**Experiment 1**

**Date Of Submission:** 26-08-2020

**1. Second largest element in the array**

**Aim:** Write a Java program to find the second smallest element in an array

**Concepts Used:** Class, Arrays

**Algorithm:**

1. Step 1: Start
2. Step 2: pos = 0 //Position of the smallest element
3. Step 3: smallest = arr[pos] //Assume the first element is the smallest
4. Step 4: for i from 1 to arraySize-1 do // Find the smallest element
5. Step 1: if arr[pos] > arr[i] then
6. Step 1: pos = i
7. Step 2: endif
8. Step 5: endFor
9. Step 6: if pos == 0 then
10. Step 1: secondSmallest = 1 // Assume that the second smallest number is the second number
11. Step 7: else
12. Step 1: secondSmallest =0;
13. Step 8: endif
14. Step 10: for i from 0 to arraySize-1 do
15. Step 1: if i == pos then
16. Step 1: continue
17. Step 2: endif
18. Step 3: if arr[i]<arr[secondSmallest] then
19. Step 1: secondSmallest = i
20. Step 4: endif
21. Step 11; Endfor
22. step 12: Stop

**Result:** The program is successfully compiled and the required output is obtained.

**Program Code:**

/\* Java program to find the second smallest element in an array

\*

\*/

class Program1{

public static void main(String args[]){

int[] arr = {-34,2,9,34,12,9,-23,1,4,9,0};

int arrSize=11;

int smallest,secondSmallest;

int i,pos=0;

smallest=arr[0];

for(i=1;i<11;i++){

if(arr[i]<smallest){

pos=i;

}

}

if(pos!=0){

secondSmallest=arr[0];

}

else{

secondSmallest=arr[arrSize-1];

}

for(i=0;i<11;i++){

if(i==pos)continue;

if(arr[i]<secondSmallest){

secondSmallest=arr[i];

}

}

System.out.println("Second Smallest element is "+secondSmallest);

}

}

**Sample Input**

-34,2,9,34,12,9,-23,1,4,9,0

**Sample Output:**

Second Smallest element is -23

**2. Program to check whether the given number is prime**

**Aim:** Write a Java program to check whether the given number is prime or not

**Concepts Used:** Class

**Algorithm:**

1. Step 1: Start
2. Step 2: read n // the number to be checked
3. Step 3: flag = 0
4. Step 4; for i from 2 to n/2 do
5. Step 1: if n%i == 0 then
6. Step 1: flag = 1
7. Step 2: break
8. Step 2: endif
9. Step 5: endFor
10. Step 6: if flag == 1 then
11. Step 1: print “The number is prime”
12. Step 7: else:
13. Step 1: print “The number is not prime”
14. Step 8: endif
15. Step 9: Stop

**Result:** The program is successfully compiled and the required output is obtained.

**Program Code:**

/\*

\*Program to check whether a given number is prime or not

\*

\*/

class Program2{

public static void main(String[] args){

int n,i;

boolean flag=true;

n=31; //The number to be checked

for(i=2;i<n/2;i++){

if(n%i==0){

flag=false;

}

}

if(flag)

System.out.println("The number "+n+" is prime");

else

System.out.println("The number "+n+" is not prime");

}

}

**Sample input**

31

**Sample output:**

The number 31 is prime

**3.Multiplication of Matrices**

**Aim:** Write a Java program to multiply two given matrices

**Concepts Used:** Array, Class

**Algorithm:**

Step 1: Start

Step 2: if A.colums == B.rows then

Step 1: C.colums = B.columns

Step 2: C.rows = A.rows

Step 3: for i from 0 to A.rows-1 do

Step 1: for j from 0 to B.columns-1 do

Step 1: C.array[i][j] = 0

Step 2: for k from 0 to B.rows do

Step 1: C[i][j] += A[i][k]\*B[k][j]

Step 3: endfor

Step 2: endFor

Step 4: endfor

Step 3:else

Step 1: Print “Matrices can’t be multiplied”

Step 4: endif

Step 5: Stop

**Result:** The program is successfully compiled and the required output is obtained.

**Program Code**

/\* Program to multiply two given matrices

\*/

class Program3{

public static void main(String[] args){

int[][] C;

int a\_rows,a\_columns,b\_rows,b\_columns,c\_rows,c\_columns;

int i,j,k;

a\_rows=3;

a\_columns=2;

int A[][] = {{1,2},{4,5},{9,16}};

b\_rows = 2; b\_columns=4;

int B[][] = {{3,4,5,6},{4,3,1,0}};

if(a\_columns==b\_rows){

c\_rows = a\_rows;

c\_columns = b\_columns;

C = new int[a\_rows][b\_columns];

for(i=0;i<a\_rows;i++){

for(j=0;j<b\_columns;j++){

C[i][j]=0;

for(k=0;k<a\_columns;k++){

C[i][j]+=(A[i][k]\*B[k][j]);

}

}

}

System.out.println("Solution Matrix is : ");

for(i=0;i<a\_rows;i++){

for(j=0;j<b\_columns;j++){

System.out.print(C[i][j]+" ");

}

System.out.println(" ");

}

}

else{

System.out.println("Matrix cant be multiplied");

}

}

}

**Sample input:**

Matrix A = 1,2

4,5

9,16

Matrix B = 3,4,5,6

4,3,1,0

**Sample output:**

Solution Marix is:

11 10 7 6

32 31 25 24

91 84 61 54