6. Prezentaţi numărul –AF,D616, +456,7810 în virgulă flotantă simplă precizie presupune reprezentarea pe 32 de biti (3p)

**Pasul 1**: Realizam conversia nr in binar utilizand metoda corespunzatoare

AF,D616 = 10101111, 11010110 2

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

10101111, 11010110 2 = 1, 0101111 11010110 2 \*27

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

C = 7 + 127 = 13410

13410 = 128 + 6 => 10000000 + 110 = 100001102

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 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 |

* **Sa se reprezinte in virgula flotanta dubla precizie numarul +371,458**

Pasul 1: перевод из 8 в 2 систему счисления

011 111 001, 100 1012

Pasul 2:

1,1111001100101 \* 27 forma normalizata cu bit ascuns Exp = 7 M = 1111001100101

Pasul 3:

Calculam carateristica

C = E +1023

C = 7 + 1023 = 1030 = 1024 + 6

210 + 22 + 21 = 10000000000 + 110 = 10000000110

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |  | 0 |  |
| 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | … | 0 |  |

* **Sa se reprezinte numarul -A3,B7 (16) in virgula fixa cod direct 6 dupa virgule**

Pasul 1:

-A3,B716 = -1010 0011, 1011 0111

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | 1 |  |  |
|  |  |  |  | A | 2, | 4 | \* |
|  |  |  |  | 9 | 5, | F |  |
|  |  |  | 9 | 8 | 1 | C |  |
|  |  |  |  |  | 4 |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

c) 2F3,816 + E,C16 = d) A2,416 x 95,F16 =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 1 |  |  |  |  |
|  | 2 | F | 3, | 8 |  |  | + |
|  |  |  | E, | C |  |  |  |
|  | 3 | 0 | 2, | 4 |  |  |  |

2. Efectuaţi conversia numărului A53,4D16 în număr binar, octal şi zecimal cu precizia de 2 cifre după virgulă (преобразовать число A53,4D16 в 2-ное, 8-ное и 10-ное числа с точностью до 2-х цифр после запятой).

2.1: A53,4D16 в 2-ное

1010 0101 0011, 0100 11012

2.2: A53,4D16 в 8-ное

101 001 010 011,010 011 0102

5123,2328

2.3: A53,4D16 в 10-ное

A\*162 + 5\*161 + 3\*160 + 4\*16-1 + D\*16-2 = 2560 + 80 +3 + 0,25 + 0,05… = 2643,30…10

**Представьте число ±C3416 в дополнительном коде**

1: Переводим в бинар

+1100 0011 01002

2: В виду того что число у нас положительное, дополнительный код числа совпадает с его прямым кодом

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Представить в дополнительном коде число **-C3416**

-1100 0011 01002

Шаг 1: Для формирования кода отрицательного числа в дополнительной форме мы представляем в начале прямой код, потом обратный и в результате обратного дополнительный.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Шаг 2: прямой код числа **-C3416**

Шаг 3: обратный код

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Шаг 4: дополнительный код. К обратному коду к биту с нулевой позиции добавляем 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1+1 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

дополнительный код является:

**Reprezentați numărul +A4,5D în virgulă flotantă dublă precizie**

1. +1010 0100, 0101 11012
2. Представление числа в виде мантиса со скрытым битом.

1,M\*2e = 1,010 0100 0101 1101 \* 27

1. Для двойной точности С = 1023 + 7 = 1030 = 1024 + 6

В двоичной системе счисления С будет представлено: 10000000110

1. Для представления чисел с плавающей запятой двойной точности представляем регистр на 64 позициях.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 |  |  |  |  |  |  |  |  | ...0 |

**Reprezentați numărul -34,78  în codul zecimal binar 4221**

-34,78 = 3\*81+ 4\*80 + 7\*8-1 = 24 + 4 + 0,875 = -28,875

**Efectuați calculele A30B,4D-FE, DCB**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | . | F | .10 | 10 | . | 10 |  |
| A | 3 | 0 | B, | 4 | D |  | - |
|  |  | F | E, | D | C | B |  |
| A | 2 | 0 | C, | 7 | 0 | 5 |  |

**111,01011001:10,1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 0, | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |  |  |  |  |
| 1 | 0 | 1 |  |  |  |  |  |  |  |  | 1 | 0, | 1 | 1 | 1 | 1 |  |
|  | 1 | 0 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 1 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 1 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**3DE,F716 + DC,A16**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 1 |  |  |  |
| 3 | D | E, | F | 7 | + |
|  | D | C, | A |  |  |
| 4 | B | B, | 9 | 7 |  |

**b) 564,3768 – 367,538 =**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| . | .10 | .10 | 10 |  |  |  |
| 5 | 6 | 4, | 3 | 7 | 6 | - |
| 3 | 6 | 7, | 5 | 3 |  |  |
| 1 | 7 | 4, | 6 | 4 | 6 |  |

**c) 2F3,816 + E,C16 =**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 1 | 1 |  |  |
|  | 2 | F | 3, | 8 | + |
|  |  |  | E, | C |  |
|  | 3 | 0 | 2, | 4 |  |

**d) A2,416 x 95,F16 =**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | | 2 |  |  |
|  |  |  | | A | 2, | 4 | \* |
|  |  |  | | 9 | 5, | F |  |
|  |  | 9 | | 8 | 1 | C |  |
|  | 3 | 2 | | B | 4 |  |  |
| 5 | B | 4 | | 4 |  |  |  |
| 5 | F | 0 | | 7, | 5 | C |  |
|  |  |  | |  |  |  |  |

1E+3=21

8+B=13+4=17