Reprezentarea numerelor reale in virgula fixa

Ex1

Reprezentarea numerelor subunitare

Sa se reprezinte in virgula fixa nr -0,9375­10

Pasul 1: Realizam conversia in binar

-0,937510 = -0,1111­2

0,9375\*2 = 1,875

0,875 \*2 =1,75

0,75 \* 2 = 1,5

0,5 \*2 = 1 STOP

Pasul 2:

Codul direct

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| S | ,-1 | -2 | -3 | -4 | -5 | -6 | -7 |

Codul invers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| S | ,-1 | -2 | -3 | -4 | -5 | -6 | -7 |

Codul complimentar:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| S | ,-1 | -2 | -3 | -4 | -5 | -6 | -7 |

Ex 2

Reprezentarea numerelor supraunitare:

+ B7,D16 intr-un registru de minim 16 biti, 5 dupa virgula si 10 pana la virgula

+B7,D16 = (1011 0111, 1101)2

Codul direct:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | ,1 | 1 | 0 | 1 | 0 |
| S | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | -1 | -2 | -3 | -4 | -5 |

Reprezentarea numerelor reale in virgula flotanta

Exemplu 1

Reprezentati in virgula flotanta simpla precizie numarul +A7,D516

Pasul 1: Realizam conversia nr in binar utilizand metoda corespunzatoare

+A7,D516= +(1010 0111, 1101 0101)2

Pasul 2: Reprezentam nr binar sub forma de mantisa normalizata cu bit ascuns

1,010 0111, 1101 0101 = 1,010 0111 1101 0101 \* 27 = 1,M \*2E

Pasul 3: Calculam caracteristica C = E + 127(constanta de deplasament pentru simpla precizie)

C = 7 + 127 = 13410 = 13410 va fi transformat in forma binara prin impartirea succesiva, o alta metoda este cea a reprezentarii prin puterile lui 2.

13410 = 128 + 6 = 10000110

Reprezentarea lui 128 = 27 va fi

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Reprezentare lui 6 = 22 + 21 va fi

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Deci reprezentarea lui 134 = 27 + 22 + 21

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Pasul 4: pentru a reprezenta numarul in virgula flotanta cu simpla precizie vom reprezenta un registru de memorie pe 4 octeti adica 32 biti cu 1 bit rezervat pentru semn si 8 biti pentru caracteristica.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| S | C = E + 127 = 134 | | | | | | | | ,Mantisa | | | | | | | | | | | | | | | | | | | | | | |

Sa se reprezinte nr -104,27 in virgule flotanta dubla precizie.