

SERIE 2**QUESTION**

How many values can be encoded using 5 bits, 7 bits or 10 bits?

How many bits are needed to code: **17, 65, 120?**

EXERCISE 01 : Give the 8-bit binary representations using the three representations

(**Sign & absolute value, One's complement, Two's complement**) of the following numbers:

-13, + 35, -56, +82, -114 .

EXERCISE 02 : Find the relative numbers corresponding to these representations in 2's complement:

1/ 100101

2/ 001010

3/ 100001

4/ 010101

5/ 111111

EXERCISE 03 : Perform the following operations in two's complement on 6 bits and specify the cases of overflow

$$1/ \begin{array}{r} +10 \\ \underline{+09} \end{array}$$

$$2/ \begin{array}{r} -11 \\ \underline{+07} \end{array}$$

$$3/ \begin{array}{r} +12 \\ \underline{-12} \end{array}$$

$$4/ \begin{array}{r} -21 \\ \underline{-17} \end{array}$$

$$5/ \begin{array}{r} +13 \\ \underline{+23} \end{array}$$

$$6/ \begin{array}{r} -19 \\ \underline{-24} \end{array}$$

$$7/ \begin{array}{r} +15 \\ \underline{+18} \end{array}$$

$$8/ \begin{array}{r} -26 \\ \underline{+15} \end{array}$$

EXERCISE 04 : Perform the following operations in 5-bit, two's complement and specify the overflow cases, then convert the operation into decimal form

$$1/ \begin{array}{r} 11001 \\ \underline{10101} \end{array} \quad 2/ \begin{array}{r} 10001 \\ \underline{01101} \end{array} \quad 3/ \begin{array}{r} 11101 \\ \underline{10001} \end{array} \quad 4/ \begin{array}{r} 11101 \\ \underline{01001} \end{array} \quad 5/ \begin{array}{r} 01101 \\ \underline{00101} \end{array} \quad 6/ \begin{array}{r} 11101 \\ \underline{11001} \end{array}$$

EXERCISE 05

- Find the IEEE 754 single-precision representation of the numbers: : **$(-13.25)_{10}$** **$(+37.125)_{10}$**
- Find the 32-bit single-precision representation of **$(10.75)_{10}$** **$(-19.25)_{10}$** knowing that the exponent is represented on 7 bits instead of 8 bits.

EXERCISE 06 : Find the floating-point number with the following IEEE754 representation :

- **$(41DC0000)_H$**
- **$(BEE00000)_H$**