LAB # 8

Generics in Java

OBJECTIVE:

Implementing generic classes and methods for ensuring compile time type safety of data.

Lab Task:

Write a program that takes integer array, double array and float array. Make a generic function that performs subtraction on array element:

Example: input→ intArray = [5, 7, 3, 9, 19]

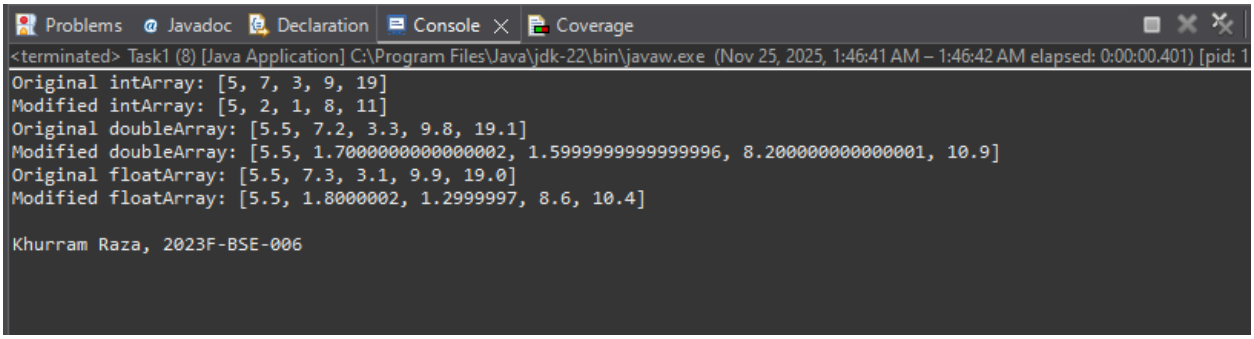
Output→ intArray = [2, -4, 6, 10]

Code:

Task1.java

```
package Task1;
import java.util.Arrays;
public class Task1 {    @SuppressWarnings("unchecked")
public static <T extends Number> void subtractArrayElements(T[] array) {
        for (int i = 1; i < array.length; i++) {
            array[i] = (T) subtract(array[i], array[i - 1]);}}
    private static Number subtract(Number a, Number b) {
        if (a instanceof Integer && b instanceof Integer) {
            return a.intValue() - b.intValue();
} else if (a instanceof Double && b instanceof Double) {
            return a.doubleValue() - b.doubleValue();} else if (a instanceof Float && b instanceof Float)
            return a.floatValue() - b.floatValue();} else {
            throw new IllegalArgumentException("Unsupported number type");}}
    private static <T> void printArray(T[] array) {
        System.out.println(Arrays.toString(array));}
    public static void main(String[] args) {
        Integer[] intArray = {5, 7, 3, 9, 19};
        System.out.print("Original intArray: ");
        printArray(intArray);
        subtractArrayElements(intArray);
        System.out.print("Modified intArray: ");
        printArray(intArray);
        Double[] doubleArray = {5.5, 7.2, 3.3, 9.8, 19.1};
        System.out.print("Original doubleArray: ");
        printArray(doubleArray);
        subtractArrayElements(doubleArray);
        System.out.print("Modified doubleArray: ");
        printArray(doubleArray);
        Float[] floatArray = {5.5f, 7.3f, 3.1f, 9.9f, 19.0f};
        System.out.print("Original floatArray: ");
        printArray(floatArray);
        subtractArrayElements(floatArray);
        System.out.print("Modified floatArray: ");
        printArray(floatArray);
        System.out.println("\nKhurram Raza, 2023F-BSE-006");}}
```

Output:



GitHub Screenshot: -