11. Write a program for matrix multiplication?

```
public class M {
   public static void main(String[] args) {
      int[][] mat1 = {
         {1, 2},
         {5, 3}
      };

      int[][] mat2 = {
         {2, 3},
         {4, 1}
      };
      int rows1 = mat1.length;
      int cols1 = mat1[0].length;
      int rows2 = mat2.length;
      int cols2 = mat2[0].length;
      if (cols1 != rows2) {
         System.out.println("Matrices cannot be multiplied");
         return;
      }
      int[][] result = new int[rows1][cols2];
      for (int i = 0; i < rows1; i++) {
         for (int j = 0; j < cols2; j++) {
            result[i][j] = 0;
            for (int k = 0; k < cols1; k++) {
```

```
                result[i][j] += mat1[i][k] * mat2[k][j];
            }
        }
    }
    System.out.println("Resultant Matrix:");
    for (int i = 0; i < rows1; i++) {
        for (int j = 0; j < cols2; j++) {
            System.out.print(result[i][j] + " ");
        }
        System.out.println();
    }
  }
}
```

12.Write a program for matrix addition?

```
public class m {
    public static void main(String[] args) {
        int[][] mat1 = {
            {1, 2},
            {5, 3}
        };

        int[][] mat2 = {
            {2, 3},
            {4, 1}
        };
        int rows = mat1.length;
        int cols = mat1[0].length;
        int[][] result = new int[rows][cols];
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                result[i][j] = mat1[i][j] + mat2[i][j];
            }
```

```
            }
            System.out.println("Resultant Matrix:");
            for (int i = 0; i < rows; i++) {
                for (int j = 0; j < cols; j++) {
                    System.out.print(result[i][j] + " ");
                }
                System.out.println();
            }
        }
    }
```

13. Write a program for Merge two sorted arrays using Array list

```
public class v {
    public static void main(String[] args) {
        int[] a = {1, 3, 4, 5};
        int[] b = {2, 4, 6, 8};
        int n = a.length;
        int m = b.length;
        int[] c = new int[n + m];
        System.arraycopy(a, 0, c, 0, n);
        System.arraycopy(b, 0, c, n, m);
        for (int i = 0; i < c.length; i++) {
            System.out.print(c[i] + " ");
        }
    }
}
```

14. Find the Mean, Median, Mode of the array of numbers?

```
public class v{
    public static void main(String[] args){
```

```
int [] a={16, 18, 27, 16, 23, 21, 19};
int s=0;
int c=0;
for(int i=0;i<a.length;i++){
   s+=a[i];
}
int mean=(s/a.length);
System.out.println("Mean:"+mean);
int mid=a.length/2;
int temp=0;
for(int i=0;i<a.length;i++){
   for(int j=i+1;j<a.length;j++){
      if(a[i]>a[j]){
         temp=a[i];
         a[i]=a[j];
         a[j]=temp;
      }
   }
}
int median=0;
for(int i=0;i<a.length;i++){
   if(mid==i){
      median=a[i];
      System.out.println("median:"+median);
   }
}
```

```
        int maxFrequency = 0;
        int mode = a[0];

        for (int i = 0; i < a.length; i++) {
            int count = 0;
            for (int j = 0; j < a.length; j++) {
                if (a[i] == a[j]) {
                    count++;
                }
            }
            if (count > maxFrequency) {
                maxFrequency = count;
                mode = a[i];
            }
        }

        System.out.println("Mode: " + mode);

    }
}
```

15. Write a program to find the number of composite numbers in an array of elements

```
public class v{
    public static void main(String[] args) {
        int[] numbers = {16, 18, 27, 16, 23, 21, 19};
        int c = 0;
        for (int num : numbers) {
```

```
        boolean x = false;

        if (num > 1) {
            for (int i = 2; i <= num / 2; i++) {
                if (num % i == 0) {
                    x = true;
                    break;
                }
            }
        }

        if (x) {
            c++;
        }
    }
    System.out.println("Number of Composite Numbers: " + c);
  }
}
```

16.Write a program to print Right Triangle Star Pattern

```
public class v {
  public static void main(String[] args) {
    int n = 5;
    for (int i = 1; i <= n; i++) {
      for (int j = 1; j <= n - i; j++) {
        System.out.print(" ");
```

```
        }
        for (int k = 1; k <= 2 * i - 1; k++) {
            System.out.print("*");
        }
        System.out.println();
    }
  }
}
```

17.Write a program to print the below pattern?

```
public class PascalTriangle {
  public static void main(String[] args) {
    int n = 5;
    for (int i = 0; i < n; i++) {
      for (int j = 0; j < n - i - 1; j++) {
        System.out.print(" ");
      }

      int number = 1;
      for (int j = 0; j <= i; j++) {
        System.out.print(number + " ");
        number = number * (i - j) / (j + 1);
      }
      System.out.println();
    }
  }
}
```

18. Write a program to print rectangle symbol pattern

```
public class v{
   public static void main(String[] args) {
      int rows = 5;
      int cols = 7;
      for (int i = 1; i <= rows; i++) {
         for (int j = 1; j <= cols; j++) {
            System.out.print("* ");
         }
         System.out.println();w
      }
   }
}
```

19.Write a program to print the following pattern

Sample Input:

Enter the number to be printed: 1
Max Number of time printed: 3
1
11
111
11
1

```
public class v {
   public static void main(String[] args) {
      int number = 1;
      int maxTimes = 3;
      for (int i = 1; i <= maxTimes; i++) {
```

```
            for (int j = 1; j <= i; j++) {
                System.out.print(number);
            }
            System.out.println();
        }
        for (int i = maxTimes - 1; i >= 1; i--) {
            for (int j = 1; j <= i; j++) {
                System.out.print(number);
            }
            System.out.println();
        }
    }
}
```

20.Write a program to print the Inverted Full Pyramid pattern?

```
public class v{
    public static void main(String[] args) {
        int rows = 5;
        for (int i = rows; i >= 1; i--) {
            for (int j = 1; j <= rows - i; j++) {
                System.out.print("  ");
            }
            for (int k = 1; k <= 2 * i - 1; k++) {
                System.out.print("* ");
            }
            System.out.println();
        }
```

```
    }
}
```