CS&A: Lab Sessions

Exercises: Data Representation
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1BA INF - 2010-2011

1   Time Schedule

Exercises are made individually. Fill in all solutions to the exercises in the file `oefeningen.html`.
List all intermediate steps and the method you used to obtain your solution.
   Put all your files in a tgz archive, as explained on the course's website, and submit your solution to the exercises on Blackboard.

- Deadline: **November, 22 2010, 23u55**

2   Exercises

1. Convert these positive numbers to base 10.

    (a) $(111110110)_2$

    (b) $(010000010)_2$

    (c) $(A15D)_{16}$

    (d) $(777)_{16}$

2. Convert to base 10.

    (a) $(1000)_2$ (2's complement)

    (b) $(1111)_2$ (2's complement)

    (c) $(.201)_3$

3. Convert to base 2.

    (a) $(1066)_{10}$

    (b) $(1939)_{10}$

    (c) $(3.30)_{10}$

    (d) $(1FF)_{16}$

    (e) $(35A7)_{16}$

4. Convert to base 2. Represent the negative numbers with 8 bits in *signed magnitude*, *one's complement*, *two's complement* and *excess 128*.

   (a) $(-112)_{10}$

   (b) $(-127)_{10}$

   (c) $(-31)_{10}$

   (d) $(-11)_{16}$

5. For the following single-precision IEEE 754 bit patterns, show the numerical value as a base 2 significand with an exponent (e.g. $+1.11 \cdot 2^5$).

   (a) `0 10000011 01100000000000000000000`

   (b) `1 10000000 00000000000000000000000`

   (c) `1 00000000 00000000000000000000000`

   (d) `1 11111111 00000000000000000000000`

   (e) `0 11111111 11010000000000000000000`

   (f) `0 00000001 10010000000000000000000`

   (g) `0 00000011 01101000000000000000000`

6. Represent these numbers in the *IEEE-754 (single precision)* format.

   (a) $(1023.125)_{10}$

   (b) $(-3.142)_{10}$

   (c) $(2048)_{10}$

   (d) $-\infty$

   (e) $+0$