Department of Computer Science, The University of Hong Kong
COMP2120
Computer Organization
Assignment 2

Deadline: 6 Apr 2017, before 5:00pm
(Hardcopy submission via Assignment Box A2)

Question 1

(a) In 8-bit 2's complement representation, write down the bit-pattern representing 37, -37, 45 and -45 respectively. (4%)

(b) Add the bit patterns together for the following and present your answers in the following format where (a + b) = c : (8%)

	a_7	a_6	a_5	a_4	a_3	a_2	a_1	a_0
+	b_7	b_6	b_5	b_4	b_3	b_2	b_1	b_0
=	c_7	c_6	c_5	c_4	c_3	c_2	c_1	c_0

(i) 37 + 45
(ii) 37 + (-45)
(iii) (-37) + 45, and
(iv) (-37) + (-45)

(c) If 8-bit 2's complement fixed-point representation is used, with the radix point fixed mid-way in the 8-bit pattern, determine the values of the bit pattens in (a). (8%)

Question 2

A machine uses the following 32-bit floating point representation.

S	9-bit Exponent(*E*)	22-bit Significant (*M*)

The value is given by:

$$V = (-1)^S \times 1.M \times 2^{E-256}$$

(a) Determine the value (in decimal form) represented by the bit pattern c1ddcccd (hex). (6%)

(b) Determine the bit pattern represented by the value 2120.25. (6%)

(c) Determine the largest positive number that can be represented. (4%)

(d) Determine the smallest positive normal nonzero that can be represented. (4%)

***Remark*: 2(c) & 2(d), there is no need to consider plus/minus infinity, NaN, as well as subnormal representation.**

=== End ===