1. Write a program to reverse a word using a loop? (Not to use inbuilt functions)
Sample Input:
String: TEMPLE
Sample Output:
Reverse String: ELPMET
Test cases:
1. SIGN UP
2. AT-LEAST
3. 1245
4. !@#$%
5. 145*999=144855

```
import java.util.*;
class stringRev
{
    public static void main(String args[])
    {
        String input;
        String word="";
        int i;
        System.out.println("Enter a String:");
        Scanner sc = new Scanner(System.in);
        input=sc.nextLine();
        int n=input.length();
        for(i=n;i>0;i--)
        {
            word=word+(input.charAt(i-1));
        }
        System.out.println("Revese string is:"+ word);
    }
}
```

2. Write a program to check the entered user name is valid or not. Get both the inputs from the user.
Sample Input:
Enter the user name: Saveetha@789
Re-enter the user name: Saveetha@123
Sample Output:
User name is Invalid

```
import java.util.*;
class stringRev
{
    public static void main(String args[])
    {
        String input1="";
        String input2="";

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a User name:");
        input2=sc.nextLine();
        System.out.println("Reenter a User name:");
        input2=sc.nextLine();
        if(input1.equals(input2))
        {
            System.out.println("Username is valid");
        }
        else
        {
            System.out.println("Username is invalid");
        }
    }
}
```

3. Write a program to reverse a number using loop?(Get the input from user)
Sample Input:
Number: 14567
Sample Output:
Reverse Number: 76541
Test cases:
1. -45721
2. 000
3. AD1947
4. !@#$%
5. 145*999=144855

```
import java.util.*;
class reverseNum
{
    public static void main(String args[])
    {
        try
        {
            int num,rem,result=0;
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter a number:");
            num=sc.nextInt();
            while(num!=0)
            {
                rem=num%10;
                result=result*10+rem;
                num=num/10;
            }
            System.out.println("reverse number is:"+result);
        }
        catch(Exception e)
        {
            System.out.println("Please! Enter a valid number");
        }
    }
}
```

4. Write a program to find whether the person is eligible to vote or not. And if that a particular person is not eligible, then print how many years are left to be eligible.
Sample Input:
Enter your age:
7
Sample output:
You are allowed to vote after 11 years

Test cases:
1. 25
2. Eighteen
3. 12
4. -18
5. 34.5

```
import java.util.*;
public class vote
{
    public static void main(String args[])
    {
        try
        {
            int age;
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter your age:");
            age=sc.nextInt();
            if(age>0)
            {
                if(age>=18)
                {
                    System.out.println("You are Eligible to vote");
                }
                else
                {
                    System.out.println("You are Eligible to vote after"+ (18-age) + "years");
                }
            }
            else
            {
                System.out.println("Enter positive number");
            }
        }
        catch(Exception e)
        {
            System.out.println("Enter only positive number");
        }
    }
}
```

5. Find the LCM and GCD of n numbers?

Sample Input:
N value = 2
Number 1 = 16
Number 2 = 20
Sample Output:
LCM = 80
GCD = 4
Test cases:
1. N = 3, {12, 25, 30}
2. N = 2, {52, 25, 63}
3. N = 3, {17, 19, 11}
4. N = -2, {52, 60}
5. N = 2, {30, 45}

6. Write a program to print Right Triangle Star Pattern

Sample Input:: n = 5

Output:

```
*
* *
* * *
* * * *
* * * * *
```

```
import java.util.*;

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

```
import java.util.*;
class sort
{
 public static void main(String[] args)
{
 Scanner sc=new Scanner(System.in);
 int n;
 System.out.print("Enter the no. strings you want to Enter: ");
 n= sc.nextInt();
 String[] s1=new String[n];
 String temp;
 System.out.println("Enter the strings: ");
 for(int i=0;i<n;i++)
 s1[i]=sc.next();
 System.out.print("Enter the order D/A: ");
 char ch=sc.next().charAt(0);
 if(ch=='D'){
 for(int i=0;i<n-1;i++)
 for(int j=i+1;j<n;j++)
 if(s1[i].compareTo(s1[j])<0)
{
 temp=s1[i];
  s1[j]=temp;
 }
 }
 if(ch=='A')
{
 for(int i=0;i<n-1;i++)
 for(int j=i+1;j<n;j++)
 if(s1[i].compareTo(s1[j])>0)
{
 temp=s1[i];
 s1[i]=s1[j];
 s1[j]=temp;
 }
 }
 for(int i=0;i<n;i++)
 System.out.print(s1[i]+" "+"\n");
 }
 }
```

5. Write a program to print the special characters separately and print number of Special characters in the line?

```
import java.util.Scanner;

class Special {
    public static void main(String args[]) {
        String input;
        int numcount = 0, alphacount = 0, splcount = 0;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a input:");
        input = sc.nextLine();

        int n = input.length();

        for (int i = 0; i < n; i++) {
            char ch = input.charAt(i);

            if (ch >= '0' && ch <= '9') {
                numcount += 1;
            } else if ((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z')) {
                alphacount += 1;
            } else {
                splcount += 1;
                System.out.println(ch);
                System.out.println("Number of Special Characters: " + splcount);
            }
        }

    }
}
```

6. Write a program to print the number of vowels in the given statement?

Sample Input:

Saveetha School of Engineering

Sample Output:

Number of vowels = 12

```
import java.util.Scanner;

class Special {
    public static void main(String args[]) {
        String input;
        int vowcount = 0;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a word:");
        input = sc.nextLine();

        int n = input.length();

        for (int i = 0; i < n; i++)
        {
            char ch = input.charAt(i);

            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
{
                vowcount += 1;
            }
        }

        System.out.println("Number of Vowels: " + vowcount);
    }
}
```

7. Write a program to print consonants and vowels separately in the given word

Sample Input:

Given Word: Engineering

Sample Output:

Consonants: n g n r n g

Vowels: e i e ei

```
import java.util.Scanner;
```

```
class Special {
    public static void main(String args[]) {
        String input;
        String vowels = "", consonants = "";

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a word:");
        input = sc.nextLine();

        int n = input.length();

        for (int i = 0; i < n; i++)
        {
            char ch = input.charAt(i);

            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
{
                vowels +=ch;
            }
            else
            {
                consonants+=ch;
            }
        }

        System.out.println("Number of Vowels: " + vowels);
        System.out.println("Number of Consonants: " + consonants);
    }
}
```

8. Write a program that finds whether a given character is present in a string or not. In case it is present it prints the index at which it is present. Do not use built-in find functions to search the character.

Sample Input:

Enter the string: I am a programmer

Enter the character to be searched: p

Sample Output:

P is found in string at index: 8

Note: Check for non available Character in the given statement as Hidden Test case.

```
import java.util.Scanner;

class Special {
    public static void main(String args[]) {
        String input1;
        char input2;
        int index=0;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a string:");
        input1 = sc.nextLine();

        System.out.println("Enter the character to be searched:");
        input2 = sc.next().charAt(0);

        int n = input1.length();

        for (int i = 0; i < n; i++)
        {
            char ch = input1.charAt(i);

            if (ch ==input2)
            {
                index=i+1;
            }

        }
        if(index>0)
        {
            System.out.println(input2 + "is found in string at index: " + index);
        }
        else
        {
            System.out.println("Character is not found");
        }


    }
}
```

1. Write a program to arrange the letters of the word alphabetically in reverse order

Sample Input:

Enter the word: MOSQUE

Sample Output:

Alphabetical Order: U S Q O M E

Test Case:

1. HYPOTHECATION

2. MATRICULATION

3. MANIPULATION

```
import java.util.Scanner;
```

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

        // Prompt user for input
        System.out.println("Enter the word:");
        String word = sc.nextLine();

        // Convert the word to a character array
        char[] charArray = word.toCharArray();

        // Sort the character array in reverse order
        for (int i = 0; i < charArray.length - 1; i++) {
            for (int j = i + 1; j < charArray.length; j++) {
                if (charArray[i] < charArray[j]) {
                    // Swap characters if they are out of order
                    char temp = charArray[i];
                    charArray[i] = charArray[j];
                    charArray[j] = temp;
                }
            }
        }

        // Create a StringBuilder to build the reversed alphabetical order string
        StringBuilder reversedOrder = new StringBuilder();
        for (char ch : charArray) {
            reversedOrder.append(ch).append(" ");
        }

        // Print the result
        System.out.println("Alphabetical Order: " + reversedOrder.toString().trim());

        // Close the scanner
        sc.close();
    }
}
```

10. Write a program that accepts a string from user and displays the same string after removing vowels from it.

Sample Input & Output:

```
Enter a string: we can play the game

The string without vowels is: w cn ply thgm
```

```
import java.util.Scanner;

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

        // Prompt user for input
        System.out.println("Enter a string:");
        String input = sc.nextLine();
        // Remove vowels from the input string
        String result = input.replaceAll("[aeiouAEIOU]", "");

        // Display the result
        System.out.println("The string without vowels is: " + result);

        // Close the scanner
        sc.close();
    }
}
```

Method 2:

```
import java.util.Scanner;

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

        System.out.println("Enter a string:");
        String input = sc.nextLine();
        System.out.print("The string without vowels is: ");
        for (int i=0;i<input.length();i++)
        {
            char ch = input.charAt(i);

            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
            {
                continue;
            }
            else
            {
                System.out.print(ch);
            }

        }

    }
}
```

Arrays:

1. Write a program for matrix multiplication?

Sample Input:

Mat1 = 1 2

5 3

Mat2 = 2 3

```
            4   1
```

Sample Output:

```
Mat Sum = 10    5

           22    18
```

12. Write a program for matrix addition?

Sample Input:

```
Mat1 =         1  2

               5  3

Mat2 =         2   3

               4   1
```

Sample Output:

```
Mat Sum = 3    5

          9    4
```

```
import java.util.Scanner;

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

        System.out.println("Enter number of rows:");
        int  row= sc.nextInt();
        System.out.println("Enter number of columns:");
        int  col= sc.nextInt();
        int[][] mat1=new int[row][col];
        int[][] mat2=new int[row][col];
        int[][] result=new int[row][row];
        int i,j;
        System.out.println("Enter the elements for matrix1:");
        for(i=0;i<row;i++)
        {
            for(j=0;j<col;j++)
            {
               mat1[i][j]=sc.nextInt();
            }
        }
        System.out.println("Enter the elements for matrix2:");
        for(i=0;i<row;i++)
        {
```

```
      for(j=0;j<col;j++)
      {
        mat2[i][j]=sc.nextInt();
      }
    }
    for(i=0;i<row;i++)
    {
      for(j=0;j<col;j++)
      {
        result[i][j]=mat1[i][j]+mat2[i][j];
      }
    }
    System.out.println("Addition of matrix is:");
    for(i=0;i<row;i++)
    {
      for(j=0;j<col;j++)
      {
         System.out.print(result[i][j]+"\t");
      }
      System.out.println();
    }
  }
}
```

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

Input: arr1[] = { 1, 3, 4, 5}, arr2[] = {2, 4, 6, 8}

Output: arr3[] = {1, 2, 3, 4, 4, 5, 6, 8}

```
// Java Program to demonstrate merging
// two array using pre-defined method

import java.util.Arrays;

public class MergeTwoArrays1 {
        public static void main(String[] args)
        {
                // first array
                int[] a = { 10, 20, 30, 40 };

                // second array
                int[] b = { 50, 60, 70, 80 };

                // determines length of firstArray
                int a1 = a.length;

                // determines length of secondArray
                int b1 = b.length;

                // resultant array size
                int c1 = a1 + b1;
                // create the resultant array
                int[] c = new int[c1];

                // using the pre-defined function arraycopy
                System.arraycopy(a, 0, c, 0, a1);
                System.arraycopy(b, 0, c, a1, b1);

                // prints the resultant array
                System.out.println(Arrays.toString(c));
        }
}
```

Method 2:

```
// Java Program to demonstrate merging
// two array without using pre-defined method

import java.io.*;

public class MergeTwoArrays2 {
    public static void main(String[] args)
    {

        // first array
        int a[] = { 30, 25, 40 };
        // second array
        int b[] = { 45, 50, 55, 60, 65 };

        // determining length of first array
        int a1 = a.length;
        // determining length of second array
        int b1 = b.length;

        // resultant array size
        int c1 = a1 + b1;

        // Creating a new array
        int[] c = new int[c1];

        // Loop to store the elements of first
        // array into resultant array
        for (int i = 0; i < a1; i = i + 1) {
            // Storing the elements in
            // the resultant array
            c[i] = a[i];
        }

        // Loop to concat the elements of second
        // array into resultant array
        for (int i = 0; i < b1; i = i + 1) {

            // Storing the elements in the
            // resultant array
            c[a1 + i] = b[i];
```

```
                    }

                    // Loop to print the elements of
                    // resultant array after merging
                    for (int i = 0; i < c1; i = i + 1) {

                         // print the element
                         System.out.println(c[i]);
                    }
          }
}
```

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

Sample Input;:

Array of elements = {16, 18, 27, 16, 23, 21, 19}

Sample Output:
Mean = 20

Median = 19

Mode = 16

Test cases:

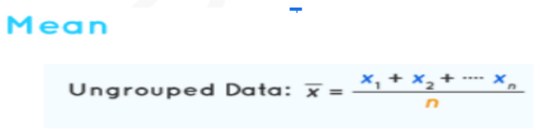
1. Array of elements = {26, 28, 37, 26, 33, 31, 29}

2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}

3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}

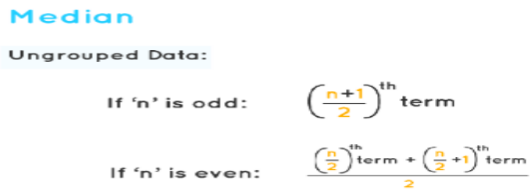
4. Array of elements = {200, 180, 180, 270, 160, 270, 270, 190, 200}

5. Array of elements = {100, 100, 100, 100, 100, 100, 100, 100, 100}



Mean

Ungrouped Data: $\overline{x} = \frac{x_1 + x_2 + \cdots x_n}{n}$

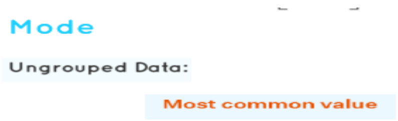


Median

Ungrouped Data:

If ‘n’ is odd: $\left(\frac{n+1}{2}\right)^{th}$ term

If ‘n’ is even: $\frac{\left(\frac{n}{2}\right)^{th}\text{term} + \left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$



Mode

Ungrouped Data:

Most common value

```
import java.util.Scanner;
class arr
{
public static void main(String[] args)
{
Scanner s=new Scanner(System.in);
System.out.print("Enter the array size: ");
int size=s.nextInt();
float[] arr=new float[size];
float msum=0;
System.out.print("Enter the array elements: ");
for(int i=0;i<size;i++){
arr[i]=s.nextFloat();
msum+=arr[i];
}
float temp=0;
for(int i=0;i<size;i++){
for(int j=0;j<size;j++){
if(arr[i]<arr[j]){
temp=arr[i];
arr[i]=arr[j];
arr[j]=temp;
}
}
}
System.out.println("Mean: "+(int)(msum/size));
if(size%2==0)
System.out.println("Median: "+(int)((arr[size/2]+arr[(size/2)+1])/2));
else
System.out.println("Median: "+(int)(arr[size/2]));
float max=0;
int o_count=0,n_count=0;
for(int i=0;i<size;i++){
for(int j=0;j<size;j++){
if(arr[i]==arr[j])
n_count++;
}
if(o_count<n_count){
max=arr[i];
o_count=n_count;
}
n_count=0;
}
System.out.print("Mode: "+(int)max);
}
}
```

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

Sample Input;:

Array of elements = {16, 18, 27, 16, 23, 21, 19}

Sample Output:
Number of Composite Numbers = 5

Test cases:

1. Array of elements = {26, 28, 37, 26, 33, 31, 29}

2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}

3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}

4. Array of elements = {200, 180, 180, 270, 270, 270, 190, 200}

5. Array of elements = {100, 100, 100, 100, 100, 100, 100, 100}

```
import java.util.Scanner;

public class composite

{

public static void main(String[] args)

{

try

{

int p_count = 0, c_count = 0;

float[] arr;

int size;

Scanner s = new Scanner(System.in);

System.out.print("Enter the no. of element: ");

size = s.nextInt();

arr = new float[size];

System.out.println("Enter the elements: ");

for (int i = 0; i < size; i++)

arr[i] = s.nextFloat();
```

```
for (int j = 0; j < size; j++) {
int count = 0;
if (arr[j] > 0) {
for (int k = 1; k <= arr[j]; k++) {
if (arr[j] % k == 0)
count++;
}
if (count > 2)
c_count++;
else
p_count++;
}
else if(arr[j]<0) {
for (float k =arr[j]; k<=-1; k++) {
if (arr[j] % k == 0)
count++;
}
if (count > 2){
c_count++;
}
else{
p_count++;
}
}
}
System.out.println("No. of composite num: " + c_count);
System.out.println("No. of Prime num: " + p_count);
```

```
s.close();

}

catch(Exception e)

{

System.out.println("Enter only positive numbers");

}

}

}
```

Patterns :

16. Write a program to print Right Triangle Star Pattern

Sample Input:: n = 5

Output:

```
        *
       * *
      * * *
     * * * *
    * * * * *
```

```
// Java Program to print
// Triangular Pattern
import java.util.*;

public class GeeksForGeeks {
    // Function to demonstrate pattern
    public static void printPattern(int n)
    {
        int i, j;
        // outer loop to handle rows
        for (i = 0; i < n; i++) {
            // inner loop to print spaces.
            for (j = n - i; j > 1; j--) {
                System.out.print(" ");
            }
```

```
                        // inner loop to print stars.
                        for (j = 0; j <= i; j++) {
                                System.out.print("* ");
                        }

                        // printing new line for each row
                        System.out.println();
                }
        }

        // Driver Function
        public static void main(String args[])
        {
                int n = 6;
                printPattern(n);
        }
}
```

17. Write a program to print the below pattern?

```
    1

   1 1

  1 2 1

 1 3 3 1

1 4 6 4 1
```

```
class pascal

{

public static void main(String[] args)

{

int num;

Scanner s = new Scanner(System.in);

System.out.print("Enter the Row Size of Pascal Triangle: ");

int row = s.nextInt();

for(int i=0; i<row; i++)

{

for(int space=row; space>i; space--)
System.out.print(" ");
num=1;
for(int j=0; j<=i; j++)
{
System.out.print(num+ " ");
num = num*(i-j)/(j+1);
}
System.out.print("\n");
}
}
}
```

18. Write a program to print rectangle symbol patterns.

Get the symbol as input from user

```
import java.io.*;
import java.util.*;
class rectpat
{
public static void main(String[] args)
{
int i,j,m,n;
char c;
Scanner sc=new Scanner(System.in);
System.out.print("Enter the number.of.rows:");
m=sc.nextInt();
System.out.print("Enter the number.of.columns:");
n=sc.nextInt();
System.out.print("Enter the symbol:");
c=sc.next().charAt(0);

for (i=0; i<m; i++)

{

for (j=0; j<n; j++)

{

System.out.print(c);

}

System.out.println();

}

}

}
```

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
```

```
    import java.io.*;

    import java.util.*;

    class rectpat

    {

    public static void main(String[] args)

    {
```

```
    int i,j,m,n;
    char c;
    Scanner sc=new Scanner(System.in);
    System.out.print("Enter the number.of.rows:");
    m=sc.nextInt();
    System.out.print("Enter the number.of.columns:");
    n=sc.nextInt();
    System.out.print("Enter the symbol:");
    c=sc.next().charAt(0);
    for (i=0; i<m; i++)
    {
    for (j=0; j<n; j++)
    {
    System.out.print(c);
    }
    System.out.println();
    }
    }
    }
```

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

```
// Java program to print reverse pyramid star pattern
// Using for loop
import java.io.*;

class GFG{
```

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

    // Size of the pyramid
    int number = 7;
    int i, j;

    // Outer loop handle the number of rows
    for(i = number; i >= 1; i--)
    {

            // Inner loop print space
            for(j = i; j < number; j++)
            {
                    System.out.print(" ");
            }

            // Inner loop print star
            for(j = 1; j <= (2 * i - 1); j++)
            {
                    System.out.print("*");
            }

            // Ending line after each row
            System.out.println("");
    }
}
```

```
}
```

21. Write a program to print the following pattern

Sample Input:

Enter the Character to be printed: %

Max Number of time printed: 3

```
    %

    % %

    % % %
```

```
public class RightTrianglePattern

{

public static void main(String args[])

{

//i for rows and j for columns

//row denotes the number of rows you want to print

int i, j, row=3;

//outer loop for rows

for(i=0; i<row; i++)

{

//inner loop for columns

for(j=0; j<=i; j++)

{

//prints stars

System.out.print("% ");

}

//throws the cursor in a new line after printing each line

System.out.println();
}
}
}
```

21. Write a program to print hollow square symbol pattern?

```
import java.util.Scanner;
public class Main
{
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter the stars in each side of square: ");
    int sideSize = sc.nextInt();

    for (int i = 0; i < sideSize; i++ )
    {
      for (int j = 0 ; j < sideSize; j++ )
      {
        if (i == 0 || i == sideSize - 1 || j == 0 || j == sideSize - 1)
        {
          System.out.print("*"+" ");
        }
        else {
          System.out.print(" "+ " ");
        }
      }
      System.out.println();
    }
  }
}
```

23. Write a program to print the below pattern

```
1

2  2

3  3  3

4  4   4   4
```

```
// Java Program to print pattern

// Number-increasing pyramid

import java.util.*;


public class GeeksForGeeks {

    // Function to demonstrate pattern

    public static void printPattern(int n)

    {

            int i, j;

            // outer loop to handle number of rows

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

                    // inner loop to handle number of columns

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

                            // printing column values upto the row

                            // value.

                            System.out.print(i + " ");

                    }


                    // print new line for each row

                    System.out.println();

            }
    }

    // Driver Function
    public static void main(String args[])
    {
        int n = 4;
        printPattern(n);
    }
}
```