ФГБОУ ВПО «СПбНИУ ИТМО»

*Факультет программной инженерии и компьютерной техники*

*Дисциплина “Дискретная математика”*

**Домашнее задание №2**

**Сложение целых чисел**

**67 вариант**

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# Задание

## Задача 1

Для заданных чисел ***А*** и ***В*** выполнить операцию знакового сложения со всеми комбинациями знаков операндов. Для каждого примера:

A = 56, B = 57

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* > 0, *B* > 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*пр. | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |  | 56 |  | 56 |
| *B*пр. | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |  | 57 |  | 57 |
| *С*пр. | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |  | 113 |  | 113 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CF=0, | ZF=0, | PF=1, | AF=0, | SF=0, | OF=0. |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* > 0, *B* < 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*пр. | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |  | 56 |  | 56 |
| *B*доп. | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |  | -57 |  | 199 |
| *С*пр. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  | -1 |  | 255 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CF=0, | ZF=0, | PF=1, | AF=0, | SF=1, | OF=0. |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | *А* < 0, *B* > 0. | | | | | | | | | Интерпретации | | | | |  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая | | | *А*доп | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |  | -56 |  | 200 | | | *B*пр. | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |  | 57 |  | 57 | | | *С*доп. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  |  |  | 1? | | | *С*пр. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | 1 |  | |  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | CF=1, | ZF=0, | PF=0, | AF=0, | SF=0, | OF=0. | |

Для беззнаковой интерпретации результат неверен вследствие возникающего переноса из старшего разряда. Вес этого переноса составляет 256.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* < 0, *B* < 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*доп. | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |  | -56 |  | 200 |
| *B*доп. | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |  | -57 |  | 199 |
| *С*доп. | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |  |  |  | 143? |
| *С*пр. | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |  | -113 |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CF=1, | ZF=0, | PF=0, | AF=0, | SF=1, | OF=0. |

Для беззнаковой интерпретации результат неверен вследствие возникающего переноса из старшего разряда. Вес этого переноса составляет 256.

## Задача 2

Cохранив значение первого операнда ***А***, выбрать такое значение ***В***, чтобы в операции сложения с одинаковыми знаками имел место особый случай переполнения формата. Выполнить два примера, иллюстрирующие эти случаи, для каждого из них проделать пункты a, b, c, d.

A = 56

A + B > 128, 127 > B > 128 – A, пусть B = 118

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | **A** |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | **B** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* > 0, *B* > 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*пр. | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |  | 56 |  | 56 |
| *B*пр. | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |  | 118 |  | 118 |
| *С*доп. | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |  |  |  | 174 |
| *С*пр. | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |  | -82? |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CF=0, | ZF=0, | PF=1, | AF=0, | SF=1, | OF=1. |

Для знакового сложения результат является некорректным вследствие переполнения формата.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* < 0, *B* < 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*доп. | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |  | -56 |  | 200 |
| *B*доп. | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |  | -118 |  | 138 |
| *С*пр. | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |  | 82? |  | 82? |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CF=1, | ZF=0, | PF=0, | AF=0, | SF=0, | OF=1. |

Для знаковой интерпретации результат неверен вследствие возникающего переполнения, для беззнаковой интерпретации результат неверен вследствие возникающего переноса из старшего разряда

## Задача 3

Сохранив операнд ***В***, подавать такое значение операнда ***А***, чтобы при сложении положительных операндов имело место переполнение формата, а при сложении отрицательных операндов результат был бы корректен. Выполнить два примера, иллюстрирующие этот случай. Для каждого из них проделать пункты a, b, c, d.

B = 57 A = 128 - B = 71

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | **A** |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | **B** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* > 0, *B* > 0. | | | | | | | Интерпретации | | | | | | |
|  |  |  |  |  |  |  | |  |  |  | Знаковая |  | Беззнаковая | |
| *А*пр. | 0 | 1 | 0 | 0 | 0 | 1 | | 1 | 1 |  | 71 |  | 71 | |
| *B*пр. | 0 | 0 | 1 | 1 | 1 | 0 | | 0 | 1 |  | 57 |  | 57 | |
| *С*доп. | 1 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |  |  |  | 128 | |
| *С*пр. | 1 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |  | -128? |  |  | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CF=0, | ZF=0, | PF=0, | AF=1, | SF=1, | OF=1. |

Для знаковой интерпретации результат некорректен вследствие возникающего переполнения.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *А* < 0, *B* < 0. | | | | | | | | | Интерпретации | | | |
|  |  |  |  |  |  |  |  |  |  | Знаковая |  | Беззнаковая |
| *А*доп. | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |  | -71 |  | 185 |
| *B*доп. | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |  | -57 |  | 199 |
| *С*доп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  | 128? |
| *С*пр. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | -128 |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CF=1, | ZF=0, | PF=0, | AF=1, | SF=1, | OF=0. |

Для беззнаковой интерпретации результат неверен вследствие возникающего переноса из старшего разряда, результат знаковой интерпретации корректен.