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Introduction to Computer Science, Winter Semester 2017
Practice Assignment 8

Discussion: 09.12.2017 - 14.12.2017

Exercise 8-1 To be Discussed in Tutorial

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 8-2 To be Discussed in Tutorial

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 8-3 To be Discussed in Tutorial

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 8-4

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 8-5

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 8-6 To be Discussed in Tutorial

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 8-7

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

Exercise 8-8

Given a list of 0s and 1s, write a Python program that checks whether the number is even or odd without converting into decimal.

Exercise 8-9

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.

Exercise 8-10 To be Solved in Lab

Write a Python algorithm that given a list `binary` of 0s and 1s representing a binary number, converts it into the equivalent decimal number and displays it.