Воронин Иван P3131

Домашнее задание №6

Вариант 47

A = 12,12 B = 7,129

Представление в формате Ф1:

*А* = (12,12)10 = (C,1EB)16 = (0,C1EB)16 · 161

М*А*

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

**1** округление к ближайшему

0 1 7 8 19

*В* = (7,129)10 = (7,210)16 = (0,721)16 · 161

M*B*

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

0 1 7 8 19

1) *XA* = \_1 0 0 0 0 0 1

*XB* = 1 0 0 0 0 0 1

(*XA-XB*)пр.= 0 0 0 0 0 0 0

(*XA-XB*). = 0; *ХС = ХВ =* 1*.*

а) Оба операнда положительные(A>0,B>0):



М*А* = . 1 1 0 0 0 0 0 1 1 1 1 1

+

М*В* = . 0 1 1 1 0 0 1 0 0 0 0 1

М*С* = 1. 0 0 1 1 0 1 0 0 0 0 0 0

Результат сложения денормализован влево.

4

4) МС = . 0 0 0 1 0 0 1 1 0 1 0 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* +1 = 2).

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (0,134)16 · 162 = (13,4)16 = 19,25.

*С*Т = 12.12 + 7.129 = 19.249

Результат получился представленным с избытком.

Погрешность полученного результата можно объяснить следующими факторами:

• неточным представлением операндов;

Δ*С* = *С*Т - *С*\* = 19,249 – 19,25 = -0,001,

δ*С* = · 100% = . 100% = 0,005%,

где δ*С* – относительная погрешность.

б) *А*<0, *B*>0.

Сложение мантисс будем проводить их прямым вычитанием. В качестве уменьшаемого используем мантиссу положительного операнда (*В*);

М*В* = . 0 1 1 1 0 0 1 0 0 0 0 1

М*А* = . 1 1 0 0 0 0 0 1 1 1 1 1

М*Сдоп* = . 1 0 1 1 0 0 0 0 0 0 1 0

М*Спр*  = . 0 1 0 0 1 1 1 1 1 1 1 0

Результат сложения нормализован.

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (0,4FE)16 · 161 = (4,FE)16 = -4.992.

*С*Т = 7.129 - 12.12 = -4.991

Δ*С* = *С*Т - *С*\* = -4,991 + 4,992= - 0,001,

δ*С* = · 100% = . 100% = 0,02%.

в) А>0, B<0.

М*А* = . 1 1 0 0 0 0 0 1 1 1 1 1

М*В* = . 0 1 1 1 0 0 1 0 0 0 0 1

М = . 0 1 0 0 1 1 1 1 1 1 1 0

Результат сложения нормализован.

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (0,4FE)16 · 161 = (4,FE)16 = 4.992.

*С*Т = 12.12 - 7.129 = 4.991

Δ*С* = *С*Т - *С*\* = 4,991 - 4,992= - 0,001,

δ*С* = · 100% = . 100% = 0,02%.

2. Формат Ф2

*А* = (12,12)10 = (C,1EB)16 = (1100,000111101011)2 = (0,1100000111101011)2 · 24

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

19 18 11 10 0  
*В* = (7,129)10 = (7,210)16 = (0111,00100001)2 = (0,11100100001)2 · 23

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

19 18 11 10 0

1) *XA* = \_1 0 0 0 0 1 0 0

*XB* = 1 0 0 0 0 0 1 1

(*XA-XB*) .= 0 0 0 0 0 0 0 1

(*XA-XB*). = 1; *ХС = ХA*= 4

а) Оба операнда положительные (*А*>0, *B*>0):

1

М*B* = . 0 1 1 1 0 0 1 0 0 0 0 1

+

М*A* = . 1 1 0 0 0 0 0 1 1 1 1 0

М*С* = 1 . 0 0 1 1 0 0 1 1 1 1 1 1

Результат сложения денормализован влево.

14

4) МС = . 1 0 0 1 1 0 0 1 1 1 1 1 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* +1 = 5).

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

*С*

19 18 11 10 0

*С*\* = М*С* · 2Р*с* = (0,100110011111)2 · 25 = (10011,0011111)2 = 19,2421875.

Δ*С* = *С*Т - *С*\* = 19,249 – 19, 1875 = 0,0068125,

δ*С* = · 100% = . 100% = 0,03%.

б) А<0, B>0

1

М*B* = . 0 1 1 1 0 0 1 0 0 0 0 1

М*A* = . 1 1 0 0 0 0 0 1 1 1 1 0

М*Сдоп* = . 1 0 1 1 0 0 0 0 0 0 1 1

М*Спр* = . 0 1 0 0 1 1 1 1 1 1 0 1

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

*С*

19 18 11 10 0

*С*\* = М*С* · 2Р*с* = (0,10011111101)2 · 23 = (100,11111101)2 = -4,98828125.

Δ*С* = *С*Т - *С*\* = -4,991 + 4,98828125= 0,00271875,

δ*С* = · 100% = . 100% = 0,05%.

в) А>0, B<0.

М*A* = . 1 1 0 0 0 0 0 1 1 1 1 0

М*B* = . 0 1 1 1 0 0 1 0 0 0 0 1

М*Сдоп* = . 0 1 0 0 1 1 1 1 1 1 0 1

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

*С*

19 18 11 10

*С*\* = М*С* · 2Р*с* = (0,10011111101)2 · 23 = (100,11111101)2 = 4,98828125.

Δ*С* = *С*Т - *С*\* = 4,991 - 4,98828125= 0,00271875,

δ*С* = · 100% = . 100% = 0,05%.