

# CS Basics - Exercises

## Play with different bases

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### 1 Martian base

#### 1.1 From Martian into decimal

**Exercise 1** *Convert the following martian numbers into decimal numbers.*

- $\equiv$
- $\equiv f$
- $\equiv \theta$
- $\equiv f\theta$
- $f\theta\theta$
- $\equiv \theta\theta$
- $f\cap\cap\theta$
- $f\int\int\int\theta$

**Exercise 2** *Write the following decimal numbers in martian style:*

- 4
- 5
- 10
- 16
- 25
- 154

## 2 Octal to decimal

**Exercise 3** *Convert the following octal numbers into decimal*

- 100
- 6573
- 7777
- 12345
- 100000

**Exercise 4** *Write the following decimal numbers into octal*

- 20
- 350
- 1000
- 890

## 3 Hexadecimal to decimal

**Exercise 5** *Compute the decimal values for the following Hexadecimal numbers ;br /& We use the letter H to denote the hexadecimal numbers (consequently with the slides).*

- 99H
- A5CH
- 700H
- E03H
- BBF9H
- C9H

**Exercise 6**

- FFFFH
- 1000H
- 1119H
- 2345H

- $739AEH$

**Exercise 7**

- $FFH$
- $CA45CH$
- $C8900H$
- $CCH$
- $8B359002H$

## 4 Decimal to Hexadecimal

**Exercise 8** Write the following decimal numbers into hexadecimal

- $304$
- $4095$
- $31'155$
- $1'011'001$
- $12'345'678$

## 5 Binary

**Exercise 9** Convert into decimal the following binary values

- $101B$
- $1100B$
- $1000111B$
- $101010101B$
- $11011011B$
- $10001B$

**Exercise 10** Convert into binary the following numbers

- $5$
- $10$
- $25$
- $1000$
- $245$

## 6 Hexadecimal to binary (and vice versa)

**Exercise 11** Write in binary the following hex numbers

- $0AH$
- $10H$
- $04H$
- $AAH$
- $A0H$
- $40H$
- $573CDH$
- $CF32H$  (we could also denote it:  $0xcff32$  in a C program)
- $40AA001100AH$
- $40AA001100A40AA001100AH$

**Exercise 12** Write in hex the following binary numbers

- $1000B$
- $1111B$
- $1001B$
- $0001B$
- $0011B$
- $10100011B$
- $01110111B$
- $11010111B$

## 7 Operations using Hex numbers

**Exercise 13** Add the following numbers

- $A23H + 5BBH$
- $DE56F3H + 78FFE3H$
- $AAAAAAAAH + 1234567H$

- $FEAH + 123AH$
- $A00AH + FFFAH$

**Exercise 14** *Execute the following subtractions*

- $ABCDEFAAH - 12345678H$
- $BAD343H - BACCAAH$
- $123456H - AAAAAAH$
- $12F36AEH - 0AAAAAFH$

## 8 Switch binary flags

**Exercise 15** *In programming, we will sometime just switch a binary flag, i.e. add a binary number to an hex number*

- $AAH + 0001000000010000B$
- $10H + 0010000000000001B$
- $34H + 0001000000000000B$
- $ECH + 0000000000000000B$
- $A9H + 010000000010000B$
- $A0H + 0000000100010000B$