



DIRO  
IFT 1215

## DÉMONSTRATION N° 2

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Exercices tirés du livre de Référence

IRV ENGLANDER.

**The Architecture of Computer Hardware  
and Systems Software : An Information  
Technology Approach.**

Wiley, ISBN : 978-1-118-32263-5, 5<sup>e</sup> édition, 2014

<b>Chapter 5</b>	<b>Représentation des données entières</b>
Exercices numéro . . . .	5.2(a,b), 5.4, 5.5(a,b,c), 5.9(a,b), 5.13
<b>Chapter 6</b>	<b>Représentation flottante</b>
Exercices numéro . . . .	cf. verso

## 6.2

a. Convert the decimal number 19557 to floating point. Use the format SEEMMMM. All digits are decimal. The exponent is stored excess-40 (not excess-50). The implied decimal point is at the *beginning* of the mantissa. The sign is 1 for a positive number, 7 for a negative number. Hint : Note carefully the number of digits in the mantissa!

- b. What is the range of numbers that can be stored in this format?
- c. What is the floating point representation for -19557?
- d. What is the six digit 10's complement representation for -19557?

## 6.3

a. Convert the number  $123.57 \times 10^{15}$  to the format SEEMMMM, with the exponent stored excess-49. The implied decimal point is to the right of the first mantissa digit.

- b. What is the smallest number you can use with this format before under-flow occurs?

## 6.5

Convert the following binary and hexadecimal numbers to floating point format. Assume a binary format consisting of a sign bit (negative=1), a base 2, 8-bit, excess-128 exponent, and 23 bits of mantissa, with the implied binary point to the right of the first bit of the mantissa.

- a.  $110110.011011_2$
- b.  $-1.1111001_2$
- c.  $-4F7F_{16}$
- d.  $0.00000000111111_2$
- e.  $0.1100 \times 2^{36}$
- f.  $0.1100 \times 2^{-36}$

## 6.7

Represent the decimal number 171.625 in IEEE 754 format.