MIT World Peace University

Object Oriented Programming with Java and C++
Second Year B. Tech, Semester 1

Case Study - Elements of an Array

Project Report

Prepared By

Krishnaraj Thadesar
Cyber Security and Forensics
Batch A1, PA 20

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Contents

1 Aim

To perform a Case study on the given problem statement, and implement the problem in C++ and Java

2 Problem Statement

Write a C++ and Java Program to Calculate Average of elements in an Integer Arrays.Take input values.Also display number of elements which are greater than average value.

3 Platform

Operating System: Arch Linux x86-64
IDEs or Text Editors Used: Visual Studio Code
Compilers : g++ and gcc on linux for C++, and javac, with JDK 18.0.2 for Java

4 Flowchart

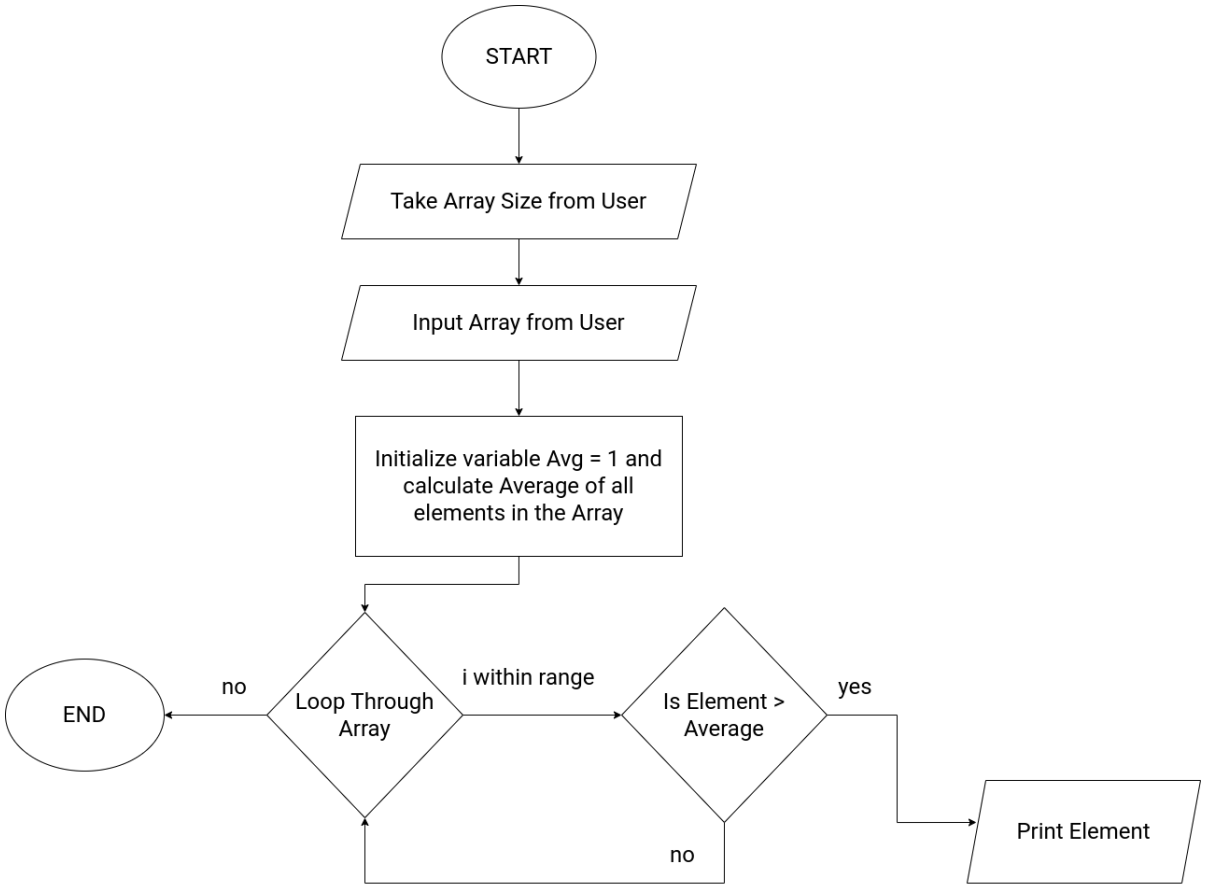

Figure 1: Flowchart for Algorithm

5 Algorithm

```
STEP 1: Start
STEP 2: Input Length of Array from user
STEP 3: Input the Array from the user
STEP 4: Initialize a variable avg to 1, and find average of Array
STEP 5: Loop through the array, if element is greater than average then print it.
STEP 6: Exit.
```

6 Code

6.1 C++ Implementation of Problem

```cpp
// C++ and Java Program to Calculate Average of elements in an Integer Arrays.Take input values.Also display number of elements which are greater than average value.
// Krishnaraj Thadesar
// PA 20 Batch A1

#include <iostream>
using namespace std;
int main()
{
    int size = 10;
    float average = 0;
    cout << "What size array do you want? " << endl;
    cin >> size;
    float arr[size];
    cout << "Enter the elements of the array!" << endl;
    for (int i = 0; i < size; i++)
    {
        cin >> arr[i];
        average += arr[i];
    }
    average /= size;
    cout << "The Average of all the elements in the array is: " << average << endl;
    cout << "The Elements of the Array which are greater than the Average of the Array are: " << endl;
    int count = 0;
    for (int i = 0; i < size; i++)
    {
        if (arr[i] > average)
        {
            cout << arr[i] << endl;
            count++;
        }
    }
    cout << endl << "The Number of Elements greater than the Average are: " << count;

    return 0;
}
```

Listing 1: Main.Cpp

6.2 Java Implementation of Problem

```java
// C++ and Java Program to Calculate Average of elements in an Integer Arrays.Take input values.Also display number of elements which are greater than average value.
// Krishnaraj Thadesar
// PA 20 Batch A1

import java.util.*;;

public class Main {
    static Scanner input = new Scanner(System.in);

    public static void main(String[] args) {
        int size = 10;
        int greater = 0;
        double average = 0;
        System.out.println("Enter the size of the Array that you want to enter");
        size = input.nextInt();
        Double arr[] = new Double[size];
        System.out.println("Enter the Elements of the Array: ");
        for (int i = 0; i < size; i++) {
            arr[i] = input.nextDouble();
            average += arr[i];
        }
        average /= size;
        System.out.println("The Average of All the Elements that you have entered is: " + average);
        System.out.println("The Elements that are above the Average of all the elements are: ");
        for (int i = 0; i < size; i++) {
            if (arr[i] > average) {
                System.out.println(arr[i] + " ");
                greater++;
            }
        }
        System.out.println("The Number of elements greater than the Average is: " + greater);
    }
}
```

Listing 2: Main.java

6.3 Input

1. What are the challenges for multithreading implementation using Java Programming? 2. What is the difference between the start and run method in Java Thread? 3. Which one is better to implement thread in Java? extending Thread class or implementing Runnable? 4. What is the difference between wait and sleep in Java? Explain with example. 5. What is the difference between the submit() and execute() method of Executor and ExecutorService in Java? Explain with example.

1. Length of the Array
2. The Elements of the Array

6.4 Output

6.5 C++ Output

```
What size array do you want?
5
Enter the elements of the array!
1
2
3
4
5
The Average of all the elements in the array is: 3
The Elements of the Array which are greater than the Average of the Array are:
4
5

The Number of Elements greater than the Average are: 2
```

Listing 3: Output for C++

6.6 Java Output

```
Enter the size of the Array that you want to enter
6
Enter the Elements of the Array:
1
4
2
3
6
3
The Average of All the Elements that you have entered is: 3.1666666666666665
The Elements that are above the Average of all the elements are:
4.0
6.0
The Number of elements greater than the Average is: 2
```

Listing 4: Output for Java