

Computer Systems and -architecture

Data Representation

1 Ba INF 2014-2015

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Time Schedule

Exercises are made individually. 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: **October 30, 23u55**

Exercises

1. Convert these positive numbers to base 10.

- (a) $(1101010111)_2$
- (b) $(18AD)_{16}$
- (c) $(10011110)_2$
- (d) $(7AE)_{16}$

2. Convert to base 10.

- (a) $(1101)_2$ (2's complement)
- (b) $(1111)_2$ (2's complement)
- (c) $(.121)_3$

3. Convert to base 2.

- (a) $(1734)_{10}$
- (b) $(635)_{10}$
- (c) $(3AD)_{16}$
- (d) $(4.25)_{10}$
- (e) $(26FB)_{16}$

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) $(-113)_{10}$
- (b) $(-134)_{10}$
- (c) $(-21)_{10}$
- (d) $(-10)_{16}$

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 11001001 011010010000000000000000

(b) 1 10000000 000000000000000000000000

(c) 1 11111111 000000000000000000000000

(d) 1 00000000 000000000000000000000000

(e) 0 11111111 110100000000000000000000

(f) 0 00000101 100100000000000000000000

(g) 0 00001011 011010000000000000000000

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

(a) $(1034.125)_{10}$

(b) $(2014)_{10}$

(c) $(3.1415)_{10}$

(d) $-\infty$

(e) $+0$