Exercises: Number Systems - Solutions

Exercise 1

This exercise practices the basics skills you need to solve the subsequent exercises in number systems.

1.1 Powers

Determine the values below:

a. 1
b. 10
c. 10000
d. 1
e. 8
f. 128
g. 1
h. 256
i. 65536

1.2 Remainders

The remainder of a after division by b is written as $\mathbf{rem}(a, b)$. For example, the remainder of 35 after division by 16 is rem(35,16) = 3.

Find the remainders below:

a. 0
b. 1
c. 1
d. 2
e. 2
f. 36
g. 6
h. 54
i. 252

Exercise 2

Convert the following binary numbers into decimal numbers.

a. 2
b. 64
c. 13
d. 6
e. 956
f. 4982

Exercise 3

Convert the following decimal numbers into binary numbers.

a. 1_2
b. 10_2
c. 11_2
d. 1010_2
e. 110001_2
f. 11010100_2

Exercise 4

Convert the following hexadecimal numbers into decimal numbers.

a. 16
b. 11
c. 92
d. 893
e. 425
f. 20625

Exercise 5

Convert the following decimal numbers into hexadecimal numbers.

a. 1_{16}
b. 7_{16}
c. 10_{16}
d. $8E_{16}$
e. 400_{16}
f. $13E3_{16}$

Exercise 6

Add the following numbers in binary.

a. 10001_2
b. 100111_2
c. 110110_2
d. 100001010_2

Exercise 7

Multiply the following numbers in binary.

a. 100_2
b. 101010_2
c. 1111110_2
d. 1111011010111010_2

Exercise 8

Calculate the exponentiations below. Do you notice a pattern?

a. 100
b. 100000
c. 100_2
d. 100000_2
e. 100_{16}
f. 100000_{16}