Министерство образования и науки РФ

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«Санкт-Петербургский национальный исследовательский университет

информационных технологий, механики и оптики»

**факультет программной инженерии и компьютерной техники**

**ДОМАШНЯЯ РАБОТА № 2**

по дисциплине

‘Дискретная Математика’

Вариант №3/4

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# Сложение

## Пункт 1

**A = 100**

**B = 26**

### A > 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | + | 100 |  | + | 100 |
| Bпр. | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | 26 |  | 26 |
|  | Cпр. | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |  |  | 126 |  |  | 126 |

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

### A > 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  | |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | + | 100 |  | + | 100 |
| Bдоп. | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |  | -26 |  | 230 |
|  | Cпр. | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |  |  | 74 |  |  | 74? |

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

Для беззнаковой интерпретации результат неверен из-за переноса из старшего разряда. Вес переноса составляет 256.

### A < 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aдоп. | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |  | + | -100 |  | + | 156 |
| Bпр. | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | 26 |  | 26 |
|  | Cдоп. | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |  |  |  |  |  | 182 |
|  | Cпр. | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |  |  | -74 |  |  |  |

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

### A > 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  | |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aдоп. | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |  | + | -100 |  | + | 156 |
| Bдоп. | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |  | -26 |  | 230 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  |  |  |  |  | 130? |
|  | Cпр. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |  |  | -126 |  |  |  |

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

Для беззнаковой интерпретации результат неверен из-за переноса из старшего разряда. Вес переноса составляет 256.

## Пункт 2

**A = 100**

### A > 0, B > 0

Пусть B = 28

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | + | 100 |  | + | 100 |
| Bпр. | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |  | 28 |  | 28 |
|  | Cпр. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | 0? |  |  | 128 |

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

Для знаковой интерпретации результат неверен из-за переноса в знаковый разряд.

### A > 0, B < 0

Пусть B = -64

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | + | 100 |  | + | 100 |
| Bдоп. | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |  | -64 |  | 192 |
|  | Cпр. | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |  |  | 36 |  |  | 36? |

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

Для беззнаковой интерпретации результат неверен из-за переноса из старшего разряда. Вес переноса составляет 256.

## Пункт 3

B = 26

Пусть A = 102

### A > 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |  | + | 102 |  | + | 102 |
| Bпр. | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | 26 |  | 26 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 128 |
|  | Cпр. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | -128? |  |  |  |
|  |

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

Для знаковой интерпретации результат некорректен вследствие возникающего переполнения.

### A < 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| + | Aпр. | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | + | -102 |  | + | 154 |
| Bпр. | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |  | -26 |  | 230 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 128? |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | -128 |  |  |  |
|  |

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

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

# Вычитание

## Пункт 1

A = 20

B = 83

### A > 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aпр. | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |  | - | 20 |  | - | 20 |
| Bпр. | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | 83 |  | 83 |
|  | Cдоп. | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  |  | -63 |  |  | 193? |
|  | Cпр. | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | -63 |  |  | 193? |
|  |

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

Для беззнаковой интерпретации результат неверен из-за возникающего займа из разряда за пределами формата

### A < 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aдоп. | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |  | - | -20 |  | - | 236 |
| Bпр. | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | 83 |  | 83 |
|  | Cдоп. | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |  |  |  |  |  | 153 |
|  | Cпр. | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |  |  | -103 |  |  |  |
|  |

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

### A > 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aпр. | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |  | - | 20 |  | - | 20 |
| Bдоп. | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |  | -83 |  | 173 |
|  | Cпр. | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |  |  | 103 |  |  | 103? |
|  |

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

Для беззнаковой интерпретации результат неверен из-за возникающего займа из разряда за пределами формата

### A < 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aдоп. | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |  | - | -20 |  | - | 236 |
| Bдоп. | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |  | -83 |  | 173 |
|  | Cпр. | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |  |  | 63 |  |  | 63 |
|  |

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

## Пункт 2

A = 20

Пусть B = 109

### A < 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aдоп. | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |  | - | -20 |  | - | 236 |
| Bпр. | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |  | 109 |  | 109 |
|  | Cпр. | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  | 127? |  |  | 127 |
|  |

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

Для знаковой интерпретации результат неверен из-за возникающего переполнения

### A > 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aпр. | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |  | - | 20 |  | - | 20 |
| Bдоп. | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |  | -109 |  | 147 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  |  |  |  |  | 129? |
|  | Cпр. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  | -127? |  |  |  |
|  |

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

Для знаковой интерпретации результат неверен из-за возникающего переполнения. Для беззнаковой интерпретации результат неверен из-за возникающего займа из разряда за пределами формата

## Пункт 3

B = 83

Пусть A = 45

### A > 0, B < 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aпр. | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |  | - | 45 |  | - | 45 |
| Bдоп. | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |  | -83 |  | 173 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 128? |
|  | Cпр. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | -128? |  |  |  |
|  |

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

Для знаковой интерпретации результат неверен из-за возникающего переполнения. Для беззнаковой интерпретации результат неверен из-за возникающего займа из разряда за пределами формата

### A < 0, B > 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Интерпретации | | | | |
|  |  |  |  |  |  |  |  |  |  |  | Знаковая | |  | Беззнаковая | |
| - | Aдоп. | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | - | -45 |  | - | 211 |
| Bпр. | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | 83 |  | 83 |
|  | Cдоп. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 128 |
|  | Cпр. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  | -128 |  |  |  |
|  |

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

Результаты для обоих интерпретаций корректны