Lab session Data Representation

Group A: October 23, 2009
Group B: October 20, 2009

Work in the given groups of two. Submit your solutions to the respective assignment on Blackboard. The file name is:
`s03_s0XXXXX_s0XXXXX.tar.gz`
One of the group members commits your solution. Keep an eye on the deadline (see Blackboard)!

1 Exercises

Convert the numbers. Mind overflow.

1. Convert manually the number 83_{ten}:

base 10	83
base 16 (hexadecimal)	
base 8 (octal)	
base 5	
base 2 (binary)	
binary coded decimal	
unsigned integer (8 bit)	
signed magnitude (8 bit)	
one's complement (8 bit)	
two's complement (8 bit)	
biased excess 128 (8 bit)	
biased excess 127 (8 bit)	

2. Convert manually the number -344_{five}:

base 10	
base 16 (hexadecimal)	
base 8 (octal)	
base 5	-344
base 2 (binary)	
binary coded decimal	
signed magnitude (8 bit)	
one's complement (8 bit)	
two's complement (8 bit)	
biased excess 128 (8 bit)	
biased excess 127 (8 bit)	
fixed-point (16 bit)[1]	
normalized fixed-point (16 bit)[2]	
IEEE-754 single precision	

3. Convert manually the number -121.34375$_{ten}$:

fixed-point (16 bit)[1]	
normalized fixed-point (16 bit)[2]	
IEEE-754 single precision	

4. What is the number in IEEE-754 that follows the number (i.e. the nearest larger number): `00000000100000000000000000000000`

5. Convert 0.1 to IEEE-754 double precision (64 bit). What is going wrong and why?

[1] In the following form: `iiiiiiiiffffffff` with `iiiiiiii` a two's complement representation of the integer part and `ffffffff` the representation of the fraction.

[2] In the following form: normalized base 8 format, `seeeeeeffffffff` with s the sign, `eeeeee` a two's complement representation of the exponent, and `ffffffff` the 3-digit base 8 representation of the fraction.

2 Project

There is no project this week. You only have to submit your solutions to the exercises. There will be no feedback loop on this lab session.