

Trabajo Practico $N^{\circ}1$

Group 2

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0.1 Exercise 1: Resolution and Range of a Fixed-Point Binary Representation

0.1.1 What is the Fixed-Point Binary Representation

A fixed-point number has an integer part and a fractional part separated by a decimal point with a fixed position, as shown below:

$$(IntegerPart).(FractionalPart)$$

The integer part is formed by n bits and the fractional part is formed by m bits.

$$(bit\#1 \quad bit\#2 \quad \dots \quad bit\#n).(bit\#1 \quad bit\#2 \quad \dots \quad bit\#m)$$

0.1.2 What is Resolution and Range

Resolution

The resolution of a number using the fixed point representation is the smallest unit that can be handled with it. Given a fixed-point number with m fractional bits, the resolution is 2^{-m} .

Range

The range is the difference between the biggest value that can be obtained with the fixed-point representation of a number with n bits in the integer part and with m bits in the fractional part, and the smallest number that can be represented.

0.1.3 Making Use of this Program

Input

Three arguments must be entered through Command Line, separated by one space:

- 1 (indicating that the numeric representation of the binary number is signed) or 0 (indicating that the representation is unsigned).
- n : A positive integer (indicating the number of bits corresponding to the integer part of the number, which is the part before the decimal point).

3. m : A positive integer (indicating the number of bits corresponding to the fractional part of the number, which is the part after the decimal point).

For example: "0 1 1"

Output

The result of this program is the resolution and range of the number that has n digits in the integer part and m digits in the fractional part.

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Signed interpretation:  
Resolution: 0.5  
Range: 1.5
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Figure 1: Output corresponding to the input "0 1 1".

0.1.4 Testing the Program