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Experiment 5: Programs on One Dimensional Arrays

Theory :

One Dimensional Array in java is always used with only one "[]". A one-dimensional array behaves likes a list of variables. You can access the variables of an array by using an index in square brackets preceded by the name of that array. Index value should be an integer.

Steps:
- Declaration of Array
- Construction of Array
- Initialization of Array

Declaration of One-dimensional array in java
Before using the array, we must declare it. Like normal variables, we must provide data type of array and name of an array. We also need to specify the name of an array so that we can use it later by name.

datatype[] arrayName;
Or
datatype arrayName[];
Or
datatype []arrayName;

- **datatype** can be a **primitive data type**(int, char, Double, byte etc.)or **Non-primitive data** (Objects).
- **arrayName** is the name of an array
- **[]** is called subscript.

Eg.
int[] number

Construction of One-dimensional array in java

For the creation of an array new keyword is used with a **data type** of array. we must specify the size of the array. The size should be an integer value or a variable that contains an integer value. How many elements you can store an array directly depends upon the size of an array.

arrayName = new DataType[size];

Note: When we are creating a new array the elements in the array will automatically be initialized by their default values. For e.g. : **zero** (int types), **false** (boolean), or **null** (for object types).

Initialization of One-dimensional array in java

To initialize the Array we have to put the values at each index of array. Hence we use single for loop to initialize array.
Eg.
for(int i=0 ;i<n ;i++) array[i]= sc.nextInt();

A.

Aim : WAP to count number of even and odd elements from an array.

Program :

```java
import java.util.Scanner;

public class OddEven {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of elements in the array :");
        int n= sc.nextInt();
        int[] a = new int[n];
        System.out.println("Enter the elements:");

        for(int i=0;i<n;i++) a[i]= sc.nextInt();

        int even=0,odd=0;
        for(int i=0;i<n;i++){ //this could be done in above loop, but then
there is no meaning of Aim.
            if(a[i]%2==0) even++;
            else odd++ ;
        }
        System.out.println("Number of odd elements:"+odd+"\nNumber of even
elements:"+even);
    }
}
```

Output :

```
Enter the number of elements in the array :7
Enter the elements:
11 22 33 44 55 66 77
Number of odd elements:4
Number of even elements:3
PS C:\Users\IsmailRatlamwala\Documents\College prog\Oops Labs\expt5>  & 'c:\Users\IsmailRatlamwala\.
vscode\extensions\vscjava.vscode-java-debug-0.36.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk-
16.0.2\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-Dfile.encoding=UTF-8' '-cp' 'C:\Use
rs\IsmailRatlamwala\AppData\Roaming\Code\User\workspaceStorage\c58f9da9765800ca506aa216f07b82a4\redh
at.java\jdt_ws\expt5_89ba4f5a\bin' 'OddEven'
Enter the number of elements in the array :4
Enter the elements:
123 34 578 976
Number of odd elements:1
Number of even elements:3
PS C:\Users\IsmailRatlamwala\Documents\College prog\Oops Labs\expt5> 
```

B.

Aim : WAP to count total marks and highest marks obtained by a student.

Program :

```java
import java.util.Scanner;

public class marks {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int[] a = new int[6];
        System.out.println("Enter the marks of 6 subjects(out of 100):");

        for(int i=0;i<6;i++) a[i]= sc.nextInt();

        int sum=0,highest=0;
        for(int i=0;i<6;i++){
            sum=sum+a[i];
            highest=(highest<a[i]) ? a[i]:highest;
        }
        System.out.println("Total marks scored :"+sum+"/600\nHighest marks
are scored is :"+highest);
    }
}
```

Output :

```
Enter the marks of 6 subjects(out of 100):
45 56 67 78 89 90
Total marks scored :425/600
Highest marks are scored is :90
PS C:\Users\IsmailRatlamwala\Documents\College prog\Oops Labs\expt5>  c:; cd 'c:\Users\IsmailRatlamw
ala\Documents\College prog\Oops Labs\expt5'; & 'c:\Users\IsmailRatlamwala\.vscode\extensions\vscjava
.vscode-java-debug-0.36.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk-16.0.2\bin\java.exe' '-XX
:+ShowCodeDetailsInExceptionMessages' '-Dfile.encoding=UTF-8' '-cp' 'C:\Users\IsmailRatlamwala\AppDa
ta\Roaming\Code\User\workspaceStorage\c58f9da9765800ca506aa216f07b82a4\redhat.java\jdt_ws\expt5_89ba
4f5a\bin' 'marks'
Enter the marks of 6 subjects(out of 100):
87 89 98 94 82 97
Total marks scored :547/600
Highest marks are scored is :98
PS C:\Users\IsmailRatlamwala\Documents\College prog\Oops Labs\expt5> ▌
```