Міністерство освіти і науки України
Національний технічний університет України
“Київський політехнічний інститут імені Ігоря Сікорського”
Факультет інформатики та обчислювальної техніки
Кафедра інформаційні систем та технологій

Лабораторна робота №4

із дисципліни «Програмування. Частина 1. Основи програмування»

Тема: «Масиви»

Виконав:
Студент групи ІА-24
Ганжа Х. М.
Кійко А. О.
Мелешко Ю. С.

Перевірив:
Колеснік Валерій Миколайович

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Варіант-5
Хід роботи:
5)

1. Код програми:

```java
package lab4;

/**
 * Lab 4, Task 5
 *
 * @author Kiiko Anna
 */
public class Lab4_Task5 {

    /**
     * Entry point. Tests the method {@code task5(...)} by calling the helper
     * method {@code printResults(m)} few times with different arguments.
     *
     * @param args the standart parameter of the function.
     */
    Run | Debug
    public static void main(String[] args) {
        printResults(new double[] {});
        printResults(new double[] {1, 2, 4, 7, 8});
        printResults(new double[] {1, 2, 3, 4, -3, -7, 0});
        printResults(m: null);
    }

    /**
     * Returns the value for the array according to formula from the task
     *
     * @param m the parameter of the function.
     * @return the elements sum according to formula from the task.
     * @exception NullPointerException if array is null
     * @exception IllegalArgumentException if array is empty
     */
    public static double task5(double[] m) {
        if (null == m) {
            throw new NullPointerException(s: "The array is null!");
        }
        if (m.length == 0) {
            throw new IllegalArgumentException(s: "The array is empty!");
        }
        double sumRow = 0;
        for (double iterVal : m)
        {
            if (iterVal < 0) {
                sumRow += iterVal;
            }
        }
        return sumRow;
    }

    /**
     * Helper method for printing result of {@code task5(m)}.
     *
     * @param m the parameter of the function.
     */
    static void printResults(double[] m) {
        System.out.print(s: "For { ");
        if (m != null) {
            for(double i : m) {
                System.out.print(i + "  ");
            }
        } else {
            System.out.print(s: "NULL ");
        }
        System.out.print(s: "} result: ");
        try {
            System.out.println(task5(m));
        } catch (Exception ex) {
            System.out.println("EXCEPTION! " + ex.getMessage());
        }
    }
}
```

2. Результати:

```
For { } result: EXCEPTION! The array is empty!
For { 1.0  2.0  4.0  7.0  8.0  } result: 0.0
For { 1.0  2.0  3.0  4.0  -3.0  -7.0  0.0  } result: -10.0
For { NULL } result: EXCEPTION! The array is null!
PS C:\Users\Kirkland>
```

35)

1. Код програми:

```java
package lab4;

/**
 * Lab 4, Task 35
 *
 * @author Kiiko Anna
 */
public class Lab4_Task35 {

    /**
     * Entry point. Tests the method {@code task35(...)} by calling the helper
     * method {@code printResults(m)} few times with different arguments.
     *
     * @param args the standart parameter of the function.
     */
    Run | Debug
    public static void main(String[] args) {
        printResults(new double[] {});
        printResults(new double[] {1, 2, 4, 7, 8});
        printResults(new double[] {1, 2, 3, 4, -3, -7, 0});
        printResults(new double[] {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11});
        printResults(new double[] {1, 2, 3, 4, -5, -6, -7, -8, -9, -10, -11});
        printResults(new double[] {0, 1, 2, 3, 4, 0, 0, 0, 0, 0, 0, 15});
        printResults(m: null);
    }

    /**
     * Returns the value for the array according to formula from the task
     * Special cases:
     * If the array not contain elements with the index [5;10], then
     * exception IndexOutOfBoundsException is thrown.
     *
     * @param m the parameter of the function.
     * @return the sum according to formula from the task.
     * @exception NullPointerException if array is null
     * @exception IllegalArgumentException if array is empty
     * @exception IndexOutOfBoundsException if array not contain elements with the index [5;10]
     */
    public static double task35(double[] m) {
        if (null == m) {
            throw new NullPointerException(s: "The array is null!");
        }
        if (m.length == 0) {
            throw new IllegalArgumentException(s: "The array is empty!");
        }
        if (m.length < 11) {
            throw new IllegalArgumentException(s: "The array is not contain elements with the index [5;10]!");
        }
        double sumRow = 0;
        for (int indexArray = 0; indexArray < m.length; ++indexArray) {
            if ((indexArray >= 5) && (indexArray <= 10)) {
                sumRow += m[indexArray];
            }
        }
        return sumRow;
    }

    /**
     * Helper method for printing result of {@code task35(m)}.
     *
     * @param m the parameter of the function.
     */
    static void printResults(double[] m) {
        System.out.print(s: "For { ");
        if (m != null) {
            for(double i : m) {
                System.out.print(i + "  ");
            }
        } else {
            System.out.print(s: "NULL ");
        }
        System.out.print(s: "} result: ");
```

```
        try {
            System.out.println(task35(m));
        } catch (Exception ex) {
            System.out.println("EXCEPTION! " + ex.getMessage());
        }
    }
}
```

2. Результати:

```
For { } result: EXCEPTION! The array is empty!
For { 1.0  2.0  4.0  7.0  8.0  } result: EXCEPTION! The array is not contain elements with the index [5;10]!
For { 1.0  2.0  3.0  4.0  -3.0  -7.0  0.0  } result: EXCEPTION! The array is not contain elements with the index [5;10]!
For { 1.0  2.0  3.0  4.0  5.0  6.0  7.0  8.0  9.0  10.0  11.0  } result: 51.0
For { 1.0  2.0  3.0  4.0  -5.0  -6.0  -7.0  -8.0  -9.0  -10.0  -11.0  } result: -51.0
For { 0.0  1.0  2.0  3.0  4.0  0.0  0.0  0.0  0.0  0.0  0.0  15.0  } result: 0.0
For { NULL } result: EXCEPTION! The array is null!
PS C:\Users\Kirkland>
```

65)

1. Код програми:

```
package lab4;

/**
 * Lab 4, Task 65
 *
 * @author Kiiko Anna
 */
public class Lab4_Task65 {

    /**
     * Entry point. Tests the method {@code task65(...)} by calling the helper
     * method {@code printResults(m)} few times with different arguments.
     *
     * @param args the standart parameter of the function.
     */
    Run | Debug
    public static void main(String[] args) {
        printResults(new int[] {});
        printResults(new int[] {1, 2, 4, 7, 8});
        printResults(new int[] {1, 2, 3, 4, -3, -7, 0});
        printResults(new int[] {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11});
        printResults(new int[] {1, 2, 3, 4, -5, -6, -7, -8, -9, -10, -11});
        printResults(new int[] {0, 1, 2, 3, 4, 0, 0, 0, 0, 0, 0, 15});
        printResults(m: null);
    }

    /**
     * Returns the value for the array according to formula from the task
     *
     * @param m the parameter of the function.
     * @return the sum according to formula from the task.
     * @exception NullPointerException if array is null
     */
    public static int[] task65(int[] m) {
        if (null == m) {
            throw new NullPointerException(s: "The array is null!");
        }
```

```java
        int[] rezultArray = new int[m.length];
        int maxIndex = m.length -1;
        for (int indexArray = 0; indexArray <= maxIndex; ++indexArray)
            rezultArray[indexArray] = m[maxIndex - indexArray];
        }
        return rezultArray;
    }

    /**
     * Helper method for printing result of {@code task65(m)}.
     *
     * @param m the parameter of the function.
     */
    static void printResults(int[] m) {
        System.out.print(s: "For { ");
        if (m != null) {
            for(int i : m) {
                System.out.print(i + "  ");
            }
        } else {
            System.out.print(s: "NULL ");
        }
        System.out.print(s: "} result: { ");
        try {
            int[] t = task65(m);
            for(int i : t) {
                System.out.print(i + "  ");
            }
            System.out.println(x: "}");
        } catch (Exception ex) {
            System.out.println("EXCEPTION! " + ex.getMessage());
        }
    }
}
```

2. Результати:

```
For { } result: { }
For { 1  2  4  7  8  } result: { 8  7  4  2  1  }
For { 1  2  3  4  -3  -7  0  } result: { 0  -7  -3  4  3  2  1  }
For { 1  2  3  4  5  6  7  8  9  10  11  } result: { 11  10  9  8  7  6  5  4  3  2  1  }
For { 1  2  3  4  -5  -6  -7  -8  -9  -10  -11  } result: { -11  -10  -9  -8  -7  -6  -5  4  3  2  1  }
For { 0  1  2  3  4  0  0  0  0  0  0  15  } result: { 15  0  0  0  0  0  0  4  3  2  1  0  }
For { NULL } result: { EXCEPTION! The array is null!
PS C:\Users\Kirkland>
```

Висновок: ознайомилися з принципами роботи з масивами, використанням Exceptions. Повторили використання циклів тощо.