7-7

Given a list of 0s and 1s, write an algorithm to perform the integer division by 4 for the number represented in the list.

Exercise 7-8

Given a list of 0s and 1s, check whether the number is even or odd without converting into decimal.

Exercise 7-9

Converting a decimal integer to its binary equivalent can be performed by repeatedly dividing the decimal number by 2. Division by 2 will either give a remainder of 1

(dividing an odd number) or no remainder (dividing an even number). Collecting the remainders (starting by the last one) from the repeated divisions gives the binary answer. Write a Python algorithm that does this conversion.