Software testing , validation and verification (CSE 338)

Assignment 1

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Group 1 Section 1

Problem 4A

The Problem Discretion:

One hot summer day Pete and his friend Billy decided to buy a watermelon. They chose the biggest and the ripest one, in their opinion. After that the watermelon was weighed, and the scales showed *w* kilos. They rushed home, dying of thirst, and decided to divide the berry, however they faced a hard problem.

Pete and Billy are great fans of even numbers, that's why they want to divide the watermelon in such a way that each of the two parts weighs even number of kilos, at the same time it is not obligatory that the parts are equal. The boys are extremely tired and want to start their meal as soon as possible, that's why you should help them and find out, if they can divide the watermelon in the way they want. For sure, each of them should get a part of positive weight.

Approach:

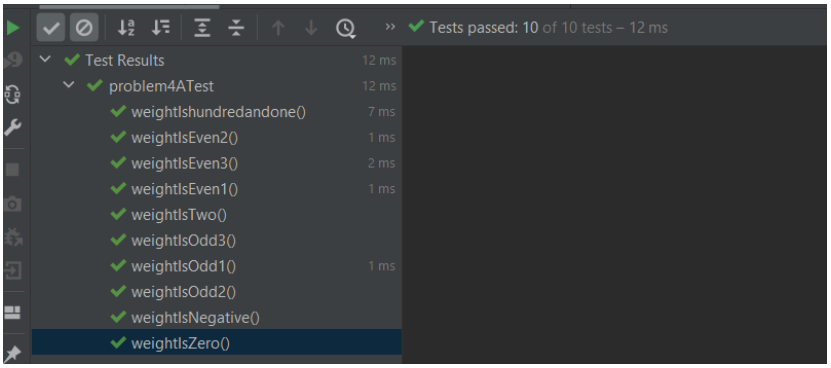
```
      public class problem4A {
    public boolean checkweight(int w){
        boolean confirmation;

        if (w <= 0 || w>100){
            throw new IllegalArgumentException("Weight not accepted");
        }

        else if (w % 2 == 0 && w != 2) {
            confirmation = true;
            return confirmation;
        }
        else {
            confirmation = false;
            return confirmation;
        }

    }
}
```

Test Cases:

```java
import org.junit.jupiter.api.Test;

import static org.junit.jupiter.api.Assertions.*;

class problem4ATest {

    @Test
    void weightIsEven1() {

            problem4A solver = new problem4A();
            assertEquals(true,solver.checkweight(4));

    }
    @Test
    void weightIsEven2() {

        problem4A solver = new problem4A();
            assertThrows(IllegalArgumentException.class , () -> {
            solver.checkweight(10000);
        });
    }
    @Test
    void weightIsEven3() {

        problem4A solver = new problem4A();
        assertEquals(true,solver.checkweight(50));

    }
    @Test
    void weightIsTwo() {

        problem4A solver = new problem4A();
        assertEquals(false,solver.checkweight(2));

    }
    @Test
    void weightIsOdd1() {

        problem4A solver = new problem4A();
        assertEquals(false,solver.checkweight(3));

    }
    @Test
    void weightIsOdd2() {

        assertThrows(IllegalArgumentException.class , () -> {
        solver.checkweight(2341);
    });

    }
    @Test
    void weightIsOdd3() {

        problem4A solver = new problem4A();
        assertEquals(false,solver.checkweight(1));

    }
```

```
    @Test
    void weightIsNegative() {

        problem4A solver = new problem4A();
        assertThrows(IllegalArgumentException.class , () -> {
            solver.checkweight(-5);
        });

    }

}

@Test
    void weightIsZero() {

        problem4A solver = new problem4A();
        assertThrows(IllegalArgumentException.class , () -> {
            solver.checkweight(0);
        });

    }

}


@Test
    void weightIshundredandone() {

        problem4A solver = new problem4A();
        assertThrows(IllegalArgumentException.class , () -> {
            solver.checkweight(101);
        });

    }

}
```

Test cases result:



Problem 69A

The Problem Discretion:

A guy named Vasya attends the final grade of a high school. One day Vasya decided to watch a match of his favorite hockey team. And, as the boy loves hockey very much, even more than physics, he forgot to do the homework. Specifically, he forgot to complete his physics tasks. Next day the teacher got very angry at Vasya and decided to teach him a lesson. He gave the lazy student a seemingly easy task: You are given an idle body in space and the forces that affect it. The body can be considered as a material point with coordinates (0; 0; 0). Vasya had only to answer whether it is in equilibrium. "Piece of cake" — thought Vasya, we need only to check if the sum of all vectors is equal to 0. So, Vasya began to solve the problem. But later it turned out that there can be lots and lots of these forces, and Vasya can not cope without your help. Help him. Write a program that determines whether a body is idle or is moving by the given vectors of forces.

Approach:

```
import java.util.Scanner;
import java.io.File;  // Import the File class
import java.io.FileNotFoundException;  // Import this class to handle errors
import java.util.Scanner; // Import the Scanner class to read text files


public class problem69A {

    public boolean checkVectors(int n) throws FileNotFoundException {
        int x = 0,y = 0,z = 0,a=0,b=0,c=0;
        File file = new File("D:\\College\\Testing\\Ass 1
submission\\problem4A\\src\\problem69A.txt");
        Scanner sc = new Scanner(file);

        while(n-- >= 1)
        {
            a = Integer.parseInt(sc.next());
            b = Integer.parseInt(sc.next());
            c = Integer.parseInt(sc.next());
            x += a;
            y += b;
            z += c;
        }
        if(x == 0 && y == 0 && z == 0){
            System.out.print("YES");
            return true;
        }
        else{
            System.out.print("NO");
            return false;
        }
    }
```

Notes :

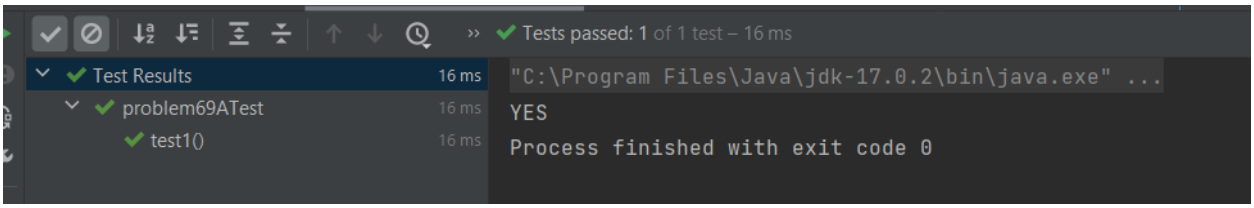
- N will be passed to the method by the test
- A text file is created with values for A,B,C where the method will read from based on each test case

Test case 1 :

N = 2

```
class problem69ATest {

    @Test
    void test1() throws FileNotFoundException {
        problem69A solver = new problem69A();
        assertEquals( expected: true,solver.checkVectors( n: 2));

    }
}
```

Test result:



Test case 2:

problem69A.txt - Notepad

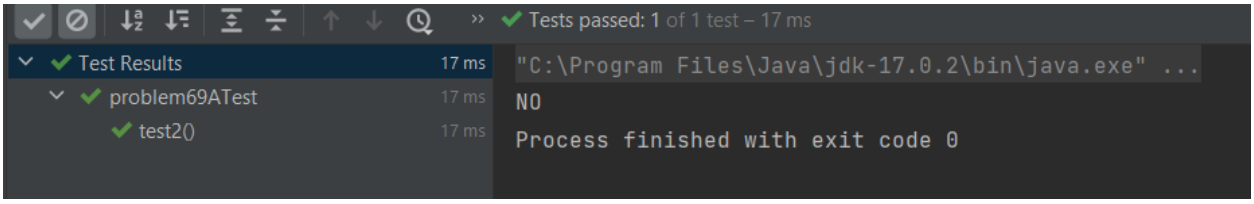
File Edit Format View Help

```
-54 -23 12
23 -12 -14
0 13 13
```

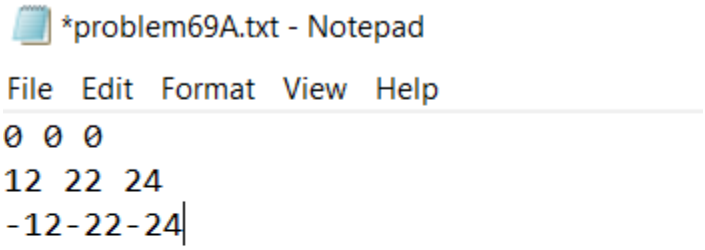
N=3

```
@Test
void test2() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertEquals( expected: false,solver.checkVectors( n: 3));

}

}
```

Test result:



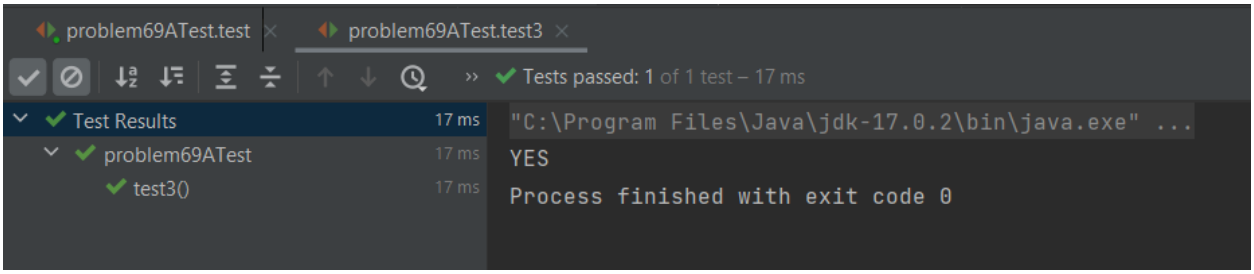
Test case 3:



N=3

```
@Test
void test3() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertEquals( expected: true,solver.checkVectors( n: 3));

}
```

Test result



Test case 4:

*problem69A.txt - Notepad

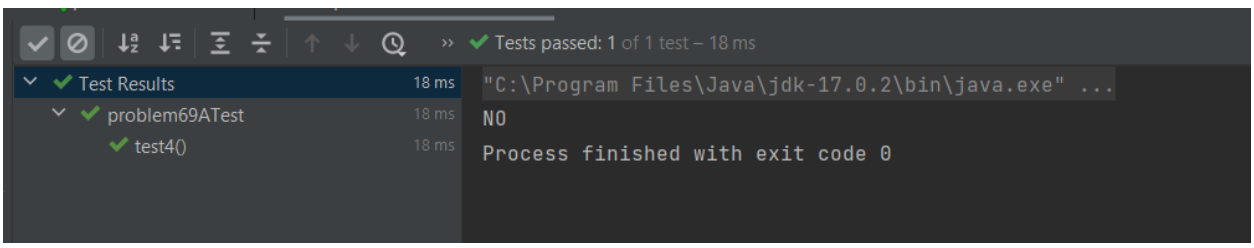
File Edit Format View Help

```
0 0 0
12 22 24
0 -22-24
```

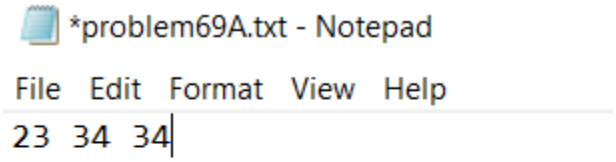
N=3

```
@Test
void test4() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertEquals( expected: false,solver.checkVectors( n: 3));

}
```

Test result:



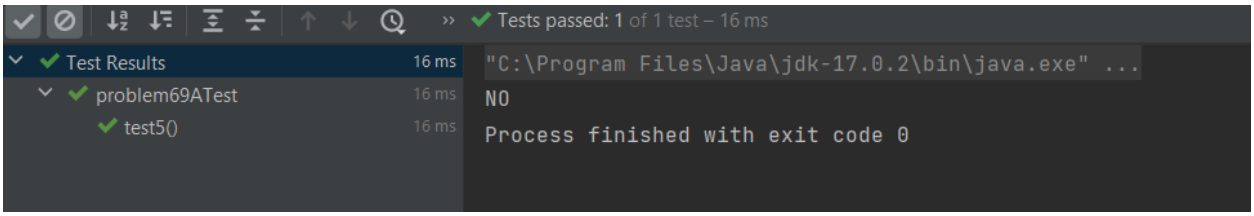
Test case 5:



N=1

```
@Test
void test5() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertEquals( expected: false,solver.checkVectors( n: 1));

}
```

Test result:



Test case 6:

*problem69A.txt - Notepad

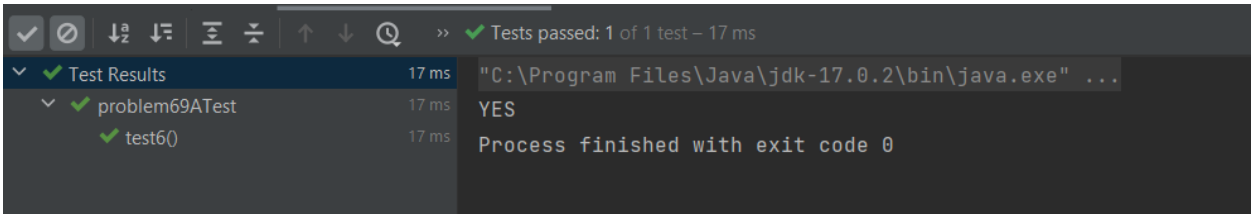
File Edit Format View Help

```
1 0 5
2 5 7
1 45 67
23 46 6
-27 -96 -85
```

N = 5

```
@Test
void test6() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertEquals( expected: true,solver.checkVectors( n: 5));

}
```

Test Result



Test case 7 : (FAILED!!)

N = 0

```java
@Test
void test7() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertThrows(IllegalArgumentException.class , () -> {
        solver.checkVectors( n: 0);
    });

}
```

Edit the code :

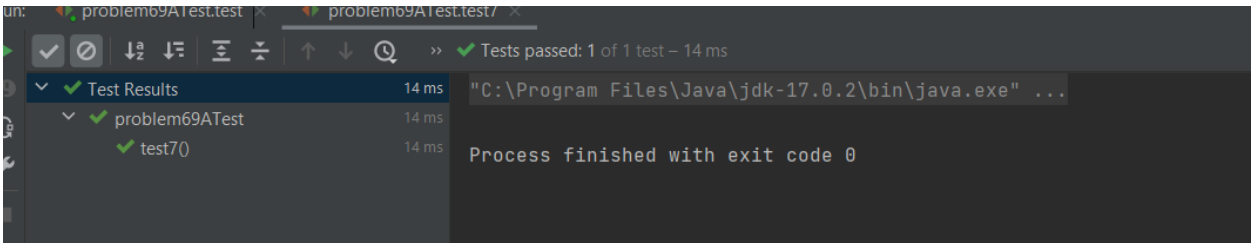
```java
public class problem69A {

    public boolean checkVectors(int n) throws
FileNotFoundException,IllegalArgumentException {
        int x = 0, y = 0, z = 0, a = 0, b = 0, c = 0;
        File file = new File("D:\\College\\Testing\\Ass 1
submission\\problems\\src\\problem69A.txt");
        Scanner sc = new Scanner(file);
        if (n <= 0){
            throw new IllegalArgumentException("N not accepted");
        }
        while (n-- >= 1) {
            a = Integer.parseInt(sc.next());
            b = Integer.parseInt(sc.next());
            c = Integer.parseInt(sc.next());
            x += a;
            y += b;
            z += c;
        }
        if (x == 0 && y == 0 && z == 0) {
            System.out.print("YES");
            return true;
        } else {
            System.out.print("NO");
            return false;
        }
    }
```

Test case 7 (rerun) :

N = 0

```java
@Test
void test7() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertThrows(IllegalArgumentException.class , () -> {
        solver.checkVectors( n: 0);
    });

}
```

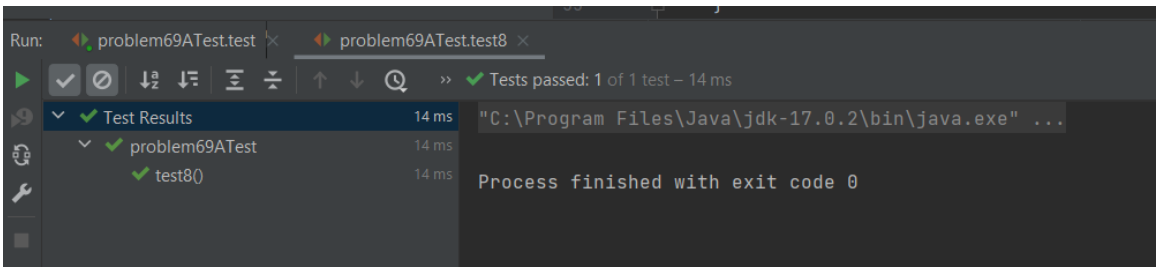
Test case result:



Test case 8:

N < 0

```java
}
@Test
void test8() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertThrows(IllegalArgumentException.class , () -> {
        solver.checkVectors( n: -4);
    });
```



Test case 9 : (FAILED!!)

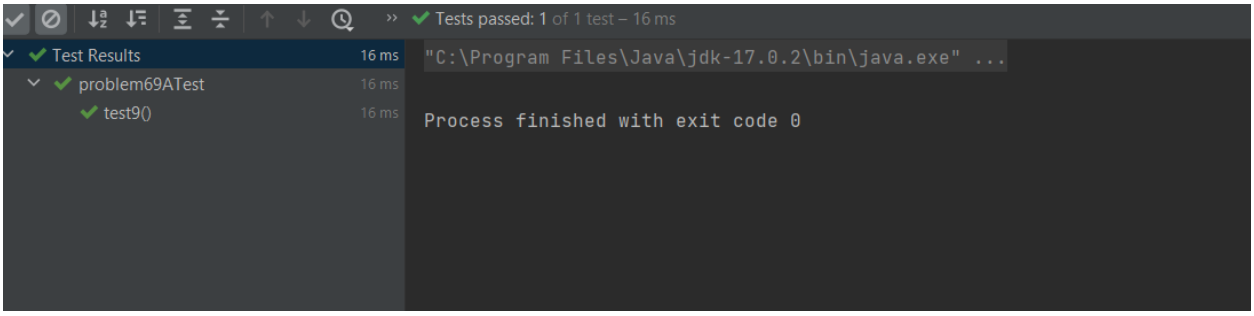
N>100

```
@Test
void test9() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertThrows(IllegalArgumentException.class , () -> {
        solver.checkVectors( n: 101);
    });

}
```

Edit the code :

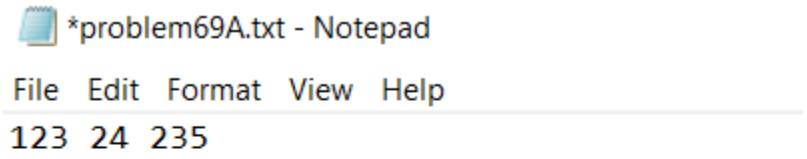
```
public class problem69A {

    public boolean checkVectors(int n) throws
FileNotFoundException,IllegalArgumentException {
        int x = 0, y = 0, z = 0, a = 0, b = 0, c = 0;
        File file = new File("D:\\College\\Testing\\Ass 1
submission\\problems\\src\\problem69A.txt");
        Scanner sc = new Scanner(file);
        if (n <= 0 || n>100){
            throw new IllegalArgumentException("N not accepted");
        }
        while (n-- >= 1) {
            a = Integer.parseInt(sc.next());
            b = Integer.parseInt(sc.next());
            c = Integer.parseInt(sc.next());
            x += a;
            y += b;
            z += c;
        }
        if (x == 0 && y == 0 && z == 0) {
            System.out.print("YES");
            return true;
        } else {
            System.out.print("NO");
            return false;
        }
    }
```

Test case (rerun):



Test case 10 : (FAILED!!)

Values of X ,Y, Z >100:



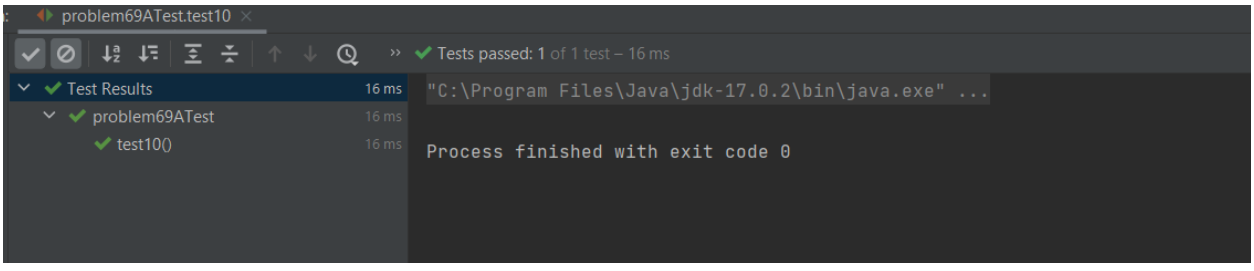
N=1:

```
@Test
void test10() throws FileNotFoundException {
    problem69A solver = new problem69A();
    assertThrows(IllegalArgumentException.class , () -> {
        solver.checkVectors(1);
    });

}
```

Edit code:

```
public class problem69A {

    public boolean checkVectors(int n) throws
FileNotFoundException,IllegalArgumentException {
        int x = 0, y = 0, z = 0, a = 0, b = 0, c = 0;
        File file = new File("D:\\College\\Testing\\Ass 1
submission\\problems\\src\\problem69A.txt");
        Scanner sc = new Scanner(file);
        if (n <= 0 || n>100){
            throw new IllegalArgumentException("N not accepted");
        }
        while (n-- >= 1) {
            a = Integer.parseInt(sc.next());
            b = Integer.parseInt(sc.next());
            c = Integer.parseInt(sc.next());
            if (a>100 || b>100 || c>100){
                throw new IllegalArgumentException("value of force greater
than 100");
            }
            x += a;
            y += b;
            z += c;
        }
        if (x == 0 && y == 0 && z == 0) {
            System.out.print("YES");
            return true;
        } else {
            System.out.print("NO");
            return false;
        }
    }
}
```

Test case 10 (rerun):



GitHub Link:

https://github.com/anassalah24/Testing-Assignment-1