Scaner Class	Used to take the input from the user
nextInt();	
nextFloat();	
nextShort();	
nextDouble();	
nextLong();	
nextByte();	
next();	String
nextLine();	String

1. WAP a program to check if a number is positive or negative.

```
import java.util.Scanner;
class mainRunner
{
  Public static void main( String args[] )
   {
      Scaner scn = new Scanner(System.in);
      System.out.println("Enter a interger value");
      int no = scn.nextint();
      if(no>=0)
         System.out.println( no + "is a Positive integer");
      else
         System.out.ptintln(no + "is a Negative integer");
   }
}
```

2. WAP to check if your number is even or odd.

```
import java.util.Scanner;
public class EvenOdd {

   public static void main(String[] args) {
         Scanner sc = new Scanner(System.in);
         System.out.println("Enter any integer ");
         int no = sc.nextInt();
         if(no%2==0)
         {
               System.out.println("Number is EVEN");
         }
         else
         {
               System.out.println("Number is ODD");
         }

   }

}
```

3. WAP to check year is leap year or not.

(www.editplus.com) download to write a program in this text editor.

```
import java.util.Scanner;
class Leap
{
      //Scanner sc = new Scanner(System.in);  (wrong bcz it should be inside
main method)
      public static void main(String[] args)
      {
            System.out.println("Enter any year");
            Scanner sc = new Scanner(System.in);
            int y = sc.nextInt();
            if (y%400==0)
            {
                  System.out.println("Year is a Leap Year");
            }
            else if(y%100==0)
            {
                  System.out.println("Year is not a leap Year");
            }
            else if(y%4==0)
            {
                  System.out.println("Year is a Leap Year");
            }
            else
            {
                  System.out.println("Year is not a Leap Year");
```

```
		}

	}
}
```

4.WAP to calculate the Simple Interest.

Alternate 1: Without using METHOD

```
import java.util.Scanner;
public class SimpleInterest {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the amount");
		long amt = sc.nextLong();
		System.out.println("Enter the Rate of Interest");
		double r = sc.nextDouble();
		System.out.println("Enter the time ");
		double y = sc.nextDouble();
		double si = (amt*r*y)/100;
		System.out.println("The Simple Interest is " + si);
	}

}
```

Alternate 2: With using METHOD

```
import java.util.Scanner;
public class SimpleInterest {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the amount");
		long amt = sc.nextLong();
		System.out.println("Enter the Rate of Interest");
		double r = sc.nextDouble();
		System.out.println("Enter the time ");
		double y = sc.nextDouble();

		double si = getSI(amt,r,y);
		//double si = (amt*r*y)/100;
		System.out.println("The Simple Interest is " + si);
	}
	static double getSI(long p,double r,double t)
	{
		double si = (p*r*t)/100;
		return si;
	}
}
```

5 WAP to define a method to calculate the area of a circle.

```
import java.util.Scanner;
public class Circle {

	public static void main(String[] args) {
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the Radius");
```

```
            double r1 = sc.nextDouble();
            area(r1);

            System.out.println("Enter the Radius");
            double r2 = sc.nextDouble();
            area(r2);

            System.out.println("Enter the Radius");
            double r3 = sc.nextDouble();
            area(r3);
      }

      static void area (double r){
            double area = 3.14*r*r;
            System.out.println("Area is " + area);
      }
}
```

6. WAP define a method to get the area of a square.

```
//import java.util.Scanner;
public class Square {

      public static void main(String[] args) {
            //Scanner sc=new Scanner(System.in);
            //System.out.println("Enter the side of a square");
            double area = area(3.5);
            System.out.println(area);

            System.out.println(area(5));
      }
 static double area ( double side)
 {
       return (side*side);
 }
}
```

7. WAP to read the 4 subject marks from the user and display the result. In any subject marks < 35 so fail; percentage> 80% so distinction,>60 first class,>50 2nd class. Otherwise just pass

ALTERNATE 1: WITHOUT USING METHOD

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

            double m1,m2,m3,m4,perc;
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter student marks in 1st subject out of 100
");
            m1= sc.nextDouble();
            System.out.println("Enter student marks in 2nd subject out of 100
");
            m2=sc.nextDouble();
            System.out.println("Enter student marks in 3rd subject out of 100
");
```

```
            m3=sc.nextDouble();
            System.out.println("Enter student marks in 4th subject out of 100
");
            m4=sc.nextDouble();
            if(m1<35 || m2<35 || m3<35 ||m4<35)
            {
                  System.out.println("Student failed");
            }
            else
            {
                  perc = ((m1+m2+m3+m4)*100)/400;
                  if(perc>80)
                  {
                        System.out.println("Distinction");
                  }
                  else if (perc >60)
                  {
                        System.out.println("First Class");
                  }
                  else if (perc>50)
                  {
                        System.out.println("Second Class");
                  }
                  else
                  {
                        System.out.println("Fail");
                  }
            }

      }

}
```

ALTERATE 2: USING METHOD

```
import java.util.Scanner;
public class Exam {
static void marks()
{
      double m1,m2,m3,m4,perc;
      Scanner sc = new Scanner(System.in);
      System.out.println("Enter student marks in 1st subject out of 100 ");
      m1= sc.nextDouble();
      System.out.println("Enter student marks in 2nd subject out of 100 ");
      m2=sc.nextDouble();
      System.out.println("Enter student marks in 3rd subject out of 100 ");
      m3=sc.nextDouble();
      System.out.println("Enter student marks in 4th subject out of 100 ");
      m4=sc.nextDouble();
      if(m1<35 || m2<35 || m3<35 ||m4<35)
      {
            System.out.println("Student failed");
      }
      else
      {
            perc = ((m1+m2+m3+m4)*100)/400;
            if(perc>80)
            {
```

```
                System.out.println("Distinction");
            }
            else if (perc >60)
            {
                System.out.println("First Class");
            }
            else if (perc>50)
            {
                System.out.println("Second Class");
            }
            else
            {
                System.out.println("Fail");
            }
        }
}
    public static void main(String[] args) {

        marks();
    }

}
```

8. WAP to read integer value from the user and print if it is even or odd.

```
import java.util.Scanner;
public class EvenOdd {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter any integer ");
        int no = sc.nextInt();
        if(no%2==0)
        {
            System.out.println("Number is EVEN");
        }
        else
        {
            System.out.println("Number is ODD");
        }

    }

}
```

9. WAP to define a method to return the area of rectangle.

```
import java.util.Scanner;
public class RectangleArea {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double length = sc.nextDouble();
        double width = sc.nextDouble();
        area(length,width);
```

```
            //System.out.println("Area of rectangle is "+ ar);

      }

      static void area(double l , double w)
      {
            double a = l*w;
            System.out.println("Area = "+ a);
            //return a;
      }
}
```

10. WAP to define a method to return biggest between two numbers.

```
import java.util.Scanner;
public class BiggestNumber {

      public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
            double a = sc.nextDouble();
            double b = sc.nextDouble();
            if(a>b)
            {
                  System.out.println(a + " is Bigger");
            }
            else if (b>a)
            {
                  System.out.println(b + " is Bigger");
            }
            else
            {
                  System.out.println("Both the numners are equal");
            }
      }

}
```

11. WAP to define if your number is even or odd.

```
import java.util.Scanner;
public class EvenOddMethd {

      public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter any integer");
            int no = sc.nextInt();
            boolean rs = isEven(no);

            if (rs == true)
                  System.out.println("Even");
            else
                  System.out.println("ODD");
      }
      static boolean isEven(int x){
            if (x%2==0)
                  return true;
            else
                  return false;
```

```
	}
}
```

12. WAP to define a method calculate the cube of a number.

```
import java.util.Scanner;
public class Cube {

	public static void main(String[] args) {
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the number");
		double no = sc.nextDouble();
		double c = cube(no);
		System.out.println(c);

		//System.out.println(c);
	}
 static double cube ( double no)
 {
	 return (no*no*no);
 }
}
```

13. WAP to define a method to perform arithmetic operation on any two values.

```
import java.util.Scanner;
public class EvenOddMethd {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter any integer");
		int no = sc.nextInt();
		boolean rs = isEven(no);

		if (rs == true)
			System.out.println("Even");
		else
			System.out.println("ODD");
	}
	static boolean isEven(int x){
		if (x%2==0)
			return true;
		else
			return false;
	}
}
```

14. WAP to check display the number between 1 to 10.

```
import java.util.Scanner;
public class Numbers {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("From where you want to print the number");
		int i = sc.nextInt();
		System.out.println("Upto what number you want to print the
numbers");
		int n = sc.nextInt();
```

```
            while(i<=n)
            {
                  System.out.println(i);
                  i++;
            }

      }

}
```

15. WAP to print the even number between 1 to n.

```
import java.util.Scanner;
public class EvenNumbers {
      public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
            System.out.println("From where you want to print the number");
            int i = sc.nextInt();
            System.out.println("Upto what number you want to print the
numbers");
            int n = sc.nextInt();
            if (i%2!=0)
                  i++;

            while(i<=n)
            {
                  System.out.println(i);
                  i+=2;
            }

      }

}
```

16. WAP to calculate the sum of first n natural numbers.

```
import java.util.Scanner;
public class SumNatural {

      public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the natural number");
            int sum =0;
            int no = sc.nextInt();
            while(no>0)
            {
                  sum = sum + no;
                  no=no-1;
            }

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

17. WAP to define a method to how many even numbers between 1 to n.

```
import java.util.Scanner;
public class EvenUptoN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		even(no);
	}

	static void even(int no)
	{
		int i=2,count=0;
		while(i<=no)
		{
			//System.out.println(i);
			i+=2;
			count++;
		}
		System.out.println("Total of "+count + " even numbers");
	}

}
```

18. WAP to calculate the sum of even numbers between 1 to n.

```
import java.util.Scanner;
public class SumEvenUptoN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		even(no);
	}
	static void even(int no)
	{
		int i=2,sum=0;
		while(i<=no)
		{
			//System.out.println(i);
			sum+=i;
			i+=2;
		}
		System.out.println("Sum of Even integer is "+sum);
	}
}
```

19. WAP to display the multiples of 5 between 1 to n.

```
import java.util.Scanner;
public class MultiplesOf5 {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		multiples(no);
```

```
	}

	static void multiples(int no)
	{
		int i=5;
		while(i<=no)
		{
			System.out.println(i);
			i+=5;
		}
	}

}
```

20. WAP to define a method to return product of first n natural numbers.

```
import java.util.Scanner;
public class Factorial {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter any natural number");
		int no = sc.nextInt();
		fact(no);
	}

	static void fact(int no)
	{
		int prod=1;
		while(no>1)
		{
			prod*=no;
			no-=1;
		}
		System.out.println("Factorial is "+prod);
	}

}
```

21. WAP to define a method to return sum of even numbers between 1 to n.

```
import java.util.Scanner;
public class ReturnEvenSum {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		int sum = sumEven(no);
		System.out.println("Sum of First even Numbers is "+ sum);
//		System.out.println("Sum of First even Numbers is " +
sumEven(no));
	}

	static int sumEven(int no)
	{
```

```
            int i=2,sum=0;
            while(i<=no)
            {
                  sum+=i;
                  i+=2;
            }
            return sum;
      }

}
```

22. WAP to display the multiplication of "N".

```
import java.util.Scanner;
public class TableOfN {

      public static void main(String[] args) {
            System.out.println("Enter te number of which you want to print
table");
            Scanner sc=new Scanner(System.in);
            int n=sc.nextInt();
            int i=1;

            while(i<=10)
            {
                  System.out.println(n+"*"+i+"="+n*i);
                  i++;
            }
      }

}
```

23. WAP to define a method to calculate the product of first N natural number.

Here I'm defining two different class. 1st is to define a "FactorialN" method and 2nd is to define the main method. While executing this in command prompt, both the class has to be complied then only o/p will come.

1st class: FactorialN class

```
class FactorialN
{
      int getFact(int n)
      {
            int P = 1;
            while (n>0)
            {
                  P=P*n;
                  n--;
            }
            return P;
      }
}
```

2nd class: Main Method

```
//import java.util.Scanner;
class MainFact
{
```

```
	public static void main(String[] args)
	{
		//Scanner sc = new Scanner(System.in);
		//int no = sc.nextInt();
		FactorialN f = new FactorialN();

		System.out.println("Factorial is "+ f.getFact(5));
	}
}
```

24. WAP to count how many digit are there in a number.

```
import java.util.Scanner;
public class Digits {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int n = sc.nextInt();
		System.out.println("Total digits are "+ countDigits(n));
	}

	static int countDigits(int n)
	{
		int count=0;
		if (n==0)
			return 1;
		while(n!=0)
		{
			count++;
			n/=10;
		}
		return count;
	}
}
```

25. WAP to count how many even digits in your number.

```
import java.util.Scanner;
public class EvenDigitInNumber {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		int rem,count=0;
		while(no!=0)
		{
			rem = no%10;
			if (rem%2==0)
			{
				count++;
			}
			no/=10;
		}
		System.out.println("Total Even digits are "+count);
	}

}
```

26 WAP to define a method to count how many odd digits present in a number.

```
import java.util.Scanner;
public class OddDigitsInNumner {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		countOdd(no);
	}
	static void countOdd(int no)
	{
		int rem,count=0;
		while(no!=0)
		{
			rem = no%10;
			if(rem%2!=0)
			count++;
			no=no/10;
		}
		System.out.println("Total Odd digits are " + count);
	}

}
```

27. WAP to define a method to display the number from 1 to n.

```
import java.util.Scanner;
public class Display1ToN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		display1ToN(no);
	}
	static void display1ToN(int no)
	{
		int i=1;
		while(i<=no)
		{
			System.out.println(i);
			i++;
		}
	}

}
```

28. WAP to define a method if a number is a strong number or not.

```
import java.util.Scanner;
public class StrongNumber {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number to check if it is strong
number or not");
		int no = sc.nextInt();
		boolean rs = isStrong(no);
		if ( rs== true)
```

```
                System.out.println("The number is strong Number");
        else
                System.out.println("The numner is not strong number");
    }

    static boolean isStrong(int no)
    {
        int no1=no,sum=0;

        while(no1!=0)
        {
            int rem=no1%10;
            sum=sum+fact(rem);
            no1=no1/10;

        }

        if (sum==no)
            return true;
        else
            return false;
    }

    static int fact(int no)
    {
        int pro =1;
        while (no!=0)
        {
            pro=pro*no;
            no--;
        }
        return pro;
    }
}
```

29. WAP to define a method to calculate the sum of square of digits.

```
import java.util.Scanner;
public class SquareOfDigits {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number to calculate the square of
digits");
        int no = sc.nextInt();
        int sum = squareOfDigit(no);
        System.out.println("The sum of square of digits is "+ sum);
    }

    static int squareOfDigit(int no)
    {
        int sum=0;
        while (no!=0)
        {
            int rem=no%10;
            sum=sum+(rem*rem);
            no/=10;
        }
```

```
		return sum;
	}

}
```

30. WAP to calculate the n to the power of p.

```
import java.util.Scanner;
public class NPowerP {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter base and exponent value");
		int no = sc.nextInt();
		int pw = sc.nextInt();
		System.out.println("Answer is "+pow(no,pw));
	}

	static int pow(int no,int pw)
	{
		int pro=1;
		while(pw>0)
		{
			pro=pro*no;
			pw--;
		}
		return pro;
	}

}
```

31. WAP to define a method to check your number is Armstrong number or not.

```
import java.util.Scanner;
public class ArmstrongNumb {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number to check the number is
armstrong or not");
		int no = sc.nextInt();
		int dig = digit(no);
		boolean rs = arms(no,dig);
		if(rs==true)
			System.out.println("The number is Armstrong");
		else
			System.out.println("The number is not Armstrong");
	}

	static int digit(int no)
	{
		int temp=0;
		while (no!=0)
		{
			temp++;
			no/=10;
		}
		return temp;
```

```
	}

	static boolean arms(int no,int dig)
	{
		int sum=0, t=no;
		while (t!=0)
		{
			int rem = t%10;
			sum=sum+pro(rem,dig);
			t/=10;
		}
		if(sum==no)
			return true;
		else
			return false;
	}

	static int pro(int rem, int dig)
	{
		int pro=1;
		while (dig>0)
		{
			pro=pro*rem;
			dig--;
		}
		return pro;
	}

}
```

32. WAP to check your number is Disarium number or not.(Sum of power of individual digit by their position).

```
import java.util.Scanner;
public class Disarium {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number to check if it is Disarium Number or not");
		int no = sc.nextInt();
		isDisarium(no);
	}

	static void isDisarium(int no)
	{
		int dig=digit(no);
		int sum=0,no1=no,rem;
		while(no1!=0)
		{
			rem=no1%10;
			no1/=10;
			sum=sum+power(rem,dig);
			dig--;
		}
		if(sum==no)
			System.out.println("Disarium Number");
		else
			System.out.println("Not Disarium Number");
```

```
	}

	static int digit(int no)
	{
		int count=0;
		if (no==0)
			count=1;
		while(no!=0)
		{
			count++;
			no/=10;
		}
		return count;
	}

	static int power(int rem,int dig)
	{
		int pw=1;
		while(dig>0)
		{
			pw*=rem;
			dig--;
		}
		return pw;
	}

}
```

33. WAP to check if a number is Perfect Number or not.

```
import java.util.Scanner;
public class PerfectNumber {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number to check if it is Perfect
Number or not");
		int no = sc.nextInt();
		isPerfect(no);
	}

	static void isPerfect(int no)
	{
		int rem,no1=no,sum=0,i=1;
		boolean rs;
		while(i<=no/2)
		{
			rs = isDivisible(no,i);
			if(rs==true)
				sum=sum+i;
			i++;
		}

		if(sum==no)
			System.out.println("Number is Perfect Number");
		else
			System.out.println("Number is not Perfect Number");
```

```
	}

	static boolean isDivisible(int no,int i)
	{
		if(no%i==0)
			return true;
		else
			return false;
	}

}
```

34. WAP to define a method to check the number is happy number or not.

```
import java.util.Scanner;
public class HappyNumber {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number to check if it is Happy number
or not");
		int no=sc.nextInt();
		isHappy(no);
	}

	static void isHappy(int no)
	{
		while(no>9)
		{
			int sum = 0;
			while(no!=0)
			{
				int rem=no%10;
				sum+=(rem*rem);
				no/=10;
			}
			no=sum;
		}

		if(no==1||no==7)
			System.out.println("The number is a Happy Number");
		else
			System.out.println("The number is not a Happy Number");
	}

}
```

35. WAP to print first N Fibonacci terms.

```
import java.util.Scanner;
public class FibonaciiTerms {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the terms of Fibonacii Terms you want
to print");
		int no = sc.nextInt();
		printFib(no);
```

```
	}

	static void printFib(int no)
	{
		int a=0,b=1,count=3;
		int c;
		if(no==1)
			System.out.println(a);
		else if (no==0)
			System.out.println("Wrong input");
		else
		{
			System.out.println(a);
			System.out.println(b);
		}

		while (count<=no)
		{
			c=a+b;
			System.out.println(c);
			a=b;
			b=c;
			count++;
		}
	}

}
```

36. WAP to print Fibonacci Number upto N.

```
import java.util.Scanner;
public class FibonacciUptoN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the terms of Fibonacii Terms you want
to print");
		int no = sc.nextInt();
		printFib(no);

	}

	static void printFib(int no)
	{
		int a=0,b=1;
		int c=1;
		if(no==1)
			System.out.println(a);
		else if (no==0)
			System.out.println("Wrong input");
		else
		{
			System.out.println(a);
			//System.out.println(b);
		}

		while (c<no)
```

```
            {

                  System.out.println(c);
                  c=a+b;
                  a=b;
                  b=c;
            }
      }

}
```

37. WAP to calculate the sum of First N Fibonacci Numbers.

```
import java.util.Scanner;

public class SumFibonaciiUptoN {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the terms of Fibonacii Terms you want
to get sum");
            int no = sc.nextInt();
            int sum=printFib(no);
            System.out.println("Sum is "+sum);
      }

      static int printFib(int no)
      {
            if(no==0)
                  return 0;
            if(no==1)
                  return 1;
            if(no==2)
                  return 2;
            int a=0,b=1;
            int c=1;
            int sum=0;
            while (c<no)
            {

                  sum+=c;
                  c=a+b;
                  a=b;
                  b=c;
            }
            return sum;
      }

}
```

38. WAP to define a method to reverse the number.

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

```
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		reverse(no);
	}

	static void reverse(int no)
	{
		int rev=0,rem;
		while(no!=0)
		{
			rem=no%10;
			rev=rev*10 + rem;
			no/=10;
		}
		System.out.println("Reverse is "+rev);
	}
}
```

39. WAP to define a method to check if a number is palindrome or not.

```
import java.util.Scanner;
public class Palindrome {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int no = sc.nextInt();
		reverse(no);
	}

	static void reverse(int no)
	{
		int rev=0,rem,c=no;
		while(no!=0)
		{
			rem=no%10;
			rev=rev*10 + rem;
			no/=10;
		}
		if(c==rev)
			System.out.println("Palindrome Number");
		else
			System.out.println("Not Palindrome Number");
	}

}
```

40. WAP to define a method to print a palindrome Numbers between 1 to N.

```
import java.util.Scanner;
public class Palindrome1ToN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number upto which you wnat to print
Palindrome Number");
		int no = sc.nextInt();
		int i=1;
		boolean j;
```

```
		while(i<=no)
		{
			j=isPalindrome(i);
			if (j==true)
				System.out.println(i);
			i++;
		}
	}

	static boolean isPalindrome(int no)
	{
		int rev=0,rem,c=no;
		while(no!=0)
		{
			rem=no%10;
			rev=rev*10 + rem;
			no/=10;
		}
		if(c==rev)
			return true;
		else
			return false;
	}

}
```

41. WAP to define a method to print the Happy Numbers between 1 to N.

```
import java.util.Scanner;
public class HapyUptoN {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number upto which Happy Number has
to be printed");
		int no = sc.nextInt();
		boolean j;
		int i=1;
		while (i<=no)
		{
			j=isHappy(i);
			if (j==true)
				System.out.println(i);
			i++;
		}
	}

	static boolean isHappy(int no)
	{
		while(no>9)
		{
			int sum = 0;
			while(no!=0)
			{
				int rem=no%10;
				sum+=(rem*rem);
				no/=10;
```

```
                }
                no=sum;
            }
            if(no==1||no==7)
                return true;
            else
                return false;
        }

}
```

42. WAP to count how many happy numbers within 1000.

```
public class HappyUpto1000 {
    public static void main(String[] args) {
        boolean j;
        int i=1;
        while (i<=1000)
        {
            j=isHappy(i);
            if (j==true)
                System.out.println(i);
            i++;
        }
    }

    static boolean isHappy(int no)
    {
        while(no>9)
        {
            int sum = 0;
            while(no!=0)
            {
                int rem=no%10;
                sum+=(rem*rem);
                no/=10;
            }
            no=sum;
        }
        if(no==1||no==7)
            return true;
        else
            return false;
    }


}
```

43. WAP to display the Armstrong within 1 to N.

```
import java.util.Scanner;
public class ArmstrongUptoN {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number to check the number is
armstrong or not");
```

```
		int no = sc.nextInt();
		int i=1,dig;
		boolean j;
		while(i<=no)
		{
			dig=digit(i);
			j=arms(i,dig);
			if (j==true)
				System.out.println(i);
			i++;
		}

	}

	static int digit(int no)
	{
		int temp=0;
		while (no!=0)
		{
			temp++;
			no/=10;
		}
		return temp;
	}

	static boolean arms(int no,int dig)
	{
		int sum=0, t=no;
		while (t!=0)
		{
			int rem = t%10;
			sum=sum+pro(rem,dig);
			t/=10;
		}
		if(sum==no)
			return true;
		else
			return false;
	}

	static int pro(int rem, int dig)
	{
		int pro=1;
		while (dig>0)
		{
			pro=pro*rem;
			dig--;
		}
		return pro;
	}
}
```

5 types of Literals

Integer ----→ 0-9 **(byte, int-4byte, long-8byte, short-2byte)**

Floating point ----→ 0-9 + . **(float-4byte, double-8byte)**

Char ----→ 'A','6','8','?' **(2byte)**

String ----→ "SSP","Programming"
Boolean ----→ true/false (1bit)

3 types of integer Literals
i) Octal: any number begin with '0'.
ii) Hexadecimal: any number begin with '0x'.
iii) Decimal: begin simply by itself.

44. WAP to convert decimal to binary.

```
import java.util.Scanner;
public class DecimalToBnary {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter decimal value");
		int no=sc.nextInt();
		String bin="";
		while(no!=0)
		{
			int rem=no%2;
			bin=rem+bin;
			no/=2;

		}
		System.out.println("Binary value is "+bin);
	}

}
```

45. WAP to convert decimal to octal number using method.

```
import java.util.Scanner;
public class DecimalToOctal {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter decimal value");
		int no=sc.nextInt();
		String bin="";
		String s = decToOct(no);
		System.out.println("Equivalent Octal is "+s);

	}

	static String decToOct(int no)
	{
		String oct = "";
		while(no!=0)
		{
			int rem = no%8;
			oct=rem+oct;
			no=no/8;
		}
		return oct;
	}
```

```
}
```

46. WAP to convert decimal to hexadecimal using method.

```
import java.util.Scanner;
public class DecToHexaD {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter decimal value");
		int no=sc.nextInt();
		String s = decToHex(no);
		System.out.println("Equivalent Hexadecimal is "+s);
	}

	static String decToHex(int no)
	{
		String hx="";
		while(no!=0)
		{
			int rem=no%16;
			if(rem<10)
				hx=rem+hx;
			else
				hx=(char)(rem+55)+hx;
			no=no/16;


		}
		return hx;
	}

}
```

47. WAP to convert decimal to required base number.

```
import java.util.Scanner;
public class DecimalConversion {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter decimal value");
		int no=sc.nextInt();
		System.out.println("Enter the base value");
		int b=sc.nextInt();
		String s = conv(no,b);
		System.out.println("Equivalent converted Number is "+s);
	}

	static String conv(int no,int b)
	{
		String con="";
		while(no!=0)
		{
			int rem=no%b;
			if(rem<10)
```

```
                        con=rem+con;
                  else
                        con=(char)(rem+55)+con;
                  no=no/b;


            }
            return con;
      }

}
```

48. WAP to define a method to convert binary to decimal.

```
import java.util.Scanner;
public class BinToDec {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter Binary value");
            int no=sc.nextInt();
            int dec = binTDec(no);
            System.out.println(dec);
      }

      static int pow(int n,int p)
      {
            int pw=1;
            while(p>0)
            {
                  pw=pw*n;
                  p--;
            }
            return pw;
      }

      static int binTDec(int bin)
      {
            int dec=0,c=0;
            while(bin!=0)
            {
                  int rem=bin%10;
                  dec=dec+rem*pow(2,c);
                  c++;
                  bin=bin/10;
            }
            return dec;
      }

}
```

49. WAP to define a method to convert hexadecimal to decimal.

```
import java.util.Scanner;
public class HexadecToDecimal {

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

```
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter any Hexadecimal value");
		String st = sc.next();
		int dec=hexToDec(st);
		System.out.println(dec);
	}

	static int hexToDec(String st)
	{
		int dec=0,c=0;
		int i=st.length()-1;
		while(i>=0)
		{
			char ch=st.charAt(i);
			if(ch>='A'&&ch<='F')
				dec=dec+(ch-55)*pow(16,c);
			else if (ch>='a'&&ch<='f')
				dec=dec+(ch-87)*pow(16,c);
			else
				dec=dec+(ch-48)*pow(16,c);
			c++;
			i--;
		}
		return dec;
	}

	static int pow(int a,int c)
	{
		int pow=1;
		while(c!=0)
		{
			pow=pow*a;
			c--;
		}
		return pow;
	}

}
```

ASCII VALUES

0-9	**48-57**
A-Z	**65-90**
a-z	**97-122**

50. WAP to convert binary to hexadecimal.

51. WAP to convert binary to octal.

52. WAP to convert hexadecimal to binary.

53. WAP to draw this pattern.

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

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=0;i<5;i++)
		{
			for(j=0;j<5;j++)
			{
				System.out.print("*");
			}
			System.out.println();
		}
	}

}
```

54. WAP to print following pattern.

```
11111
22222
33333
44444
55555
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=01;i<=5;i++)
		{
			for(j=0;j<5;j++)
			{
				System.out.print(i);
			}
			System.out.println();
		}
	}

}
```

55. WAP to print following pattern.

```
10101
01010
10101
01010
10101
```

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=1;
		for(i=0;i<5;i++)
		{
			for(j=0;j<5;j++)
			{
				System.out.print(k);
				if(k==1)
					k--;
				else
					k++;
			}
			System.out.println();
		}
	}

}
```

METHOD 2:

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=n;j++)
			{
				System.out.print(k%2);
				k++;
			}
			System.out.println();
		}
	}
}
```

56. WAP to print the following pattern

```
00000
11111
00000
11111
00000
```

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=0;i<5;i++)
		{
```

```
                for(j=0;j<5;j++)
                {
                        if(i%2==0)
                                System.out.print("0");
                        else
                                System.out.print("1");
                }
                System.out.println();
        }
    }

}
```

57. WAP to print the following pattern.

```
12345
67891
23456
78912
34567
```

```
public class Pattern_1 {

    public static void main(String[] args)
    {
        int i,j,k=1;
        for(i=0;i<5;i++)
        {
                for(j=0;j<5;j++)
                {
                        System.out.print(k);
                        k++;
                        if(k>9)
                                k=1;
                }
                System.out.println();
        }
    }

}
```

58. WAP to print the following pattern.

```
1*1*1
0*0*0
1*1*1
0*0*0
1*1*1
```

```
public class Pattern_1 {

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

```
		int i,j,k=1;
		for(i=0;i<5;i++)
		{
			if(i%2==0)
			{
				for(j=0;j<5;j++)
				{
					if(j%2==1)
						System.out.print("*");
					else
						System.out.print("1");
				}
			}
			else
			{
				for(j=0;j<5;j++)
				{
					if(j%2==1)
						System.out.print("*");
					else
						System.out.print("0");
				}
			}
			System.out.println();
		}
	}

}
```

59. WAP to print the following pattern.

```
1*0*1
1*0*1
1*0*1
1*0*1
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=1;
		for(i=0;i<5;i++)
		{
			for(j=0;j<5;j++)
			{
				if(j%2==1)
					System.out.print("*");
				else if (j==2)
					System.out.print("0");
				else
					System.out.print("1");
			}

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

```
	}

}
```

60. WAP to print the following pattern.

```
ABCDE
ABCDE
ABCDE
ABCDE
ABCDE
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k;
		for(i=0;i<5;i++)
		{
			k=65;
			for(j=0;j<5;j++)
			{
				System.out.print((char)k);
				k++;
			}

			System.out.println();
		}
	}

}
```

61. WAP to print the following pattern.

```
AAAAA
BBBBB
CCCCC
DDDDD
EEEEE
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=65;
		for(i=0;i<5;i++)
		{
			for(j=0;j<5;j++)
			{
				System.out.print((char)k);
			}
			k++;
			System.out.println();
```

```
            }
      }

}
```

62. WAP to print the following pattern.

```
ABCDE
FGHIJ
KLMNO
PQRST
UVWXY
```

```
public class Pattern_1 {

      public static void main(String[] args)
      {
            int i,j,k=65;
            for(i=0;i<5;i++)
            {
                  for(j=0;j<5;j++)
                  {
                        System.out.print((char)k);
                        k++;
                  }
                  System.out.println();
            }
      }

}
```

63. WAP to print the following pattern.

```
12345
12345
12345
12345
12345
```

```
public class Pattern_1 {

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

```
}
```

64. WAP to print the following pattern.

```
1*2*3
1*2*3
1*2*3
1*2*3
1*2*3
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k;
		for(i=0;i<5;i++)
		{
			k=1;
			for(j=0;j<5;j++)
			{
				if(j%2==1)
					System.out.print("*");
				else
				{
					System.out.print(k);
					k++;
				}
			}
			System.out.println();
		}
	}

}
```

65. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=1;i<6;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print("*");
			}
```

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

}
```

66. WAP to print following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=5;i>0;i--)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print("*");
			}
			System.out.println();
		}
	}

}
```

67. WAP to print following pattern.

```
1
12
123
1234
12345
```

```
public class Pattern_1 {

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

```
	}

}
```

68. WAP to print following pattern.

```
12345
1234
123
12
1
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=5;i>0;i--)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(j);
			}
			System.out.println();
		}
	}

}
```

69. WAP to print following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=1;i<=5;i++)
		{
			for(j=1;j<(2*i);j++)
			{
				System.out.print("*");
			}
			System.out.println();
		}
	}

}
```

70.WAP to print following pattern.

```
A
AB
ABC
ABCD
ABCDE
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j;
		for(i=1;i<=5;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print((char)(j+64));
			}
			System.out.println();
		}
	}

}
```

71. WAP to print the following pattern.

```
A
BC
DEF
GHIJ
KLMNO
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=65;
		for(i=1;i<=5;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print((char)k);
				k++;
			}
			System.out.println();
		}
	}

}
```

72. WAP to print the following pattern.

```
A
BC
CDE
DEFG
EFGHI
FGHIJK
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k;
		for(i=1;i<=6;i++)
		{
			k=64;
			for(j=1;j<=i;j++)
			{
				System.out.print((char)(i+k));
				k++;
			}
			System.out.println();
		}
	}

}
```

73. WAP to print the following pattern.

```
1
23
456
7891
23456
```

METHOD 1

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=1;
		for(i=1;i<=5;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(k);
				k++;
				if(k>9)
					k=1;
			}
			System.out.println();
		}
	}

}
```

METHOD 2

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,k=0;
		for(i=1;i<=5;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(k%9+1);
				k++;
			}
			System.out.println();
		}
	}

}
```

74. WAP to print the following pattern.

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

```
public class Pattern_1 {

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

			for(j=1;j<=i;j++)
			{
				System.out.print("*");
			}
			System.out.println();
		}
	}

}
```

75. WAP to print the following pattern.

```
1
10
101
1010
10101
```

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(j%2);
			}
			System.out.println();
		}
	}

}
```

76. WAP to print the following pattern.

```
    1
   12
  123
 1234
12345
```

```java
public class Pattern_1 {

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

			for(j=1;j<=i;j++)
			{
				System.out.print(j);
			}
			System.out.println();
		}
	}

}
```

77. WAP to print the following pattern.

```
1
01
010
1010
10101
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(k);
				k++;
				if(k>1)
					k=0;
			}
			System.out.println();
		}
	}

}
```

78. WAP to print the following pattern.

```
    A
   BC
  DEF
 GHIJ
KLMNO
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k=65;
		for(i=1;i<=n;i++)
		{
			for(j=i;j<n;j++)
				System.out.print(" ");

			for(j=1;j<=i;j++)
			{
				System.out.print((char)k);
				k++;
			}
			System.out.println();
		}
	}

}
```

79. WAP to print the following pattern.

```
1
00
111
0000
11111
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=i;j++)
			{
				System.out.print(i%2);
			}
			System.out.println();
		}
	}

}
```

80. WAP to print the following pattern.

```
    1
   22
  333
 4444
55555
```

```
public class Pattern_1 {

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

			for(j=1;j<=i;j++)
			{
				System.out.print(i);
			}
			System.out.println();
		}
	}

}
```

81. WAP to print the following pattern.

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

```
public class Pattern_1 {

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

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

}
```

82. WAP to print the following pattern.

```
12345
 1234
  123
   12
    1
```

```
public class Pattern_1 {

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

			for(j=1;j<=n-i+1;j++)
			{
				System.out.print(j);
			}
			System.out.println();
		}
	}

}
```

83. WAP to print the following pattern.

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

```
public class Pattern_1 {

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

			for(j=1;j<=n-i+1;j++)
			{
				System.out.print("*");
			}
			System.out.println();
		}
	}

}
```

84. WAP to print the following pattern.

```
    A
   BC
  DEF
 GHIJ
KLMNO
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k=65;
		for(i=1;i<=n;i++)
		{
			for(j=0;j<n-i;j++)
				System.out.print(" ");

			for(j=1;j<=i;j++)
			{
				System.out.print((char)k);
				k++;
			}
			System.out.println();
		}
	}

}
```

85. WAP to print the following pattern.

```
    A
   AB
  ABC
 ACBD
ABCDE
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k;
		for(i=1;i<=n;i++)
		{
			for(j=0;j<n-i;j++)
				System.out.print(" ");
			k=65;
			for(j=1;j<=i;j++)
			{
				System.out.print((char)k);
				k++;
			}
			System.out.println();
		}
	}

}
```

86. WAP to print the following pattern.

```
    A
   BC
  CDE
 DEFG
EFGHI
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k;
		for(i=1;i<=n;i++)
		{
			for(j=0;j<n-i;j++)
				System.out.print(" ");
			k=64+i;
			for(j=1;j<=i;j++)
			{
				System.out.print((char)k);
				k++;
			}
			System.out.println();
		}
	}
}
```

87. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}

			for(j=1;j<=k;j++)
			{
				System.out.print("*");
			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				k=k+2;
			}
			else
			{
				s++;
				k=k-2;
			}
		}
	}

}
```

88. WAP to print the following pattern.

```
   1
  1*2
 1*2*3
1*2*3*4
 1*2*3
  1*2
   1
```

```
public class Pattern_1 {

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

```
		int i,j,n=7,k=1,s=n/2;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}

			int l=1;
			for(j=1;j<=k;j++)
			{
				if(j%2==0)
					System.out.print("*");
				else
				{
					System.out.print(l);
					l++;
				}
			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				k=k+2;
			}
			else
			{
				s++;
				k=k-2;
			}
		}
	}

}
```

89. WAP to print the following patten.

```
   1
  101
 10101
1010101
 10101
  101
   1
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}
```

```
                int l=1;
                for(j=1;j<=k;j++)
                {
                        System.out.print(l%2);
                        l++;
                }
                System.out.println();
                if(i<=n/2)
                {
                        s--;
                        k=k+2;
                }
                else
                {
                        s++;
                        k=k-2;
                }
            }
      }

}
```

90. WAP to print the following pattern.

```
   1
  222
 33333
4444444
 33333
  222
   1
```

```
public class Pattern_1 {

      public static void main(String[] args)
      {
            int i,j,n=7,k=1,s=n/2,l=1;
            for(i=1;i<=n;i++)
            {
                  for(j=1;j<=s;j++)
                  {
                        System.out.print(" ");
                  }

                  for(j=1;j<=k;j++)
                  {
                        System.out.print(l);
                  }
                  System.out.println();
                  if(i<=n/2)
                  {
                        s--;
                        l++;
                        k=k+2;
                  }
                  else
```

```
                {
                        s++;
                        l--;
                        k=k-2;
                }
        }
    }

}
```

91. WAP to print the following pattern.

```
   1
  121
 12321
1234321
 12321
  121
   1
```

```
public class Pattern_1 {

    public static void main(String[] args)
    {
        int i,j,n=7,k=1,s=n/2,l=1;
        for(i=1;i<=n;i++)
        {
            for(j=1;j<=s;j++)
            {
                System.out.print(" ");
            }

            l=1;
            for(j=1;j<=k;j++)
            {
                System.out.print(l);
                if(j<=k/2)
                    l++;
                else
                    l--;
            }
            System.out.println();
            if(i<=n/2)
            {
                s--;
                k=k+2;
            }
            else
            {
                s++;
                k=k-2;
            }
        }
    }

}
```

92. WAP to print the following pattern.

```
   A
  ABC
 ABCDE
ABCDEFG
 ABCDE
  ABC
   A
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}

			l=1;
			for(j=1;j<=k;j++)
			{
				System.out.print((char)(j+l+63));
			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				k=k+2;
			}
			else
			{
				s++;
				k=k-2;
			}
		}
	}

}
```

93. WAP to print the following pattern.

```
   A
  BBB
 CCCCC
DDDDDDD
 CCCCC
  BBB
   A
```

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}

			for(j=1;j<=k;j++)
			{
				System.out.print((char)(l+64));

			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				l++;
				k=k+2;
			}
			else
			{
				s++;
				l--;
				k=k-2;
			}
		}
	}

}
```

94. WAP to print the following pattern.

```
   A
  ABA
 ABCBA
ABCDCBA
 ABCBA
  ABA
   A
```

```java
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
```

```
                }

                l=1;
                for(j=1;j<=k;j++)
                {
                        System.out.print((char)(l+64));
                        if(j<=k/2)
                                l++;
                        else
                                l--;
                }
                System.out.println();
                if(i<=n/2)
                {
                        s--;
                        k=k+2;
                }
                else
                {
                        s++;
                        k=k-2;
                }
        }
    }

}
```

95. WAP to print the following pattern.

```
    1
   010
  10101
 0101010
101010101
```

```
public class Pattern_1 {

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

    }

}
```

96. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print(" ");
			}

			for(j=1;j<=k;j++)
			{
				if(j==1||j==k)
					System.out.print("*");
				else
					System.out.print(" ");

			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				l++;
				k=k+2;
			}
			else
			{
				s++;
				l--;
				k=k-2;
			}
		}
	}

}
```

97. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
				System.out.print("  ");
			}

			for(j=1;j<=k;j++)
			{
				if(j==1||j==k||j==k/2+1)
					System.out.print("* ");
				else
					System.out.print("  ");

			}
			System.out.println();
			if(i<=n/2)
			{
				s--;
				l++;
				k=k+2;
			}
			else
			{
				s++;
				l--;
				k=k-2;
			}
		}
	}

}
```

98. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1,s=n/2,l=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=s;j++)
			{
```

```
                        System.out.print("   ");
                }

                for(j=1;j<=k;j++)
                {
                        if(j==1||j==k||j==k/2+1||i==n/2+1)
                                System.out.print("* ");
                        else
                                System.out.print("   ");

                }
                System.out.println();
                if(i<=n/2)
                {
                        s--;
                        l++;
                        k=k+2;
                }
                else
                {
                        s++;
                        l--;
                        k=k-2;
                }
        }
    }

}
```

99. WAP to print the following pattern.

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

```
public class Pattern_1 {

    public static void main(String[] args)
    {
        int i,j,n=7,k=1;
        for(i=0;i<n;i++)
        {

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

        }
```

```
	}

}
```

100. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1;
		for(i=0;i<n;i++)
		{

			for(j=0;j<n;j++)
			{
				if(j==0||j==n-1||j==n/2||i==n/2||i==0||i==n-1)
					System.out.print("* ");
				else
					System.out.print("  ");
			}
			System.out.println();

		}
	}

}
```

101. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=7,k=1;
		for(i=0;i<n;i++)
		{

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

```
                                    if(j==0||j==n-1||j==n/2||i==n/2||i==0||i==n-
1||j==i||j==n-i-1)
                                          System.out.print("* ");
                                    else
                                          System.out.print("  ");
                        }
                        System.out.println();

                  }
            }

}
```

102. WAP to print the following pattern.

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

```
public class Pattern_1 {

      public static void main(String[] args)
      {
            int i,j,n=7,k=1;
            for(i=0;i<n;i++)
            {

                  for(j=0;j<n;j++)
                  {
                              if(j==n/2||i==n/2||j==i||j==n-i-1)
                                    System.out.print("* ");
                              else
                                    System.out.print("  ");
                  }
                  System.out.println();

            }
      }

}
```

103. WAP to print the following pattern.

```
1
2 5
3 6 8
4 7 9 10
```

```
public class Pattern_1 {

      public static void main(String[] args)
      {
            int i,j,n=4,k;
```

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

		}
	}

}
```

104. WAP to print the following pattern.

```
1
3  2
6  5  4
10 9  8  7
```

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=5,k=1,l=2,m=1;
		for(i=1;i<=n;i++)
		{
			m=k;
			for(j=1;j<=i;j++)
			{
				System.out.print(m +" ");
				m--;
			}
			k=k+l;
			l++;
			System.out.println();

		}
	}

}
```

105. WAP to print the following pattern.

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

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=13,k=1;
		for(i=1;i<=n;i++)
		{
			for(j=1;j<=n;j++)
			{

	if(i==n/2+1||j==n/2+1||j==1&&i<=n/2||j==n&&i>n/2||i==1&&j>n/2||i==n&&j<
=n/2)
					System.out.print("* ");
				else
					System.out.print("  ");
			}
			System.out.println();

		}
	}
}
```

106. WAP to print the following pattern.

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

```
public class Pattern_1 {

	public static void main(String[] args)
	{
		int i,j,n=13,k=1;
		for(i=1;i<=n;i++)
		{

			for(j=1;j<=n;j++)
			{
				if(i<3&&j<3||i>n-3&&j<3||i==3||i==n-
2||j==3||j==n-2||j<3&&i>n-3||j>n-2&&i<3||j>n-2&&i>n-2)
					System.out.print("* ");
				else
					System.out.print("  ");
			}
			System.out.println();

		}
```

```
    }
}
```

ARRAYS:

Array is an object in JAVA. Stored in heap memory.

```
int ar[];  //decleration
int []ar;
int[] ar;

ar = new int[5];//allocation

ar[3]=45;
ar[1]=42;
```

index	value	memory address
0	0	8000
1	42	8004
2	0	8008
3	45	8012
4	0	8016

```
psvm(__)
{
  //<datatype> <identifier>[];
  int a; //normal variable;
  int ar[]; // or int []ar; int[] ar;
  ar=new int[5]; //allocation
  ar[2]=45;
  ar[3]=67; //initialization
  SOP("number of elements: "+ar.length);
  For(int i=0;i<n;i++)
  {
    SOP(i+"-→"+ar[i]);
  }
}


int a[],b,c;      // Only a is array
int []x,y,z;      // All are array
int[] m,n,o;      // All are array


int ar[]={23,46,75,89};       // declaration and initialization
for(int i=0;i<ar.length;i++)
{
  SOP(ar[i]);
}


int ar[];                     // declaration
ar = new int[]{23,46,75,89};  // initialization


int ar[];                     // declaration
```

```
ar=new int[4];                  // memory allocation
ar[0]=23;                       // initialization
ar[1]=46;                       // initialization
ar[2]=75;                       // initialization
ar[3]=89;                       // initialization
```

107. WAP to calculate the sum and average of n element.

```
import java.util.Scanner;
public class SumAndAverage {

	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		int n;
		double sum=0,avg;
		System.out.println("Enter the number of elementes ");
		n=sc.nextInt();
		double arr[]=new double[n];
		System.out.println("Enter the elements ");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextDouble();
			sum=sum+arr[i];
		}
		avg=sum/n;
		System.out.println("Sum = "+sum);
		System.out.println("Average = "+avg);
	}

}
```

108. WAP to read array elements from the user and define a method a method to return the average of n elements.

```
import java.util.Scanner;
public class AvgMethod {

	public static void main(String[] args)
	{
		Scanner sc= new Scanner(System.in);
		System.out.println("Enter the number of elements");
		int n = sc.nextInt();
		double arr[]=new double[n];
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextDouble();
		}
		average(arr);
	}
	static void average(double arr[])
	{
		double sum=0;
		for(int i=0;i<arr.length;i++)
		{
			sum=sum+arr[i];
		}
		System.out.println(sum/arr.length);
```

```
	}

}
```

109. WAP to define a method to return how many even numbers in the passed array.

110. WAP to define a method to return how many odd numbers present in the array.

Solution of 109 & 110 :

```
import java.util.Scanner;
public class EvenOddArray {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number of element ");
		int n=sc.nextInt();
		int arr[]=new int[n];
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		int c=evenOdd(arr);
		System.out.println("Even Numbers = "+c);
		System.out.println("Odd Numbers = "+(n-c));

	}

	static int evenOdd(int arr[])
	{
		int c=0;
		for(int i=0;i<arr.length;i++)
		{
			if(arr[i]%2==0)
				c++;
		}
		/*
		 Method 2
		 define a array of size 2;
		 for(int i=0;i<n;i++)
		 {
			c[arr[i]%2]++;
		 */
		return c;
	}

}
```

111. WAP to count and display how many negative and positive numbers present in your array.

```
import java.util.Scanner;
public class NegPosArray {
```

```
	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number of elements ");
		int n=sc.nextInt();
		int arr[]=new int[n];
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
//		int c[]=new int[3];
		int c[]=positive(arr);
		System.out.println("Negative Numbers are : "+c[0]);
		System.out.println("Positive Numbers are : "+c[1]);
		System.out.println("Number of '0's are : "+c[2]);
	}

	static int[] positive(int arr[])
	{
		int c[]=new int[3];
		for(int i=0;i<arr.length;i++)
		{
			if(arr[i]<0)
				c[0]++;
			else if (arr[i]>0)
				c[1]++;
			else
				c[2]++;
		}
		return c;
	}

}
```

112. WAP to read 'n' people's weights based on that display lift is working or not. Max capacity of your lift is 800kg.

```
import java.util.Scanner;
public class WorkingLift {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the number of Persons");
		int n = sc.nextInt();
		System.out.println("Enter the weight of Persons");
		int arr[]=new int[n];
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		int c=lift(arr);
		if(c<=800)
			System.out.println("Lift can work");
		else
```

```
                System.out.println("Lift Overloaded");
        }

        static int lift(int arr[])
        {
                int sum=0;
                for(int i=0;i<arr.length;i++)
                {
                        sum+=arr[i];
                }
                return sum;
        }

}
```

113. WAP to delete the duplicate elements from the array.

```
import java.util.Scanner;
public class DeleteDuplicates {

        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 elememts");
                int arr[]=new int[n];
                for(int i=0;i<n;i++)
                {
                        arr[i]=sc.nextInt();
                }

                int no=remove(arr);
                display(arr,no);

        }

        static int remove(int arr[])
        {
                int i,j,n=arr.length;
                for(i=0;i<n-1;i++)
                {
                        for(j=i+1;j<n;j++)
                        {
                                if(arr[i]==arr[j])
                                {
                                        for(int k=j;k<n-1;k++) // Shifting the values
to left
                                        {
                                                arr[k]=arr[k+1];
                                        }
//                                      arr[j]=arr[n-1]; This will exchange the values
with the last one.
                                        j--;
                                        n--;
                                }
                        }
```

```
            }
            return n;
      }

      static void display(int arr[],int no)
      {
            System.out.println("Array without Duplicates");
            for(int i=0;i<no;i++)
            {
                  System.out.println(arr[i]);
            }
      }

}
```

114. WAP to insert the element in the existing array to the specified index.

```
import java.util.Scanner;
public class InsertAtIndex {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements is Original
Array");
		int n=sc.nextInt();
		System.out.println("Enter the Elements of array");
		int arr[]=new int[n];
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		arr=insert(arr);
		display(arr);

	}

	static int[] insert(int arr[])
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the element you want to insert");
		int ele=sc.nextInt();
		int n=arr.length;
		System.out.println("Enter the index at which you want to
insert");
		int ind=sc.nextInt();
		int brr[]=new int[n+1];
		if(ind<0||ind>n)
		{
			System.out.println("Wrong index");
			return insert(arr);
		}
		else if(ind>=0&&ind<n)
		{
			for(int i=0;i<n;i++)
			{
				if(i<ind)
					brr[i]=arr[i];
				else
					brr[i+1]=arr[i];
			}
			brr[ind]=ele;
		}
		return brr;
	}

	static void display(int arr[])
	{
		System.out.println("Array without Duplicates");
		for(int i=0;i<arr.length;i++)
		{
			System.out.println(arr[i]);
```

```
		}
	}

}
```

115. WAP to delete the element at a particular index.

```
import java.util.Scanner;
public class DeleteAtIndex {

	public static void main(String[] args)
	{
		int arr[]=readArray();
		arr=delete(arr);
		displayArray(arr);

	}

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

	static int[] delete(int arr[])
	{
		Scanner sc = new Scanner(System.in);
		int n=arr.length;
		System.out.println("Enter the index of the element you want to
delete");
		int ind=sc.nextInt();
		int brr[]=new int[n-1];
		for(int i=0;i<n-1;i++)
		{
			if(i<ind)
				brr[i]=arr[i];
			else
				brr[i]=arr[i+1];
		}
		return brr;
	}

	static void displayArray(int arr[])
	{
		int n=arr.length;
		System.out.println("Array after deleting elements are : ");
		for(int i=0;i<n;i++)
		{
			System.out.println(arr[i]);
```

```
            }
      }

}
```

METHOD 2: BY FOLLOWING CODE YOU CAN DELETE BY INDEX AS WELL AS BY ELEMENT.

```
import java.util.Scanner;
public class DeleteAtIndex {

      public static void main(String[] args)
      {
            DeleteAtIndex d= new DeleteAtIndex();
            int arr[]=d.readArray();
            arr=d.delete(arr);
            d.displayArray(arr);

      }

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

      int[] delete(int arr[])
      {
            Scanner sc = new Scanner(System.in);
            int n=arr.length;
            int brr[]=new int[n-1];

            System.out.println("Press 1 to delete by index");
            System.out.println("Press 2 to delete by element");
            int no=sc.nextInt();

            if(no==1)
                  brr=delIndex(arr);
            else if(no==2)
                  brr=delElement(arr);
            else
            {
                  System.out.println("Wrong Choice");
                  arr=delete(arr);
            }
            return brr;

      }

      int[] delIndex(int brr[])
```

```
	{
		Scanner sc= new Scanner(System.in);
		int n=brr.length;
		int crr[]=new int[n-1];
		System.out.println("Enter the index of the element you want to
delete");
		int ind=sc.nextInt();
		if(ind>=n||ind<0)
		{
			System.out.println("Wrong Index Input");
			crr=delIndex(brr);
		}
		else
		{
			for(int i=0;i<n-1;i++)
			{
				if(i<ind)
					crr[i]=brr[i];
				else
					crr[i]=brr[i+1];
			}
		}
		return crr;
	}

	int[] delElement(int brr[])
	{
		Scanner sc= new Scanner(System.in);
		int n=brr.length;
		int crr[]=new int[n-1];
		System.out.println("Enter the element you want to delete");
		int ele=sc.nextInt();
		int ind=0,count=0;
		for(int i=0;i<n;i++)
		{
			if(ele==brr[i])
			{
				ind=i;
				count++;
			}
		}

		if(count==0)
		{
			System.out.println("Wrong choice");
			System.out.println("Element not present in the Array");
			crr=delElement(brr);
		}

		else
		{
			for(int i=0;i<n-1;i++)
			{
				if(i<ind)
					crr[i]=brr[i];
				else
					crr[i]=brr[i+1];
```

```
                }
            }
            return crr;
        }

        void displayArray(int arr[])
        {
            int n=arr.length;
            System.out.println("Array after deleting elements are : ");
            for(int i=0;i<n;i++)
            {
                System.out.println(arr[i]);
            }
        }

}
```

116. WAP to count how many prime numbers in the array.

```
import java.util.Scanner;
public class PrimeInArray {

        public static void main(String[] args)
        {
            Scanner sc = new Scanner(System.in);
            int arr[]=readArray();
            arr=primeArr(arr);
        }

        static int[] readArray()
        {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the Number of elements in Array");
            int n=sc.nextInt();
            int arr[]=new int[n];
            System.out.println("Enter the elements of Array");
            for(int i=0;i<n;i++)
            {
                arr[i]=sc.nextInt();
            }
            return arr;
        }

        static int[] primeArr(int arr[])
        {
            int n=arr.length;
            int count=0;
            System.out.println("Prime Numbers are : ");
            for(int i=0;i<n;i++)
            {
                if(isPrime(arr[i]))
                {
                    System.out.println(arr[i]);
                    count++;
```

```
                }
            }
            System.out.println("Total number of prime numbers are : "+count);
            return arr;
      }

      static boolean isPrime(int no)
      {
            for(int i=2;i<=no/2;i++)
            {
                  if(no%i==0)
                        return false;
            }
            return true;
      }

}
```

117. WAP count how many digits in the array (digits not number).

```
import java.util.Scanner;
public class DigitsInArray {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            int arr[]=readArray();
            int count=countDigits(arr);
            System.out.println("Total number of digits are : "+count);
      }

      static int[] readArray()
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the Number of elements in Array");
            int n=sc.nextInt();
            int arr[]=new int[n];
            System.out.println("Enter the elements of Array");
            for(int i=0;i<n;i++)
            {
                  arr[i]=sc.nextInt();
            }
            return arr;
      }

      static int countDigits(int arr[])
      {
            int count=0;
            System.out.println("Digits in array are : ");
            for(int i=0;i<arr.length;i++)
            {
                  if(arr[i]>=0&&arr[i]<=9)
                  {
                        count++;
                        System.out.println(arr[i]);
                  }
```

```
		}
		return count;
	}

}
```

118. WAP check how many numbers are divisible by 4,3and 5 in the array.

```
import java.util.Scanner;
public class DivisibilityInArray {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int n3,n4,n5;
		n3=div(arr,3);
		n4=div(arr,4);
		n5=div(arr,5);
		System.out.println("Count of numbers divisible by 3 are "+n3);
		System.out.println("Count of numbers divisible by 4 are "+n4);
		System.out.println("Count of numbers divisible by 5 are "+n5);

	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int div(int arr[],int no)
	{
		int n=arr.length;
		int count=0;
		for(int i=0;i<n;i++)
		{
			if(arr[i]%no==0)
				count++;
		}
		return count;
	}

}
```

119. WAP to define a method to return how many palindrome are there in the array.

```
import java.util.Scanner;
public class PalindromeInArray {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int count=isPalindrome(arr);
		System.out.println("Total Palindrome Numbers in Array are :
"+count);
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int isPalindrome(int arr[])
	{
		int n=arr.length;
		int count=0;
		for(int i=0;i<arr.length;i++)
		{
			int j=reverse(arr[i]);
			if(j==arr[i])
			{
				count++;
			}
		}
		return count;
	}

	static int reverse(int no)
	{
		int rem,rev=0;
		while(no!=0)
		{
			rem=no%10;
			rev=rev*10 + rem;
			no/=10;
		}
		return rev;
```

```
	}

}
```

120. WAP to define a method to return how many perfect numbers are there in the array.

```
import java.util.Scanner;
public class PerfectNoInArray {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int count=countPerfect(arr);
		System.out.println("Total Perfect Numbers in Array is : "+count);
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int countPerfect(int arr[])
	{
		int count=0;
		for(int i=0;i<arr.length;i++)
		{
			if(isPerfect(arr[i]))
				count++;
		}
		return count;
	}

	static boolean isPerfect(int no)
	{
		int sum=0;
		for(int i=1;i<no-1;i++)
		{
			if(no%i==0)
				sum=sum+i;
		}
		if(sum==no)
			return true;
		else
			return false;
```

```
	}
}
```

121. WAP to create the duplicate of existing array.

```
import java.util.Scanner;
public class CreateDuplicateArray {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int brr[]=duplicateArray(arr);
		display(brr);

	}

	static void display(int[] brr)
	{
		System.out.println("Duplicate Array is : ");
		for(int i=0;i<brr.length;i++)
		{
			System.out.println(brr[i]);
		}
	}

	static int[] duplicateArray(int[] arr)
	{
		int brr[]=new int[arr.length];
		for(int i=0;i<arr.length;i++)
		{
			brr[i]=arr[i];
		}
		return brr;
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

}
```

122. WAP to combine two arrays.

```
import java.util.Scanner;
public class Combine2Arrays {
```

```
	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray(1);
		int brr[]=readArray(2);
		int crr[]=combine(arr,brr);
		display(crr);
	}

	static int[] readArray(int x)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in "+x+"
Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int[] combine(int arr[],int brr[])
	{
		int l1=arr.length;
		int l2=brr.length;
		int crr[]=new int[l1+l2];
		for(int i=0;i<l1;i++)
		{
			crr[i]=arr[i];
		}
		for(int i=0;i<l2;i++)
		{
			crr[l1+i]=brr[i];
		}
		/*
		 * for(int i=0;i<crr.length;i++)
		 * {
		 *    if(i<a.length)
		 *          crr[i]=arr[i];
		 * else
		 *          crr[i]=brr[i-arr.length];
		 * }
		 */

		return crr;
	}

	static void display(int[] brr)
	{
		System.out.println("Combined Array is : ");
		for(int i=0;i<brr.length;i++)
		{
			System.out.println(brr[i]);
		}
```

```
	}
}
```

122. WAP to add unique elements and return from the array.

```
import java.util.Scanner;
public class AddUniqueElements {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int sum=addUnique(arr);
		System.out.println("Sum of unique elements is "+sum);
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int addUnique(int arr[])
	{
		int sum=0;
		for(int i=0;i<arr.length;i++)
		{
			int find=0;
			for(int j=i+1;j<arr.length;j++)
			{
				if(arr[i]==arr[j])
				{
					find=1;
					arr[j]=0;
				}
			}

			if(find==0)
			{
				sum+=arr[i];
			}
		}
		return sum;
	}

}
```

123. Mrs. Sofia as imported container of shoes. The container has different size of shoes and needs to know the second highest shoes size in the

container. Could you help Sofia by writing a method to find the second highest size of shoes in the container?

```
import java.util.Scanner;
public class Problem123 {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		int arr[]=readArray();
		int no=secondHighest(arr);
		System.out.println("Second Highest is : "+no);
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int secondHighest(int arr[])
	{
		for(int i=0;i<arr.length;i++)
		{
			int count=0;
			for(int j=0;j<arr.length;j++)
			{
				if(arr[j]>arr[i])
				{
					count++;
				}
			}
			if(count==1)
				return arr[i];
		}
		return -1;
	}

}
```

124. WAP to define a method to return nth smallest element.

```
import java.util.Scanner;
public class Problem123 {

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

```
		int arr[]=readArray();
		System.out.println("Enter the n value to find the nth smallest");
		int n = sc.nextInt();
		int no=nthSmallest(arr,n);
		if(no==-1)
		{
			System.out.println("Wrong Input");
		}
		else
			System.out.println(n+"th Smallest is : "+no);
	}

	static int[] readArray()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the Number of elements in Array");
		int n=sc.nextInt();
		int arr[]=new int[n];
		System.out.println("Enter the elements of Array");
		for(int i=0;i<n;i++)
		{
			arr[i]=sc.nextInt();
		}
		return arr;
	}

	static int nthSmallest(int arr[],int n)
	{
		for(int i=0;i<arr.length;i++)
		{
			int count=0;
			for(int j=0;j<arr.length;j++)
			{
				if(arr[j]>arr[i])
				{
					count++;
				}
			}
			if(count==arr.length-n)
				return arr[i];
		}
		return -1;
	}

}
```

125. WAP to define a method to display the pair of elements who's sum is equal to n.

```
import java.util.Scanner;
public class PairSumToN {

	public static void main(String[] args)
	{
		int arr[]=readArray();
		pairSum(arr);
```

```
	}

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

	static void pairSum(int []arr)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the value of Sum");
		int sum=sc.nextInt();
		int count=0,k=1;
		for(int i=0;i<arr.length-1;i++)
		{
			for(int j=i;j<arr.length;j++)
			{
				if(i!=j)
				{
					if(arr[i]+arr[j]==sum)
					{
						System.out.println(k+" Pair is : ");
						System.out.println("First elements is
"+arr[i]);
						System.out.println("Second element is
"+arr[j]);
						count++;
						k++;
					}
				}
			}
		}
		if(count==0)
		{
			System.out.println("Wrong value of Sum");
			pairSum(arr);
		}

	}
}
```

126. WAP to merge two array element in zigzag manner.

```
import java.util.Scanner;
public class ZigzagArray
{
```

```
	public static void main(String[] args)
	{
		int a[]=readArr();
		int b[]=readArr();
		int c[]=zigzag(a, b);
		System.out.println("zigzag array is ");
		for(int i=0;i<c.length;i++)
		{
			System.out.println(c[i]);
		}
	}


	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}

	static int[] zigzag(int a[],int b[])
	{
		int c[] = new int[a.length+b.length];
		for(int i=0,a1=0,b1=0;i<c.length;)
		{
			if(a1<a.length)
			{
				c[i]=a[a1];
				a1++;
				i++;
			}

			if(b1<b.length)
			{

				c[i]=b[b1];
				b1++;
				i++;
			}
		}
		return c;
	}

}
```

127. WAP to merge two sorted array in the sorted form.

```
import java.util.Scanner;
public class MergeArrayInSortedForm
```

```
{
	public static void main(String[] args)
	{
		int a[]=readArr();
		int b[]=readArr();
		int c[]=merge(a,b);
		System.out.println("Merge Sorted Array is : ");
		for(int i=0;i<c.length;i++)
		{
			System.out.println(c[i]);
		}
	}
	static int[] merge(int[] a, int[] b)
	{
		int c[]=new int[a.length+b.length];
		for(int i=0,m=0,n=0;i<c.length;i++)
		{
			if(m<a.length&&n<b.length)
			{
				if(a[m]<b[n])
				{
					c[i]=a[m];
					m++;
				}
				else
				{
					c[i]=b[n];
					n++;
				}
			}
			else if(m<a.length)
			{
				c[i]=a[m];
				m++;
			}
			else
			{
				c[i]=b[n];
				n++;
			}
		}
		return c;
	}
	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}
```

```
}
```

128. WAP display number of occurrence of each element in the array.

```
import java.util.Scanner;
public class OccurenceOfElement
{
	public static void main(String[] args)
	{
		int a[]=readArr();
		occurence(a);
	}
	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}
	static void occurence(int a[])
	{
		int n=a.length;
		for(int i=0;i<n;i++)
		{
			int c=1;
			for(int j=i+1;j<n;j++)
			{
				if(a[i]==a[j])
				{
					c++;
					a[j]=a[n-1];
					n--;
					j--;
				}
			}
			System.out.println(a[i]+" is repeated by "+c+" times");
		}
	}

}
```

129. WAP to first and second biggest element from the array without sorting.

```
import java.util.Scanner;
public class TwoBiggestElementInArray {

	public static void main(String[] args)
	{
		int arr[] = readArr();
```

```
		int se1=big(arr,0);
		int se2=big(arr,1);
		System.out.println("Biggest Element is "+se1);
		System.out.println("Second Biggest Element is "+se2);
	}

	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}

	static int big(int arr[],int n)
	{
		for(int i=0;i<arr.length;i++)
		{
			int count=0;
			for(int j=0;j<arr.length;j++)
			{
				if(arr[j]>arr[i])
				{
					count++;
				}
			}
			if(count==n)
				return arr[i];
		}
		return -1;
	}

}
```

130. WAP to calculate the sum and average of the even element of the array.

```
import java.util.Scanner;
public class SumAndAverageInArray {

	public static void main(String[] args)
	{

		int arr[] = readArr();
		sumArray(arr);
	}

	static void sumArray(int[] arr)
	{
		double sum=0,count=0;
		for (int i = 0; i < arr.length; i++)
```

```
		{
			if(arr[i]%2==0)
			{
				sum+=arr[i];
				count++;
			}
		}
		System.out.println("Sum of even Numbers in Array is "+sum);
		double avg=sum/count;
		System.out.println("Average of even Numbers in Array is "+avg);
	}

	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}
}
```

131. WAP to find the first and second smallest element of the array.

```
import java.util.Scanner;
public class TwoSmallestElementInArray {

	public static void main(String[] args)
	{
		int arr[] = readArr();
		int se1=small(arr,0);
		int se2=small(arr,1);
		System.out.println("Smallest Element is "+se1);
		System.out.println("Second Smallest Element is "+se2);
	}

	static int[] readArr()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the how many elements: ");
		int n= sc.nextInt();
		int ar[]=new int[n];
		System.out.println("Enter "+ n+" values ");
		for(int i=0;i<n;i++)
		{
			ar[i]= sc.nextInt();
		}
		return ar;
	}

	static int small(int arr[],int n)
```

```
	{
		for(int i=0;i<arr.length;i++)
		{
			int count=0;
			for(int j=0;j<arr.length;j++)
			{
				if(arr[j]<arr[i])
				{
					count++;
				}
			}
			if(count==n)
				return arr[i];
		}
		return -1;
	}
}
```

132. WAP to reverse the elements of the array.

```
import java.util.Scanner;
public class ReverseArrayElement {

	public static void main(String[] args)
	{
		int arr[]=readArray();
		reverse(arr);
		displayArray(arr);
	}

	static void reverse(int[] arr)
	{
		int temp;
		int n=arr.length;
		for(int i=0;i<n/2;i++)
		{
			temp=arr[i];
			arr[i]=arr[n-i-1];
			arr[n-i-1]=temp;
		}
		// changes happen to memory location so, no need to return the
arr[].
	}

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

```
	}

	static void displayArray(int arr[])
	{
		int n=arr.length;
		System.out.println("Array after deleting elements are : ");
		for(int i=0;i<n;i++)
		{
			System.out.println(arr[i]);
		}
	}
}
```

133. WAP to swap two adjacent element.

```
import java.util.Scanner;
public class SwapAdjacentEle {

	public static void main(String[] args)
	{
		int arr[]=readArray();
		swap(arr);
		displayArray(arr);
	}

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

	static void displayArray(int arr[])
	{
		int n=arr.length;
		System.out.println("Array after deleting elements are : ");
		for(int i=0;i<n;i++)
		{
			System.out.println(arr[i]);
		}
	}

	static void swap(int[] arr)
	{
		int temp,n=arr.length;
		for(int i=0;i<n-1;i+=2)
		{
			temp=arr[i];
			arr[i]=arr[i+1];
```

```
                arr[i+1]=temp;
            }
        }
}
```

134. WAP to swap the first half elements of an array with the second half of an array.

```
import java.util.Scanner;
public class SwapHalfArray {

	public static void main(String[] args)
	{
		int arr[]=readArray();
		swap(arr);
		displayArray(arr);
	}

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

	static void displayArray(int arr[])
	{
		int n=arr.length;
		System.out.println("Array after deleting elements are : ");
		for(int i=0;i<n;i++)
		{
			System.out.println(arr[i]);
		}
	}

	static void swap(int[] arr)
	{
		int temp,n=arr.length;
			for(int i=0;i<n/2;i++)
			{
				temp=arr[i];
				arr[i]=arr[i+n/2+n%2];
				arr[i+n/2+n%2]=temp;
			}
	}
}
```

135. WAP to display the enter number in the form of sentence.

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

```
public class NumberToSentence {

	static String
one[]={"","One","Two","Three","Four","Five","Six","Seven","Eight","Nine","Ten
","Eleven","Twelve","Thirteen","Fourteen","Fifteen","Sixteen","Seventeen","Ei
ghteen","Nineteen"};
	static String
two[]={"","","Twenty","Thirty","Fourty","Fifty","Sixty","Seventy","Eighty","N
inty"};

	public static void main(String[] args)
	{
		NumberToSentence nw=new NumberToSentence();
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the Number");
		int n=sc.nextInt();

		nToWord(n/10000000%100,"Crore ");
		nToWord(n/100000%100," Lakh");
		nToWord(n/1000%100," Thousand");
		nToWord(n/100%10," Humdred");
		nToWord(n%100,"");
	}

	static void nToWord(int n,String s)
	{
		if(n<20)
		{
			System.out.print(one[n]);
		}
		else
		{
			System.out.print(two[n/10]+one[n%10]+" ");
		}
		if(n!=0)
		{
			System.out.print(s+" ");
		}

	}

}
```

136. WAP to read and display n student information.

Class:

```
public class Problem136 {

	int id;
	String name;
	double per;

	public Problem136(int id, String name, double per)
	{
		this.id = id;
		this.name = name;
		this.per = per;
```

```
	}

	void display(int i)
	{
		System.out.println("Details of "+(i+1)+" Student is ");
		System.out.println(id+" "+name+" "+per);
	}


}
```

Main Method Class:

```
import java.util.Scanner;
public class MainProblem136
{
	public static void main(String[] args)
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the Number of Student");
		int n=sc.nextInt();
		Problem136 std[]=new Problem136[n];
		for (int i = 0; i < std.length; i++)
		{
			System.out.println("Enter the id,name and percentage of
"+(i+1)+" Student");
			int id=sc.nextInt();
			String name = sc.next();
			double per=sc.nextDouble();
			std[i]= new Problem136(id,name,per);
		}

		System.out.println("Details of the Students are ");

		for (int i = 0; i < std.length; i++)
		{
			std[i].display(i);
		}
	}

}
```

137. WAP to enter the info of employees and display the detail of the employee with the least salary.

Class:

```
public class Problem137
{
	int id;
	String name;
	double sal;
	public Problem137(int id, String name, double salary)
	{
		this.id = id;
		this.name = name;
		this.sal = salary;
	}
```

```
	void display(int i)
	{
		System.out.println("Details of "+(i+1)+" Employee is ");
		System.out.println(id+" "+name+" "+sal);
	}

	void display()
	{
		System.out.println("Details of Employee is ");
		System.out.println(this.id+" "+this.name+" "+this.sal);
	}
}
```

Main Method:

```
import java.util.Scanner;
public class MainProblem137 {

	public static void main(String[] args)
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the Number of Employees");
		int n=sc.nextInt();
		Problem137 emp[]=new Problem137[n];
		for (int i = 0; i < emp.length; i++)
		{
			System.out.println("Enter the id,name and salary of
"+(i+1)+" Employee");
			int id=sc.nextInt();
			String name = sc.next();
			double sal=sc.nextDouble();
			emp[i]= new Problem137(id,name,sal);
		}

		System.out.println("Details of the Employees are ");

		for (int i = 0; i < emp.length; i++)
		{
			emp[i].display(i);
		}

		Problem137 eh=emp[0];
		for (int i = 0; i < emp.length; i++)
		{
			if(eh.sal<emp[i].sal)
			{
				eh=emp[i];
			}
		}

		eh.display();
	}

}
```

138. WAP to count number of vowels, consonant, digits, special characters, capital letters, small letters in the given string.

```
import java.util.Scanner;
public class Problem138 {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the String");
		String st=sc.nextLine();
		int nv=0,nc=0,nd=0,ns=0,nu=0,nl=0;

		for(int i=0;i<st.length();i++)
		{
			char ch = st.charAt(i);
			if(ch>='A'&&ch<='Z')
			{
				nu++;
				if(ch=='A'||ch=='E'||ch=='I'||ch=='O'||ch=='U')
					nv++;
				else
					nc++;
			}

			else if(ch>='a'&&ch<='z')
			{
				nl++;
				if(ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u')
					nv++;
				else
					nc++;
			}

			else if(ch>='0'&&ch<='9')
				nd++;

			else
				ns++;
		}
		System.out.println("Number of Vowels : "+ nv);
		System.out.println("Number of Consonant : "+ nc);
		System.out.println("Number of Digits : "+ nd);
		System.out.println("Number of Upper case Letters : "+ nu);
		System.out.println("Number of Lower case Letters : "+ nl);
		System.out.println("Number of Special Characters : "+ns);
	}

}
```

139. WAP to display how many characters in each words.

```
import java.util.Scanner;
public class Problem139 {

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

```
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the String");
            String st=sc.nextLine();
            int wc=0,c=0;
            for(int i=0;i<st.length();i++)
            {
//                  if(st.charAt(i)==' '||i==st.length()-1)
//                  {
//                        System.out.println(wc+" word is "+lc+" character");
//                        wc++;
//                        lc=0;
//                  }
//                  else
//                  {
//                        lc++;
//                  }

                  c=0;
                  while(i<st.length()&&st.charAt(i)!=' ')
                  {
                        c++;
                        i++;
                  }
                  if(c>0)
                  {
                        wc++;
                        System.out.println(wc+"--->"+c);
                  }
            }
      }

}
```

140. WAP to display how many characters in each words along with the word.

```
import java.util.Scanner;
public class Problem140 {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the String");
            String st=sc.nextLine();

            for(int i=0;i<st.length();i++)
            {
                  int c=0;
                  String t="";
                  while(i<st.length()&&st.charAt(i)!=' ')
                  {
                        t=t+st.charAt(i);
                        c++;
                        i++;
                  }

                  if(c>0)
```

```
                {
                        System.out.println(t+" waor has "+c+" words");
                }
        }
    }

}
```

141. WAP to count how many words in your sentence.

```
import java.util.Scanner;
public class Problem141 {

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String");
        String st=sc.nextLine();
        char ch[]=st.toCharArray();
        int wc=0;

        for (int i = 0; i < ch.length; i++)
        {
            if(i==0&&st.charAt(i)!=' '||st.charAt(i)!=' '&&st.charAt(i-
1)==' ')
                wc++;

//              if(i==0&&ch[i]!=' '||ch[i]!=' '&&ch[i-1]==' ')
//                  wc++;
        }

        System.out.println("Number of words are : "+wc);
    }

}
```

142. WAP to convert every word first character to capital and remaining characters to lower.

```
import java.util.Scanner;
public class Problem142 {

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String");
        String st=sc.nextLine();
        char ch[]=st.toCharArray();

        for (int i = 0; i < st.length(); i++)
        {
            if(i==0&&st.charAt(i)!=' '||st.charAt(i)!=' '&&st.charAt(i-
1)==' ')
            {
                if(ch[i]>=97&&ch[i]<=122)
```

```
                        ch[i]=(char)(ch[i]-32);
                }
                else
                {
                        if(ch[i]>=65&&ch[i]<=90)
                                ch[i]=(char)(ch[i]+32);
                }
        }

        String s=new String(ch);
        System.out.println(s);
    }
}
```

143. WAP to count how many small letters in each words.

```
import java.util.Scanner;
public class Problem143 {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String");
        String st=sc.nextLine();
        char ch[]=st.toCharArray();
        int c=0,wc=1;
        for(int i=0;i<ch.length;i++)
        {
                c=0;
                while((i==0&&ch[i]!=' ')||(i<ch.length&&ch[i]!=' '&&ch[i-
1]==' ')||(i<ch.length&&ch[i]!=' '&&ch[i-1]!=' '))
                {
                        if(ch[i]>='a'&&ch[i]<='z')
                        {
                                c++;
                        }
                        i++;
                }
                System.out.println(wc+" word ----> "+c+" Small letters");
                wc++;
        }

    }

}
```

144. WAP to count how many even length words present in your sentence.

```
import java.util.Scanner;
public class Problem144 {

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String");
        String st=sc.nextLine();
```

```
            char ch[]=st.toCharArray();
            int ewc=0;
            for (int i=0;i<ch.length;i++)
            {
                  int wl=0;
                  while((i==0&&ch[i]!=' ') || (i<ch.length&&ch[i]!=' '&&ch[i-
1]==' ') || (i<ch.length&&ch[i]!=' '&&ch[i-1]!=' '&&i<ch.length))
                  {
                        wl++;
                        i++;
                  }
                  if(wl>0&&wl%2==0)
                  {
                        ewc++;
                  }

            }

            System.out.println("Total Even Words are : "+ewc);
      }

}
```

145. WAP to calculate the sum of digits in the string.
E.g. Fs8g6hu o/p should be 14

```
import java.util.Scanner;
public class Problem145 {
      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the String");
            String st=sc.nextLine();
            char ch[]=st.toCharArray();
            int sum=0;
            for (int i = 0; i < ch.length; i++)
            {
                  if(ch[i]>='1'&&ch[i]<='9')
                  {
                        sum=sum+ch[i]-48;
                  }
            }
            System.out.println("Sum is : "+sum);
      }

}
```

146. WAP to count how many words start with vowel.

```
import java.util.Scanner;
public class Problem146 {

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

```
            System.out.println("Enter the String");
            String st=sc.nextLine();
            char ch[]=st.toCharArray();
            int c=0;
            for (int i = 0; i < ch.length; i++)
            {
                  while(i==0&&ch[i]!=' '||ch[i]!=' '&&ch[i-1]==' ')
                  {

      if(ch[i]=='A'||ch[i]=='E'||ch[i]=='I'||ch[i]=='O'||ch[i]=='U'||ch[i]=='
a'||ch[i]=='e'||ch[i]=='i'||ch[i]=='o'||ch[i]=='u')
                        {
                              c++;
                        }
                        i++;
                  }
            }
            System.out.println("Total Number of words starting with vowel are
: "+c);
      }

}
```

147. WAP to reverse the words in a sentence.

```
import java.util.Scanner;
public class Problem147 {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the String");
            String st=sc.nextLine();
            char ch[]=st.toCharArray();
            st=reverseString(st);
            System.out.println(st);

      }

      static String reverseString(String st)
      {
            char ch[]=st.toCharArray();
            st="";
            for(int i=0;i<ch.length;i++)
            {
                  int j=i;
                  while(i<ch.length&&ch[i]!=' ')
                  {
                        i++;
                  }
                  int k=i-1;
                  while(k>=j)
                  {
                        st=st+ch[k];
                        k--;
```

```
                }
                if(i<ch.length)
                        st=st+ch[i];
        }
        return st;
    }

}
```

148. WAP to reverse the sentence.

e.g. Shri Rama And Laxmana -→ Laxmana And Rama Shri

```
import java.util.Scanner;
public class Problem148 {

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String");
        String st=sc.nextLine();
        char ch[]=st.toCharArray();
        st=reverseString(st);
        System.out.println(st);
    }

    static String reverseString(String st)
    {
        char ch[]=st.toCharArray();
        st="";
        for(int i=ch.length-1;i>=0;i--)
        {
            int j=i;
            while(i>=0&&ch[i]!=' ')
            {
                i--;
            }
            int k=i+1;
            while(k<=j)
            {
                st=st+ch[k];
                k++;
            }
            if(i>=0)
                st=st+ch[i];
        }

        return st;
    }

}
```

149. WAP to read two strings and define a method to check those two strings are Anagram are not. E.g. s1=keep s2=peek, s1=listen s2=silent, s1=debit card

s2=bad credit, s1=mother in law s2=Hitler mother. Ignore space and case sensitivity.

Step1: Remove the space

Step2: Compare the length

Step3: Convert both into uppercase or lower case

Step4: Sort both the string alphabetically

Step5: Compare elements of both the index.

```
import java.util.Scanner;
public class Problem149 {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the First String");
		String st1=sc.nextLine();
		System.out.println("Enter the Second String");
		String st2=sc.nextLine();
		st1=st1.replaceAll(" ", "");
		st2=st2.replaceAll(" ", "");
		int l1=st1.length();
		int l2=st2.length();
		if(l1!=l2)
		{
			System.out.println("Strings are not Anagram");
		}
		st1=st1.toLowerCase();
		st2=st2.toLowerCase();


		st1=sort(st1);
		st2=sort(st2);

		boolean t=check(st1,st2);
		if(t==true)
		{
			System.out.println("Strings are Anagram");
		}
		else
			System.out.println("Strings are not Anagram");
	}

	static String sort(String s)
	{
		char ch[]=s.toCharArray();
		for(int i=0;i<s.length();i++)
		{
			for (int j =i+1;j<ch.length; j++)
			{
```

```
                        if(ch[i]>ch[j])
                        {
                              char t=ch[i];
                              ch[i]=ch[j];
                              ch[j]=t;
                        }
                  }
            }
            String s1=new String(ch);
            return s1;
      }

      static boolean check(String s1, String s2)
      {
            for(int i=0;i<s1.length();i++)
            {
                  if(s1.charAt(i)!=s2.charAt(i))
                  {
                        return false;
                  }
            }
            return true;
      }

}
```

150. WAP to count number of occurrence of each character in the given string.

```
import java.util.Scanner;
public class Problem150 {

      public static void main(String[] args)
      {
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter the String");
            String st=sc.nextLine();
            int c[]=new int[128];
            for (int i = 0; i < st.length(); i++)
            {
                  c[st.charAt(i)]++;
            }
            for (int i = 0; i < c.length; i++)
            {
                  if(c[i]!=0)
                  {
                        System.out.println((char)i+"----->"+c[i]);
                  }
            }
      }

}
```

151. WAP to convert string to number.

```
import java.util.Scanner;
public class Problem151 {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the String");
		String st=sc.nextLine();
		int n=convertToInt(st);
		System.out.println(n);
	}

	static int convertToInt(String st)
	{
		char ch[]=st.toCharArray();
		int n=0;
		for (int i = 0; i <st.length(); i++)
		{
			n=n*10+(st.charAt(i)-48);
		}
		return n;
	}

}
```

152. WAP to check if your string is pangram or not. (Pangram is a sentence which has all the alphabet in it).

```
import java.util.Scanner;
public class Problem152 {

	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the String");
		String st=sc.nextLine();
		st=st.replaceAll(" ", "");
		st=st.toLowerCase();
		boolean t=check(st);
		if(t==true)
		{
			System.out.println("Strings are Anagram");
		}
		else
			System.out.println("Strings are not Anagram");
	}

	static boolean check(String s)
	{
		int l=s.length();
		if(l<26)
		{
```

```
                System.out.println("Entered String is not Panagram");
                return false;
            }
            int c[]=new int[26];
            for(int i=0;i<s.length();i++)
            {
                if(s.charAt(i)>='a'&&s.charAt(i)<='z')
                {
                    c[s.charAt(i)-97]++;
                }
            }

            for (int i = 0; i < c.length; i++)
            {
                if(c[i]==0)
                {
                    System.out.println(c[i]);
                    return false;
                }
            }
            return true;
        }

}
```

153. WAP to define a method to check substring or not.

```
import java.util.Scanner;
public class Problem153 {

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the First String");
        String fs=sc.nextLine();
        System.out.println("Enter the Second String");
        String ss=sc.nextLine();
        sc.close();
        boolean t=check(fs,ss);
        if(t==true)
        {
            System.out.println("Second String is Present");
        }
        else
            System.out.println("Second String is not Present");

        boolean u=check(fs,ss);
        if(u==true)
        {
            System.out.println("Second Word is Present");
        }
        else
            System.out.println("Second Word is not Present");
```

```
		int c=countWord(fs,ss);
		System.out.println("Second Word is Present "+c+" times");

	}

	static boolean check(String fs,String ss)
	{
		char c1[]=fs.toCharArray();
		char c2[]=ss.toCharArray();

		for(int i=0;i<c1.length;i++)
		{
			int j=0,k=i;
			while(i<c1.length&&j<c2.length&&c1[k]==c2[j])
			{
				k++;
				j++;
			}
			if(j==c2.length)
				return true;
		}
		return false;


//		MY CODE		NOT WORKING YET
//		char cm[]=ms.toCharArray();
//		char cs[]=ss.toCharArray();
//		int lm=cm.length;
//		int ls=ss.length();
//		int j=0;
//		for (int i = 0; i < lm; i++)
//		{
//			j=0
//			if(cs[j]==cm[i])
//			{
//				for(int k=j;k<ls;k++)
//				{
//					int l=i;
//					if(cs[k]!=cm[l])
//					{
//						return false;
//					}
//					l++;
//					if(l==ls)
//						return true;
//				}
//			}
//		}
//		return false;
	}

	static boolean checkWord(String fs,String ss)
	{
		char c1[]=fs.toCharArray();
		char c2[]=ss.toCharArray();
```

```
		for(int i=0;i<c1.length;i++)
		{
			int j=0,k=i;
			while(i<c1.length&&j<c2.length&&c1[k]==c2[j])
			{
				k++;
				j++;
			}
			if(j==c2.length)
			{
				if((i==0||c1[i-1]==' ')&&(k==c1.length||c1[k]==' '))
				return true;
			}
		}
		return false;
	}

	static int countWord(String fs,String ss)
	{
		char c1[]=fs.toCharArray();
		char c2[]=ss.toCharArray();
		int count=0;
		for(int i=0;i<c1.length;i++)
		{
			int j=0,k=i;
			while(i<c1.length&&j<c2.length&&c1[k]==c2[j])
			{
				k++;
				j++;
			}
			if(j==c2.length)
			{
				if((i==0||c1[i-1]==' ')&&(k==c1.length||c1[k]==' '))
				count++;
			}
		}
		return count;
	}
}
```

154. WAP to calculate the number of days between two dates.

CLASS:

```
import java.util.Scanner;

public class Date
{
	int dd,mm,yy;
	int month[]={0,31,28,31,30,31,30,31,31,30,31,30,31};
	public Date(int dd,int mm,int yy)
	{
		this.dd=dd;
		this.mm=mm;
		this.yy=yy;
	}
```

```
	static Date readDate()
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the date(ss,mm,yyyy) format");
		int dd=sc.nextInt();
		int mm=sc.nextInt();
		int yy=sc.nextInt();
		return new Date(dd,mm,yy);
	}
	String getDate()
	{
		return dd+"/"+mm+"/"+yy;
	}
	int getNumberOfDays()
	{
		int days=0;
		int y=yy-1;
		days=y*365;
		days+=(y/4+y/400-y/100);
		for(int i=1;i<mm;i++)
		{
			days+=month[i];
		}
		days+=dd;

		return days;
	}
}
```

MAIN METHOD:

```
import java.util.Scanner;
public class Problem154Main {

	public static void main(String[] args)
	{
		System.out.println("Enter the First date");
		Date d1=Date.readDate();
		System.out.println("Enter the Second date");
		Date d2=Date.readDate();

		System.out.println("First Date: "+d1.getDate());
		System.out.println("Second Date: "+d2.getDate());

		System.out.println("Number of Days Between two Dates:
"+(d2.getNumberOfDays()-d1.getNumberOfDays()));
	}

}
```

155. WAP to calculate the time between two time slots.

Time Class:

```
import java.util.Scanner;
public class Time
```

```
{
	int sec,min,hr;
	public Time(int sec, int min, int hr) {
		super();
		if(hr==12)
		{
			hr=0;
		}
		this.sec = sec;
		this.min = min;
		this.hr = hr;
	}
	static Time readTime()
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the Time(hr::min::sec)");
		int hr=sc.nextInt();
		int min=sc.nextInt();
		int sec=sc.nextInt();
		return new Time(sec,min,hr);
	}

	int getTime()
	{
		int s=0;
		s=(hr*60*60)+(min*60)+sec;
		return s;
	}
}
```

Main Method :

```
public class Problem155 {

	public static void main(String[] args)
	{
		System.out.println("Enter the First time");
		Time t1=Time.readTime();
		Time t2=Time.readTime();
		int s=(t2.getTime()-t1.getTime());
		if(s<0)
			s=s+(12*60*60);

		System.out.println("Number of Seconds are: "+s);
		int s1=s,min1=0,hr1=0;
		if(s1>=60)
		{
			min1=s1/60;
			s1=s1%60;
		}
		if(min1>=60)
		{
			hr1=min1/60;
			min1%=60;
		}
```

```
            System.out.println("Hour: "+hr1+" Minutes: "+min1+" Seconds:
"+s1);
      }

}
```

2-D ARRAY

```
int a[][];

int [][]a;

int[][] a;

int mat[][];

mat=new int[3][2];      (3→number of rows, 2→number of elements in each row.)


mat[1][1]=456;

SOP("Number of rows:"+mat.length);

SOP("Number of elements in 1st row:"+mat[0].length);

SOP("Number of elements in 2nd row:"+mat[1].length);

SOP("Number of elements in 2nd row:"+mat[mat.length-1].length);
```

- It allocates the continuous memory for 2-D array.
- Default value will be 0 at any index.

Index	Value	Address
00	0	8000
01	0	8004
10	0	8008
11	456	8012
20	0	8016
21	0	8020

```
int a[][]={ {23,64,23},{56,78,89,20},{56,78} }

for(int i=0;i<a.length;i++)
{
    for(int j=0;j<a[i].length;j++)
    {
           SOPrint(ar[i][j];
    }
    SOPrintln();
```

```
    }
```

In following questions I have made a separate class for Matrix Input() and Matrix Output(). I have made object in each of the following question to read and display the Matrix.

This is the following class for which object is created in following question.

```
import java.util.Scanner;
public class Matrix {

	void displayMatrix(int mat[][])
	{
		for(int i=0;i<mat.length;i++)
		{
			for(int j=0;j<mat[i].length;j++)
			{
				System.out.print(mat[i][j]+" ");
			}
			System.out.println();
		}
	}

	int[][] readMatrix()
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the number of rows and columns");
		int r=sc.nextInt();
		int c=sc.nextInt();

		System.out.println("Enter the "+r*c+" elements");
		int arr[][]=new int[r][c];
		for(int i=0;i<r;i++)
		{
			for(int j=0;j<c;j++)
			{
				arr[i][j]=sc.nextInt();
			}
		}
		return arr;
	}


}
```

156. WAP to define a method to add two matrix. Also print the biggest element in the added matrix.

```
public class Problem156 {
```

```
	public static void main(String[] args)
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		int brr[][]=m.readMatrix();
		if(arr.length!=brr.length||arr[0].length!=brr[0].length)
		{
			System.out.println("Addition not possible");
		}
		else
		{
			System.out.println("Added Matrix is:");
			arr=addMatrix(arr, brr);
			m.displayMatrix(arr);
		}

		System.out.println("Biggest element in the sum matrix is :
"+biggestEle(arr));
	}

	static int [][] addMatrix(int arr[][],int brr[][])
	{
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[0].length;j++)
			{
				arr[i][j]+=brr[i][j];
			}
		}
		return arr;
	}

	static int biggestEle(int arr[][])
	{
		int big=arr[0][0];
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[0].length;j++)
			{
				if(big<arr[i][j])
				{
					big=arr[i][j];
				}
			}
		}
		return big;

	}

}
```

157. WAP to define a method to subtract two matrix.

```
public class Problem157 {
	public static void main(String[] args)
```

```
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		int brr[][]=m.readMatrix();
		if(arr.length!=brr.length||arr[0].length!=brr[0].length)
		{
			System.out.println("Addition not possible");
		}
		else
		{
			System.out.println("Substracted Matrix is:");
			arr=subMatrix(arr, brr);
			m.displayMatrix(arr);
		}

	}

	static int [][] subMatrix(int arr[][],int brr[][])
	{
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[0].length;j++)
			{
				arr[i][j]-=brr[i][j];
			}
		}
		return arr;
	}
}
```

158. WAP to display the row wise biggest element.

```
public class Problem158 {

	public static void main(String[] args)
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		rowWiseBig(arr);
	}

	static void rowWiseBig(int arr[][])
	{
		for(int i=0;i<arr.length;i++)
		{
			int big=arr[i][0];
			for(int j=0;j<arr[i].length;j++)
			{
				if(big<arr[i][j])
					big=arr[i][j];
			}
			System.out.println("Biggest element of "+(i+1)+" row is
"+big);
		}
```

```
	}
}
```

159. WAP to display the row wise sum.

```
public class Problem158 {

	public static void main(String[] args)
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		rowWiseSum(arr);
	}

	static void rowWiseSum(int arr[][])
	{
		for(int i=0;i<arr.length;i++)
		{
			int sum=0;
			for(int j=0;j<arr[i].length;j++)
			{
				sum+=arr[i][j];
			}
			System.out.println("Sum of "+(i+1)+" row is "+sum);
		}

	}
}
```

160. WAP to display the column wise least element.

```
public class Problem158 {

	public static void main(String[] args)
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		System.out.println("Entered Matrix is : ");
		m.displayMatrix(arr);
		rowWiseSum(arr);
	}

	static void rowWiseSum(int arr[][])
	{
		for(int i=0;i<arr[0].length;i++)
		{
			int least=arr[i][0];
			for(int j=0;j<arr.length;j++)
			{
				if(least>arr[j][i])
				{
					least=arr[j][i];
```

```
                        }
                    }
                    System.out.println("least of "+(i+1)+" column is "+least);
                }

        }
}
```

161. WAP to define a method to reverse the row or column element in the matrix.

```
import java.util.Scanner;

public class Problem161 {

        public static void main(String[] args)
        {
                Scanner sc=new Scanner(System.in);
                Matrix m=new Matrix();
                int arr[][]=m.readMatrix();

                System.out.println("Original Matrix is ");
                m.displayMatrix(arr);
                System.out.println("Press 1 to reverse Row wise");
                System.out.println("Press 2 to reverse Column wise");
                int n=sc.nextInt();
                System.out.println("Modified array is ");

                if(n==1)
                {
                        arr=reverseRows(arr);
                }
                else if(n==2)
                        arr=reverseColumn(arr);
                else
                        System.out.println("Wrong Choice");
                m.displayMatrix(arr);

        }

        static int[][] reverseRows(int arr[][])
        {
                for(int i=0;i<arr.length;i++)
                {
                        for(int j=0;j<arr[i].length/2;j++)
                        {
                                int t=arr[i][j];
                                arr[i][j]=arr[i][arr[i].length-j-1];
                                arr[i][arr[i].length-j-1]=t;
                        }
                }
                return arr;
        }

        static int[][] reverseColumn(int arr[][])
```

```
	{
		for(int i=0;i<arr.length/2;i++)
		{
			for(int j=0;j<arr[i].length;j++)
			{
				int t=arr[i][j];
				arr[i][j]=arr[arr[i].length-i-1][j];
				arr[arr[i].length-i-1][j]=t;
			}
		}
		return arr;
	}
}
```

162. WAP to define a method to transpose the matrix.

```
public class Problem162 {

	public static void main(String[] args)
	{
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		System.out.println("Original Matrix is ");
		m.displayMatrix(arr);
		transpose(arr);
		System.out.println("Transposed Matrix is ");
		m.displayMatrix(arr);
	}

	static void transpose(int a[][])
	{
		for(int i=0;i<a.length;i++)
		{
			for(int j=0;j<i;j++)
			{
				int t=a[i][j];
				a[i][j]=a[j][i];
				a[j][i]=t;
			}
		}
	}
}
```

163. WAP to rotate the matrix 90 Degree left or right.

```
1 2 3
4 5 6
7 8 9
```

90 Degree Right

```
7 4 1
```

```
8 5 2
9 6 3

90 Degree Left


3 6 9
2 5 8
1 4 7
```

```java
import java.util.Scanner;

import javax.sql.rowset.RowSetWarning;

public class Problem163 {

	public static void main(String[] args)
	{
		Scanner sc=new Scanner(System.in);
		Matrix m=new Matrix();
		int arr[][]=m.readMatrix();
		System.out.println("Original Matrix is ");
		m.displayMatrix(arr);
		System.out.println("Press 1 to Rotate 90 Degree Right");
		System.out.println("Press 2 to Rotate 90 Degree Left");
		int no=sc.nextInt();
		if(no==1)
			rotate90DegreeRight(arr);
		else if(no==2)
			rotate90DegreeLeft(arr);
		else
			System.out.println("Wrong choice");
		m.displayMatrix(arr);
	}

	static void rotate90DegreeRight(int arr[][])
	{
		transpose(arr);
		reverseRows(arr);
	}

	static void rotate90DegreeLeft(int arr[][])
	{
		transpose(arr);
		reverseColumn(arr);
	}

	static void transpose(int a[][])
	{
		for(int i=0;i<a.length;i++)
		{
			for(int j=0;j<i;j++)
			{
				int t=a[i][j];
				a[i][j]=a[j][i];
				a[j][i]=t;
```

```
                }
            }
        }

        static int[][] reverseRows(int arr[][])
        {
            for(int i=0;i<arr.length;i++)
            {
                for(int j=0;j<arr[i].length/2;j++)
                {
                    int t=arr[i][j];
                    arr[i][j]=arr[i][arr[i].length-j-1];
                    arr[i][arr[i].length-j-1]=t;
                }
            }
            return arr;
        }

        static int[][] reverseColumn(int arr[][])
        {
            for(int i=0;i<arr.length/2;i++)
            {
                for(int j=0;j<arr[i].length;j++)
                {
                    int t=arr[i][j];
                    arr[i][j]=arr[arr[i].length-i-1][j];
                    arr[arr[i].length-i-1][j]=t;
                }
            }
            return arr;
        }
}
```

164. WAP to display the biggest element from the diagonal (Primary and Secondary).

```
public class Problem164 {

    public static void main(String[] args)
    {
        Matrix m=new Matrix();
        int arr[][]=m.readMatrix();
        System.out.println("Original Matrix is ");
        m.displayMatrix(arr);

        int pbig=arr[0][0];
        int sbig=arr[arr.length-1][0];

        for(int i=0;i<arr.length;i++)
        {
            for(int j=0;j<arr[i].length;j++)
            {
                if(i==j)
                {
                    if(arr[i][j]>pbig)
```

```
                                    pbig=arr[i][j];
                        }
                        if(i+j==arr.length-1)
                        {
                              if(sbig<arr[i][j])
                              {
                                    sbig=arr[i][j];
                              }
                        }
                  }
            }

            System.out.println("Primary Diagonal Biggest Element is "+pbig);
            System.out.println("Secondary Diagonal Biggest Element is
"+sbig);

      }

}
```

165. WAP to display the matrix element in the clockwise spiral order.

```
1 2 3
4 5 6
7 8 9
```

To

```
1 2 3 6 9 8 7 4 5
```

```
public class Problem165 {

      public static void main(String[] args)
      {

            Matrix m=new Matrix();
            int arr[][]=m.readMatrix();
            System.out.println("Matrix Entered is ");
            m.displayMatrix(arr);
            displaySpiral(arr);

      }

      static void displaySpiral(int arr[][])
      {
            int n=arr.length;
            for(int i=0,j=n-1;i<j;i++,j--)
            {
                  for(int k=i;k<j;k++)
                        System.out.print(arr[i][k]+" ");
                  for(int k=i;k<j;k++)
                        System.out.print(arr[k][j]+" ");
                  for(int k=j;k>i;k--)
                        System.out.print(arr[j][k]+" ");
```

```
                for(int k=j;k>i;k--)
                        System.out.print(arr[k][i]+" ");
                }

                if(n%2!=0)
                        System.out.print(arr[n/2][n/2]+" ");
        }
}
```

166. WAP to display the matrix element in the anti-clockwise spiral order.

```
1 2 3 4 5
6 7 8 9 0
1 2 3 4 5
6 7 8 9 0
1 2 3 4 5
```

To

```
1 6 1 6 1 2 3 4 5 0 5 0 5 4 3 2 7 2 7 8 9 4 9 8 3
```

```
public class Problem166 {

        public static void main(String[] args)
        {

                Matrix m=new Matrix();
                int arr[][]=m.readMatrix();
                System.out.println("Matrix Entered is ");
                m.displayMatrix(arr);
                displaySpiral(arr);

        }

        static void displaySpiral(int arr[][])
        {
                int n=arr.length;
                for(int i=0,j=n-1;i<j;i++,j--)
                {
                        for(int k=i;k<j;k++)
                                System.out.print(arr[k][i]+" ");
                        for(int k=i;k<j;k++)
                                System.out.print(arr[j][k]+" ");
                        for(int k=j;k>i;k--)
                                System.out.print(arr[k][j]+" ");
                        for(int k=j;k>i;k--)
                                System.out.print(arr[i][k]+" ");
                }


                if(n%2!=0)
                        System.out.print(arr[n/2][n/2]+" ");
        }
}
```