CSE1007: Java Programming

SLOT: L53+L54

Faculty: JAISANKAR N

LAB Assessment- 2

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1. **Write a Java program to print the third largest number in an array**

```
import java.util.*;
public class prog1{
public static void thirdLargest(int arr[], int arr_size)
{
    if (arr_size < 3)
    {
        System.out.printf(" Invalid Input ");
        return;
    }

    int first = arr[0];
    for (int i = 1; i < arr_size ; i++)
        if (arr[i] > first)
            first = arr[i];

    int second = Integer.MIN_VALUE;
    for (int i = 0;  i < arr_size ; i++)
        if (arr[i] > second &&
            arr[i] < first)
            second = arr[i];

    int third = Integer.MIN_VALUE;
    for (int i = 0;  i < arr_size ; i++)
        if (arr[i] > third &&
```

```
                arr[i] < second)
                third = arr[i];

    System.out.printf("The third Largest " +  "element is
%d", third);
}

public static void main(String []args)
{
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of elements: ");
     int n =sc.nextInt();
    System.out.println("Enter the elements of the array:
");
     int[] arr = new int[10];
     for(int i=0; i<n; i++)
     {
     arr[i]=sc.nextInt();
     }
    thirdLargest(arr, n);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog1.java

C:\vit\kandra ksheeraj\AS-2>java prog1
Enter the number of elements:
6
Enter the elements of the array:
75
12
8
15
48
6
The third Largest element is 15
```

2. Read the following details of 'n' students using Scanner class methods and display the same.

- Registration number (String)

- **Name (String that may contain first name, middle name and last name)**
- **CGPA (Floating point number)**
- **Programme Name(String)**
- **School Name (String with multiple words)**
- **Proctor Name (String that may contain first, middle and last names)**

```
import java.util.*;
class prog2
{
      String name;
      String reg_no;
      float cgpa;
      String programe;
      String school;
      String proctor;
      public void get()
    {
      Scanner sc = new Scanner(System.in);
      System.out.print("\nEnter first name of student :
");
      String firstName = sc.nextLine();
      System.out.print(" Enter middle name of student :
");
      String middleName = sc.nextLine();
      System.out.print(" Enter last name of student : ");
      String lastName = sc.nextLine();
      StringBuffer fullName = new StringBuffer();
```

```
      fullName.append(firstName);
      fullName.append(" ");
      fullName.append(middleName);
      fullName.append(" ");
      fullName.append(lastName);
      this.name=fullName.toString();

       System.out.print("\n Enter regno of student : ");
       this.reg_no=sc.nextLine();

       System.out.print("\n Enter CGPA : ");
       this.cgpa=sc.nextFloat();

       System.out.print("\n Enter programme : ");
       sc.nextLine();
       this.programe=sc.nextLine();

       System.out.print("\n Enter school : ");
       this.school=sc.nextLine();

      System.out.print(" Enter first name of proctor : ");
      String firstNamep = sc.nextLine();
      System.out.print(" Enter middle name of proctor :
");
      String middleNamep = sc.nextLine();
      System.out.print(" Enter last name of proctor : ");
      String lastNamep = sc.nextLine();
      StringBuffer fullNamep = new StringBuffer();
      fullNamep.append(firstNamep);
      fullNamep.append(" ");
      fullNamep.append(middleNamep);
      fullNamep.append(" ");
      fullNamep.append(lastNamep);
      this.proctor=fullNamep.toString();
    }
     public void display()
    {
```

```
       System.out.println("Name of Student : " + this.name
+ "\nregno :"+ this.reg_no +"\ncgpa : " + this.cgpa +
"\nprograme : " + this.programe +"\nschool : "+
this.school + "\n proctor : " + this.proctor+ "\n");
    }
  static public void main(String args[])
  {
    int n;
    System.out.println("Enter number of students ");
    Scanner sc = new Scanner(System.in);
    n=sc.nextInt();
    Student array[]= new Student[n];
    sc.nextLine();
    for(int i=0;i<n;i++)
    {
       array[i]=new Student();
    }
    for(int i=0;i<n;i++)
    {
       System.out.print("\n Enter Student Details -
"+(i+1));
       array[i].get();
    }
    for(int i=0;i<n;i++)
    {
       System.out.println("\nStudent Details  - "+ (i+1));
       array[i].display();
    }
  }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog2.java

C:\vit\kandra ksheeraj\AS-2>java prog2
Enter number of students
1

 Enter Student Details - 1
 Enter first name of student : ksheeraj
Enter middle name of student :
Enter last name of student : kandra

 enter reg number of student : 19BCE0829

 enter cgpa : 9.1

 enter programe : cse

 enter school : scope
Enter first name of proctor : umakanta
Enter middle name of proctor : ram
Enter last name of proctor : mishra

Student Details  - 1
Name of Student : ksheeraj  kandrareg_no :19BCE0829
cgpa : 9.1
programe : cse
school : scope
 proctor : umakanta ram mishra
```

3. **Write a Java program to sort an array of positive integers of an given array, in the sorted array the value of the first element should be maximum, second value should be minimum value, third should be second maximum, fourth second be second minimum and so on.**

```
import java.util.*;
public class prog3 {

    public static void rearrange(int arr[], int n)
    {
```

```
      int max_idx = n - 1, min_idx = 0;
      int max_elem = arr[n - 1] + 1;

      for (int i = 0; i < n; i++) {
          if (i % 2 == 0) {
              arr[i] += (arr[max_idx] % max_elem) *
max_elem;
              max_idx--;
          }

          else {
              arr[i] += (arr[min_idx] % max_elem) *
max_elem;
              min_idx++;
          }
      }

      for (int i = 0; i < n; i++)
          arr[i] = arr[i] / max_elem;
  }

  public static void main(String args[])
  {

Scanner sc = new Scanner(System.in);
      System.out.println("Enter the number of elements:
");
int n =sc.nextInt();
      System.out.println("Enter the elements of the
array: ");
int[] arr = new int[10];
for(int i=0; i<n; i++)
{
arr[i]=sc.nextInt();
}

      System.out.println("Original Array: ");
```

```
        for (int i = 0; i < n; i++)
            System.out.print(arr[i] + " ");

        rearrange(arr, n);

        System.out.print("\nModified Array: \n");
        for (int i = 0; i < n; i++)
            System.out.print(arr[i] + " ");
    }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog3.java

C:\vit\kandra ksheeraj\AS-2>java prog3
Enter the number of elements:
9
Enter the elements of the array:
1
2
3
4
5
6
7
8
9
Original Array:
1 2 3 4 5 6 7 8 9
Modified Array:
9 1 8 2 7 3 6 4 5
```

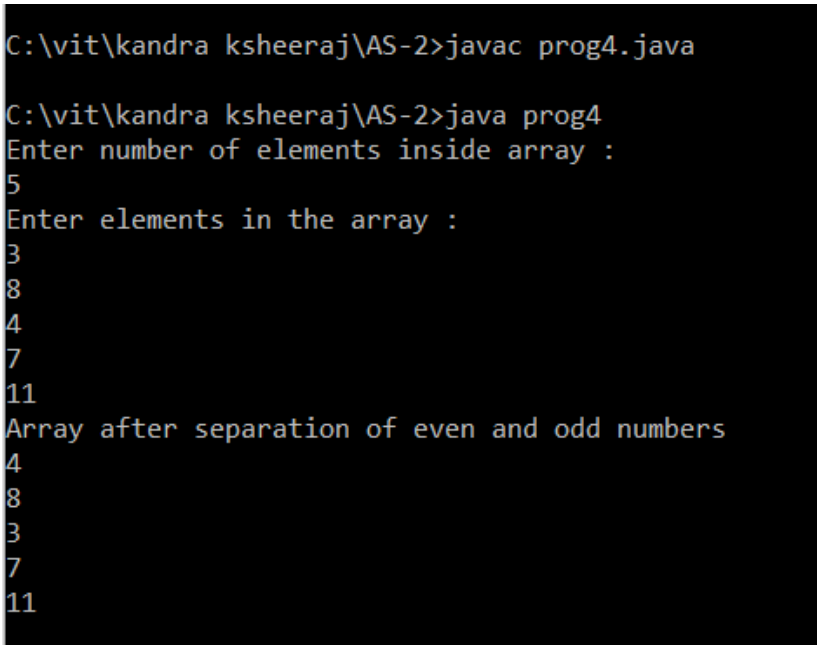
4. **Write a Java program to separate even and odd numbers of an given array of integers. Put all even numbers first, and then odd numbers.**

```
import java.util.*;
public class prog4
{
    public static void main (String[] args)
      {
```

```
      int n;
      Scanner sc=new Scanner(System.in);
      System.out.println("Enter number of elements inside
array : ");
      n=sc.nextInt();
      int array[] = new int [n];
      System.out.println("Enter elements in the array :
");

      for(int i=0;i<array.length;i++)
      {
        array[i]=sc.nextInt();
      }
      array = separate_odd_even(array);
      System.out.println("Array after separation of even
and odd numbers ");
      for(int i=0;i<array.length;i++)
      {
      System.out.println(array[i]);
      }
  }
  static int [] separate_odd_even(int arr[])
  {
      int left_side = 0, right_side = arr.length - 1;
      while (left_side < right_side)
      {
          while (arr[left_side]%2 == 0 && left_side <
right_side)
              left_side++;

          while (arr[right_side]%2 == 1 && left_side <
right_side)
              right_side--;

          if (left_side < right_side)
          {
              int temp = arr[left_side];
```

```
                arr[left_side] = arr[right_side];
                arr[right_side] = temp;
                left_side++;
                right_side--;
            }
        }
        return arr;
    }
}
```

Sample Output:



5. **Write a Java program to convert a binary number to decimal number and to decimal number to binary number.**

```
import java.util.*;
public class prog5{
        public static void main(String args[])
        {
            Scanner s=new Scanner(System.in);

            System.out.println("Enter a binary number:");
            int n=s.nextInt();
```

```
            int decimal=0,p=0;
            while(n!=0)
            {
                decimal+=((n%10)*Math.pow(2,p));
                n=n/10;
                p++;
            }
            System.out.println("Corresponding Decimal
   number:");
            System.out.println(decimal);
        }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog5.java

C:\vit\kandra ksheeraj\AS-2>java prog5
Enter a binary number:
110
Corresponding Decimal number:
6
```

```
import java.util.*;
public class prog5b{
public static void toBinary(int decimal){
     int binary[] = new int[40];
     int index = 0;
     while(decimal > 0){
       binary[index++] = decimal%2;
       decimal = decimal/2;
     }
     for(int i = index-1;i >= 0;i--){
       System.out.print(binary[i]);
     }
System.out.println();//new line
}
```

```
public static void main(String args[]){
            Scanner s=new Scanner(System.in);
            System.out.println("Enter a decimal number:");
            int n=s.nextInt();

System.out.println("correaponding binary: ");
toBinary(n);
}}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog5b.java

C:\vit\kandra ksheeraj\AS-2>java prog5b
Enter a decimal number:
6
correaponding binary:
110
```

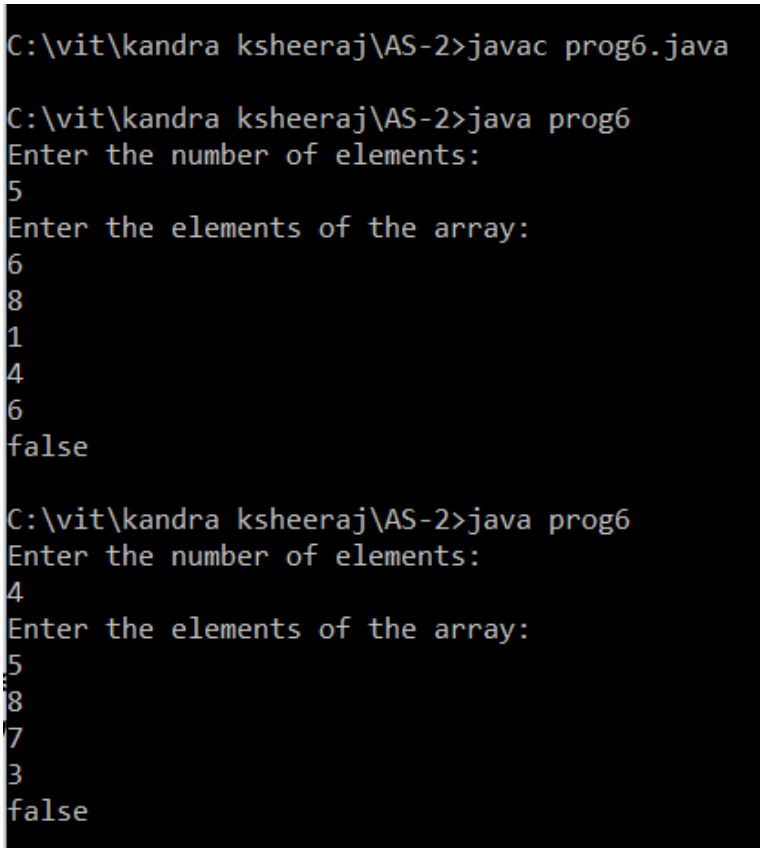
6. **Write a Java program to test if the first and the last element of an array of integers are same. The length of the array must be greater than or equal to 2.**
   Test Data: array = 50, -20, 0, 30, 40, 60, 10
   Sample Output:

False

```
import java.util.*;
public class prog6{
public static void main(String[] args)
{
      Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of elements: ");
      int n =sc.nextInt();
    System.out.println("Enter the elements of the array:
");
      int[] arr = new int[10];
      for(int i=0; i<n; i++)
```

```
        {
        arr[i]=sc.nextInt();
        }
 System.out.println (arr.length >= 2 && arr[0] ==
arr[arr.length-1]);
}
}
```

Sample Output:



7. **Write a Java program to test if the first and the last element of two array of integers are same. The length of the array must be greater than or equal to**
   Test Data: array1 = 50, -20, 0, 30, 40, 60, 12
   array2 = 45, 20, 10, 20, 30, 50, 11
   Sample Output:

false

```
import java.util.*;
public class prog7 {
public static void main(String[] args)
{
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of elements: ");
     int n =sc.nextInt();
    System.out.println("Enter the elements of the array1:
");
     int[] array1 = new int[7];
     for(int i=0; i<n; i++)
     {
     array1[i]=sc.nextInt();
     }
      System.out.println("Enter the elements of the array2:
");
     int[] array2 = new int[7];
     for(int i=0; i<n; i++)
     {
     array2[i]=sc.nextInt();
     }

 if(array1.length>=2 && array2.length>=2)
 {
 System.out.println(array1[0] == array2[0] ||
array1[array1.length-1] == array2[array2.length-1]);
 }
 else
 {
 System.out.println("Array lengths less than 2.");
 }
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog7.java

C:\vit\kandra ksheeraj\AS-2>java prog7
Enter the number of elements:
7
Enter the elements of the array1:
50
-20
0
30
40
60
12
Enter the elements of the array2:
45
20
10
20
30
50
11
false
```

8. **Write a Java program to create a new array of length 2 from two arrays of integers with three elements and the new array will contain the first and last elements from the two arrays**
   Test Data: array1 = 50, -20, 0
   array2 = 5, -50, 10
   Sample Output:

Array1: [50, -20, 0]
Array2: [5, -50, 10]
New Array: [50, 10]

```
import java.util.*;
public class prog8{
public static void main(String[] args)
```

```
{
    Scanner sc = new Scanner(System.in);

    System.out.println("Enter the elements of the array1:
");
     int[] array1 = new int[3];
     for(int i=0; i<3; i++)
     {
     array1[i]=sc.nextInt();
     }
      System.out.println("Enter the elements of the array2:
");
     int[] array2 = new int[3];
     for(int i=0; i<3; i++)
     {
     array2[i]=sc.nextInt();
     }

System.out.println("Array1: "+Arrays.toString(array1));
System.out.println("Array2: "+Arrays.toString(array2));
 int[] array_new = {array1[0], array2[2]};
System.out.println("New Array:
"+Arrays.toString(array_new));
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>java prog8
Enter the elements of the array1:
50
-20
0
Enter the elements of the array2:
5
-50
10
Array1: [50, -20, 0]
Array2: [5, -50, 10]
New Array: [50, 10]
```

9. Write a Java program to test that a given array of integers of length 2 contains a 4 or a 7.

Sample Output:

Original Array: [5, 7]

true

```
import java.util.*;
public class prog9{
public static void main(String[] args)
{
      Scanner sc = new Scanner(System.in);

    System.out.println("Enter the elements of the array:
");
      int[] arr = new int[2];
      for(int i=0; i<2; i++)
      {
      arr[i]=sc.nextInt();
      }

System.out.println("Original Array:
"+Arrays.toString(arr));
if(arr[0] == 4 || arr[0] == 7)
System.out.println("True");
else
 System.out.println(arr[1] == 4 || arr[1] == 7);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog9.java

C:\vit\kandra ksheeraj\AS-2>java prog9
Enter the elements of the array:
5
7
Original Array: [5, 7]
true
```

10. Write a Java program to rotate an array (length 3) of integers in left direction.

Sample Output:

Original Array: [20, 30, 40]
Rotated Array: [30, 40, 20]

```
import java.util.*;
public class prog10{
public static void main(String[] args){
      Scanner sc = new Scanner(System.in);

    System.out.println("Enter the elements of the array:
");
      int[] arr = new int[3];
      for(int i=0; i<3; i++)
      {
      arr[i]=sc.nextInt();
      }

System.out.println("Original Array:
"+Arrays.toString(arr));
int[] new_arr = {arr[1], arr[2], arr[0]};
System.out.println("Rotated Array:
"+Arrays.toString(new_arr));
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog10.java

C:\vit\kandra ksheeraj\AS-2>java prog10
Enter the elements of the array:
20
30
40
Original Array: [20, 30, 40]
Rotated Array: [30, 40, 20]
```

11. Write a Java program to get the larger value between first and last element of an array (length 3) of integers.

Sample Output:

Original Array: [20, 30, 40]

Larger value between first and last element: 40

```
import java.util.*;
public class prog11{
public static void main(String[] args)
{
     Scanner sc = new Scanner(System.in);

    System.out.println("Enter the elements of the array:
");
     int[] arr = new int[3];
     for(int i=0; i<3; i++)
     {
     arr[i]=sc.nextInt();
     }
System.out.println("Original Array:
"+Arrays.toString(arr));
int max_val = arr[0];
if(arr[2] >= max_val)
```

```
max_val = arr[2];
System.out.println("Larger value between first and last
element:"+max_val);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog11.java

C:\vit\kandra ksheeraj\AS-2>java prog11
Enter the elements of the array:
20
30
40
Original Array: [20, 30, 40]
Larger value between first and last element:40
```

12. Write a Java program to swap the first and last elements of an array (length must be at least 1) and create a new array.

Sample Output:

Original Array: [20, 30, 40]
New array after swaping the first and last elements: [40, 30, 20]

```
import java.util.*;
public class prog12{
public static void main(String[] args)
{
     Scanner sc = new Scanner(System.in);
    System.out.println("Enter the elements of the array:
");
     int[] arr = new int[3];
     for(int i=0; i<3; i++)
     {
     arr[i]=sc.nextInt();
```

```
    }
System.out.println("Original Array:
"+Arrays.toString(arr));
int x = arr[0];
arr[0] = arr[2];
arr[2] = x;
System.out.println("New array after swaping the first and
last elements: "+Arrays.toString(arr));
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog12.java

C:\vit\kandra ksheeraj\AS-2>java prog12
Enter the elements of the array:
20
30
40
Original Array: [20, 30, 40]
New array after swaping the first and last elements: [40, 30, 20]
```

13. Write a Java program to find the largest element between first, last, and middle values from an array of integers (even length).

Sample Output:

Original Array: [20, 30, 40, 50, 67]

Largest element between first, last, and middle values: 67

```
import java.util.*;
public class prog13{
public static void main(String[] args)
{
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of elements: ");
      int n =sc.nextInt();
```

```
    System.out.println("Enter the elements of the array:
");
      int[] arr = new int[10];
      for(int i=0; i<n; i++)
      {
      arr[i]=sc.nextInt();
      }
System.out.println("Original Array:
"+Arrays.toString(arr));
int max_val = arr[0];
if(max_val <= arr[arr.length-1])
max_val = arr[arr.length-1];
if(max_val <= arr[arr.length/2])
max_val = arr[arr.length/2];
System.out.println("Largest element between first, last,
and middle values: "+max_val);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog13.java

C:\vit\kandra ksheeraj\AS-2>java prog13
Enter the number of elements:
6
Enter the elements of the array:
20
30
40
50
60
67
Original Array: [20, 30, 40, 50, 60, 67, 0, 0, 0, 0]
Largest element between first, last, and middle values: 67
```

14. Write a Java program to multiply corresponding elements of two arrays of integers.

Sample Output:

Array1: [1, 3, -5, 4]

Array2: [1, 4, -5, -2]

Result: 1 12 25 -8

```
import java.util.*;
public class prog14{
 public static void main(String[] args){
 String result = "";
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of elements: ");
      int n =sc.nextInt();
    System.out.println("Enter the elements of the array1:
");
      int[] array1 = new int[4];
      for(int i=0; i<n; i++)
      {
      array1[i]=sc.nextInt();
      }
     System.out.println("Enter the elements of the array2:
");
      int[] array2 = new int[4];
      for(int i=0; i<n; i++)
      {
      array2[i]=sc.nextInt();
      }

 System.out.println("\nArray1: "+Arrays.toString(array1));
 System.out.println("\nArray2: "+Arrays.toString(array2));
 for (int i = 0; i < array1.length; i++) {
int num1 = array1[i];
```

```
int num2 = array2[i];
result += Integer.toString(num1 * num2) + " ";
}
System.out.println("\nResult: "+result);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog14.java

C:\vit\kandra ksheeraj\AS-2>java prog14
Enter the number of elements:
4
Enter the elements of the array1:
1
3
-5
4
Enter the elements of the array2:
1
4
-5
-2

Array1: [1, 3, -5, 4]

Array2: [1, 4, -5, -2]

Result: 1 12 25 -8
```

15. Write a Java program to add two matrix.

```
import java.util.*;
public class prog15
{
public static void main(String args[]){

int a[][]={{1,2,3},{1,2,3},{1,2,3}};
int b[][]={{1,3,4},{2,4,3},{1,2,4}};
```

```
int c[][]=new int[3][3];

System.out.println("Sum of the 2 matrices:");
for(int i=0;i<3;i++){
for(int j=0;j<3;j++){
c[i][j]=a[i][j]+b[i][j];
System.out.print(c[i][j]+" ");
}
System.out.println();
}
  }}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog15.java

C:\vit\kandra ksheeraj\AS-2>java prog15
Sum of the 2 matrices:
2 5 7
3 6 6
2 4 7
```

16. Write a Java program to multiply two matrix.

```
import java.util.*;
public class prog16
{
public static void main(String[] args) {
 Scanner sc = new Scanner(System.in);
int a[][]={{1,1,1},{2,2,2},{3,3,3}};
int b[][]={{1,1,1},{2,2,2},{3,3,3}};
System.out.println("product of the 2 matrices:");
int c[][]=new int[3][3];
for(int i=0;i<3;i++){
 for(int j=0;j<3;j++){
 c[i][j]=0;
for(int k=0;k<3;k++)
 {
```

```
 c[i][j]+=a[i][k]*b[k][j];
 }
 System.out.print(c[i][j]+" ");
 }
 System.out.println();
 }
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog16.java

C:\vit\kandra ksheeraj\AS-2>java prog16
product of the 2 matrices:
6 6 6
12 12 12
18 18 18
```

17. Write a Java program to Calculate diagonal element.

```
import java.util.*;

public class prog17
{
 public static void main(String args[])
 {
 Scanner sc = new Scanner(System.in);

         int i,j,row,col,sum=0;
 System.out.println("Enter the number of rows:");
 row = sc.nextInt();
 System.out.println("Enter the number of columns:");
 col = sc.nextInt();

 int[][] mat = new int[row][col];
```

```
     System.out.println("Enter the elements of the
matrix") ;
     for(i=0;i<row;i++)
     {
      for(j=0;j<col;j++)
      {
          mat[i][j] = sc.nextInt();
     }
 }

     System.out.println("The elements of the matrix") ;
     for(i=0;i<row;i++)
     {
      for(j=0;j<col;j++)
      {
        System.out.print(mat[i][j]+"\t");
     }
       System.out.println("");
 }

     for(i=0;i<row;i++)
     {
      for(j=0;j<col;j++)
      {
 if(i==j)
 {
 sum = sum + mat[i][j];
 }
     }
 }

     System.out.printf("Sum of diagonal elements of the
matrix = "+sum) ;
 }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog17.java

C:\vit\kandra ksheeraj\AS-2>java prog17
Enter the number of rows:
3
Enter the number of columns:
3
Enter the elements of the matrix
1
2
3
4
5
6
7
8
9
The elements of the matrix
1       2       3
4       5       6
7       8       9
Sum of diagonal elements of the matrix = 15
```

18. Write a Java Program to print this pattern for n lines

1

12

123

1234

1234

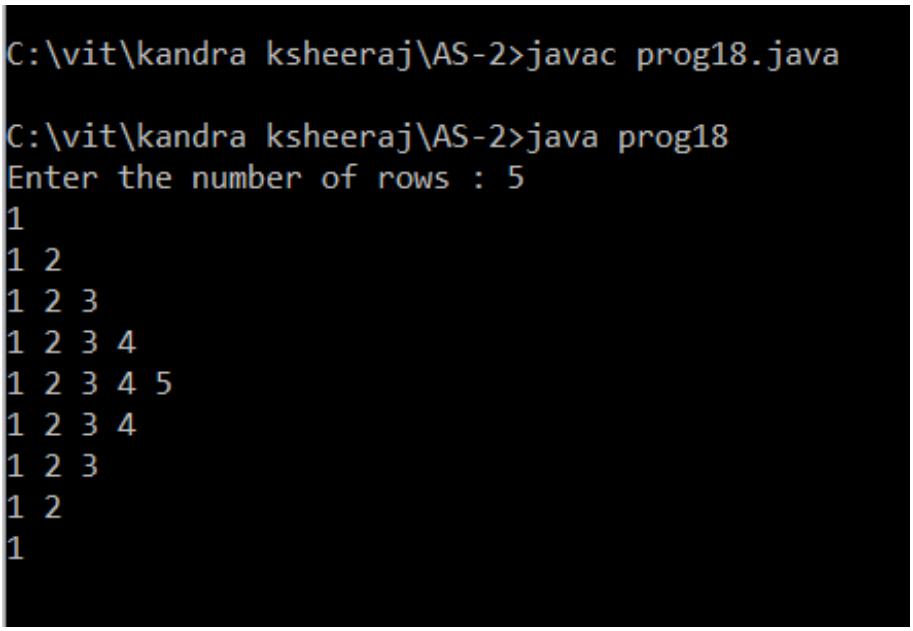
123

12

1

```
import java.util.*;
public class prog18
{
public static void main(String[] args) {
int i, j, rows,nuum;
 Scanner sc = new Scanner(System.in);
 System.out.print("Enter the number of rows : ");
 rows = sc.nextInt();
 for (i= 0; i<= rows-1; i++)
 {
 for (j=0; j<=i; j++)
 {
 System.out.print(j+1+ " ");
 }
 System.out.println("");
}
 for (i=rows-1; i>=0; i--)
 {
 for(j=0; j <= i-1;j++)
 { nuum=j+1;
 System.out.print(nuum+ " ");
 }
 System.out.println("");
 }
}
}
```

Sample Output:



19. **Write a program to demonstrate the knowledge of students in multidimensional arrays and looping constructs.**
Eg., If there are 4 batches in BTech - "CSE1007" course, read the count of the slow learners (who have scored <25) in each batch. Tutors should be assigned in the ratio of 1:4 (For every 4 slow learners, there should be one tutor). Determine the number of tutors for each batch. Create a 2-D jagged array with 4 rows to store the count of slow learners in the 4 batches. The number of columns in each row should be equal to the number of groups formed for that particular batch (Eg., If there are 23 slow learners in a batch, then there should be 6 tutors and in the jagged array, the corresponding row should store 4, 4, 4, 4, 4,3). Use for-each loop to traverse the array and print the details. Also print the number of batches in which all tutors have exactly 4 students.

```
import java.util.*;
class prog19
{
 public static void main(String args[])
 {
   int x,y,z,w;
   float count;
   int arr[][]=new int[4][];
   Scanner sc =new Scanner(System.in);
   System.out.println("Enter the slow learners in batch
1 :");
   x=sc.nextInt();
   allocate(arr,x,0);
   System.out.println("Enter the slow learners in batch
2 :");
   y=sc.nextInt();
   allocate(arr,y,1);
   System.out.println("Enter the slow learners in batch
3 :");
   z=sc.nextInt();
   allocate(arr,z,2);
   System.out.println("Enter the slow learners in batch
4 :");
   w=sc.nextInt();
   allocate(arr,w,3);
   for(int i=0;i<4;i++)
   {
    System.out.println("For batch "+ (i+1) +" no of
tutors required :"+ arr[i].length);
   }
   for(int[] r:arr)
  {
    for(int s:r)
    {
      System.out.print(s +" ");
    }
     System.out.println();
```

```
  }
   int sum=0;
   for(int[] r:arr)
  {
    for(int s:r)
    {
      if(s==4)
      {
        sum++;
      }
    }
  }
   System.out.println(sum + " batches in which all
tutors have exactly 4 students");
  }
  public static void allocate(int arr[][],int x,int p)
 {
   int count=x/4;
   if(x%4>0)
   {
     arr[p]=new int[count+1];
   }
   else
  {
     arr[p]=new int[count];
  }
   int i=0;
   while(count>0)
   {
      arr[p][i]=4;
      i++;count--;
   }
   if(x%4!=0)
   {
     arr[p][i]=x%4;
   }
  }
```

```
    }
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog19.java

C:\vit\kandra ksheeraj\AS-2>java prog19
Enter the slow learners in batch 1 :
14
Enter the slow learners in batch 2 :
9
Enter the slow learners in batch 3 :
12
Enter the slow learners in batch 4 :
17
For batch 1 no of tutors required :4
For batch 2 no of tutors required :3
For batch 3 no of tutors required :3
For batch 4 no of tutors required :5
4 4 4 2
4 4 1
4 4 4
4 4 4 4 1
12 batches in which all tutors have exactly 4 students
```

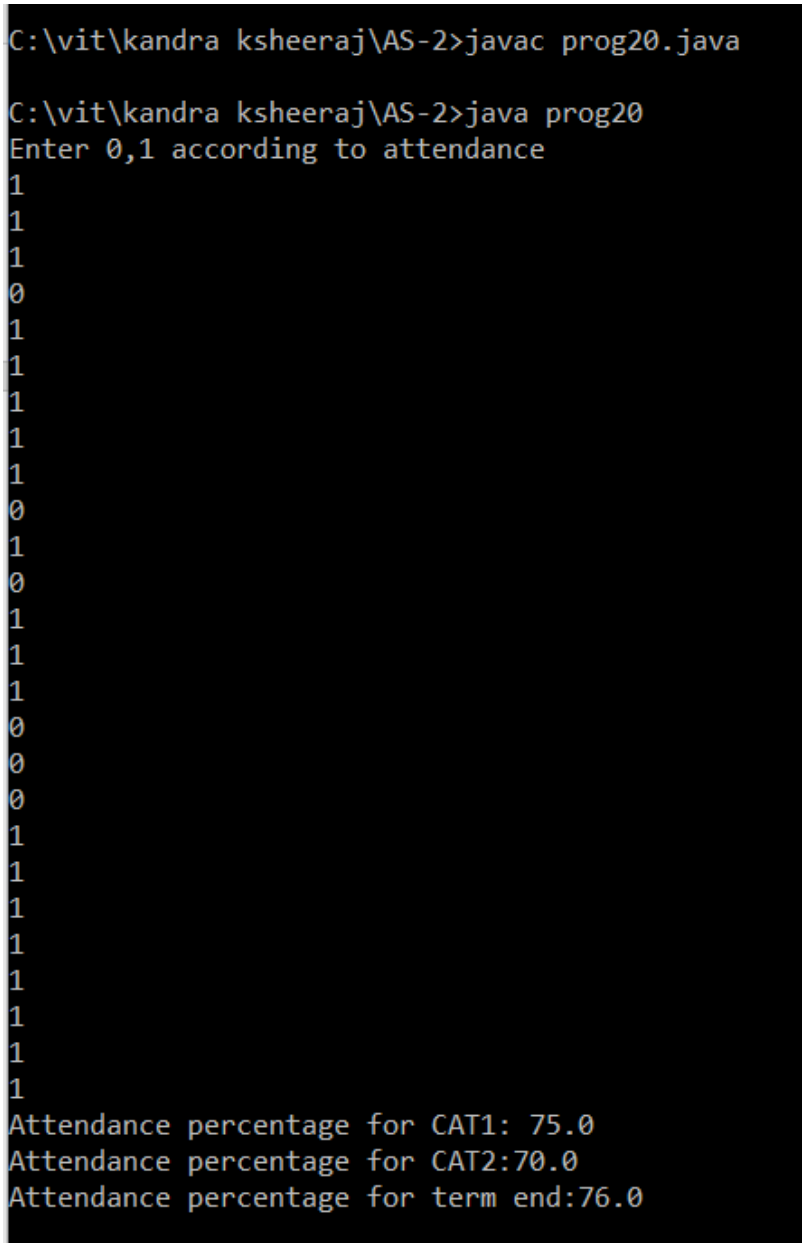
20. There are 12 10 and 8 instructional days for a particular course before CAT-1, CAT-2 and Termend examinations respectively. Declare a 2-dimensional jagged array with 3 rows to store the entire attendance details of a single student in that course, where in the first row must have 12 elements, second row- 10 elements and third row- 8 elements. Assuming the array elements contain any of the 2 values '1' / '0' denoting Present/Absent, Write a Java program to evaluate the attendance percentage for his CAT-1, CAT-2 and Term-end period (all the three terms taken together). Use enhanced-for loops to traverse the array.

```
import java.util.*;
class prog20
{
   public static void main(String args[])
  {
```

```
 System.out.println("Enter 0,1 according to
attendance");
   Scanner sc=new Scanner(System.in);
   int arr[][]=new int[3][];
   arr[0]=new int[12];
   arr[1]=new int[8];
   arr[2]=new int[6];
   for(int i=0;i<arr.length;i++)
    { for(int j=0;j<arr[i].length;j++)
      {
         arr[i][j]=sc.nextInt();
      }
    }
   float CAT1,CAT2,term;
   int count=0;
   for(int i : arr[0])
   {
     count=count+i;
   }
   CAT1=100*count/12f;
   System.out.println("Attendance percentage for CAT1:
"+ CAT1);
   for(int i : arr[1])
   {
    count=count+i;
   }
   CAT2=100*count/20;
   System.out.println("Attendance percentage for CAT2:"+
CAT2);
   for(int i:arr[2])
   {
    count=count+i;
   }
   term=100*count/26;
   System.out.println("Attendance percentage for term
end:"+ term);
}
```

```
}
```

Sample Output:



21. Write a Java program with class definition for 'Employee' with emp-name, emp-id, salary and joining-date and required methods as members of the class. Create an array of objects of 'emp' for 'n' number of employees in VIT. Write a Java program to display the emp-name and emp-id of employees who have salary less than INR100000 and sort the emp-name and display

the Employee details based on salary in ascending order.

```
import java.util.*;
class prog21
{
  String emp_name;
  int emp_id;
  float salary;
  String date;
  public void get()
 {
   Scanner sc=new Scanner(System.in);
   System.out.print("\n Enter employee name :");
   this.emp_name=sc.nextLine();
   System.out.print("\n Enter employee id :");
   this.emp_id=sc.nextInt();
   System.out.print("\n Enter employee salary :");
   this.salary=sc.nextFloat();
   System.out.print("\n Enter employee joining date :");
   sc.nextLine();
   this.date=sc.nextLine();
 }
  public void displayless()
  {
    if(this.salary<100000.00f)
    {
       System.out.println("Name of employee :"+
  this.emp_name);
       System.out.println("Employee id  : "+ this.emp_id);
    }
  }

  public void display()
  {
     System.out.println("name of employee :"+
  this.emp_name);
     System.out.println("employee id  : "+ this.emp_id);
```

```
   System.out.println("employee salary : "+
this.salary);
}
public static void main(String args[])
{
   int n;
   Scanner sc=new Scanner(System.in);
   System.out.print("\n enter number of employee:");
   n=sc.nextInt();
   prog21[] obj= new prog21[n];
   for(int i=0;i<n;i++)
  {
    System.out.println("\n employee no :"+ (i+1));
    obj[i]=new prog21();
    obj[i].get();
  }
   System.out.println("\nEmployee whose salary is less
than INR 100000/-");
   for(int i=0;i<n;i++)
  {
    obj[i].displayless();
  }
   System.out.println("employees list after sorting ----
----");
   prog21 temp=new prog21();
  for(int i=0;i<n;i++)
   {
     for(int j=0;j<n;j++)
    {
     if(obj[i].salary<obj[j].salary)
      {
          temp=obj[i];
          obj[i]=obj[j];
          obj[j]=temp;
      }
    }
  }
```

```
   for(int i=0;i<n;i++)
  {
    obj[i].display();
  }
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog21.java

C:\vit\kandra ksheeraj\AS-2>java prog21

 enter number of employee:2

 employee no :1

 enter employee name :mishra

 enter employee id :1045

 enter employee salary :80000

 enter employee joining date :1-12-20

 employee no :2

 enter employee name :ethiraj

 enter employee id :0809

 enter employee salary :150000

 enter employee joining date :8-2-20
employee whose salary is less than INR 100000/-
name of employee :mishra
employee id  : 1045
employees list after sorting --------
name of employee :mishra
employee id  : 1045
employee salary : 80000.0
name of employee :ethiraj
employee id  : 809
employee salary : 150000.0
```

22. Write a Java program to find the sum of the elements of a two dimensional array of integers and floating point numbers with method overloading.

```
import java.util.*;
class prog22
{
  public static int add(int[][] arr)
  {
    int sum = 0;
    for (int[] array : arr)
    {
    for(int i: array)
    {
        sum+=i;
    }}
    return sum;
  }
  public static float add(float[][] arr)
  {
    float sum = 0;
    for (float[] array : arr)
    {
    for(float i: array)
    {
        sum+=i;
    }}
    return sum;
  }
  public static void main(String args[])
  {
      int n,m;
      Scanner sc=new Scanner(System.in);
      System.out.println("Enter the dimension of integers
   2D array");
      n=sc.nextInt();
      m=sc.nextInt();
```

```
    int arr[][]=new int[n][m];
    System.out.println("Enter the elements of integers
2D array");
    for(int i=0;i<n;i++)
   {
     for(int j=0;j<m;j++)
     {
        arr[i][j]=sc.nextInt();
     }
   }
    System.out.println("Enter the dimension of floats 2D
array");
    n=sc.nextInt();
    m=sc.nextInt();
    float arry[][]=new float[n][m];
    System.out.println("Enter the elements of float 2D
array");
    for(int i=0;i<n;i++)
   {
     for(int j=0;j<m;j++)
     {
        arry[i][j]=sc.nextFloat();
     }
   }
  int sum;
  float res;
  sum=add(arr);
  res=add(arry);
  System.out.println("Sum of elements of integers 2D
array is : "+ sum);
  System.out.println("Sum of elements of floats 2D array
is : "+ res);
}
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac prog22.java

C:\vit\kandra ksheeraj\AS-2>java prog22
Enter the dimension of integers 2D array
2
2
Enter the elements of integers 2D array
1
2
3
4
Enter the dimension of floats 2D array
2
2
Enter the elements of float 2D array
1.1
2.2
3.3
4.4
Sum of elements of integers 2D array is : 10
Sum of elements of floats 2D array is : 11.0
```

23. Consider an example of declaring the examination result. Design three classes: Student, Exam and Result. The Student class has data members such as registration number, name etc. Create a class Exam by inheriting the student class. The Exam class adds data members representing the marks scored in six subjects. Derive class Result from the Exam class and it has own data members such as total_marks. Write an interactive program in Java to model this relationship

```
import java.util.*;
class Student
{
  String reg_num;
  String name;
  public void details()
   {
```

```
      Scanner sc =new Scanner(System.in);
      System.out.println("Name of student :");
      this.name =sc.nextLine();
      System.out.println("Regno of student :");
      this.reg_num=sc.nextLine();
   }
}
class Exam extends Student
{
  float marks[]=new float[6];
  public void get()
   {
      Scanner sc =new Scanner(System.in);
      System.out.println("Marks of student in 6 subjects
  :");
      for(int i=0;i<6;i++)
      {
        this.marks[i]=sc.nextFloat();
      }
   }

}
class Result extends Exam
{
  float total_marks=0.0f;
  public float marks()
 {
  for(int i=0;i<6;i++)
  {
    this.total_marks=this.total_marks+this.marks[i];
  }
  return total_marks;
 }
 public static void main(String args[])
 {
   int n;
   System.out.println("Number of students :");
```

```
  Scanner sc =new Scanner(System.in);
  n=sc.nextInt();
  float fina=0.0f;
  Result[] obj=new Result[n];
  for(int i=0;i<n;i++)
   {
    System.out.println("\nDetails of student " + (i+1) +
 "\n");
    obj[i]=new Result();
    obj[i].details();
    obj[i].get();
   }
for(int i=0;i<n;i++)
   {
    fina=obj[i].marks();
    System.out.println("name  of student is : "+obj[i].
 name);
    System.out.println("regno of student is : "+
 obj[i].reg_num);
    System.out.println("total marks of student is : "+
 fina);
    }
}
 }
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-2>javac Result.java

C:\vit\kandra ksheeraj\AS-2>java Result
Number of students :
2

Details of student 1

Name of student :
ksheeraj
Regno of student :
19BCE0829
Marks of student in 6 subjects :
28
24
20
18
22
23

Details of student 2

Name of student :
sankar
Regno of student :
19BIT0032
Marks of student in 6 subjects :
19
28
25
16
24
26
name  of student is : ksheeraj
regno of student is : 19BCE0829
total marks of student is : 135.0
name  of student is : sankar
regno of student is : 19BIT0032
total marks of student is : 138.0
```