1. Write a java program to print the pascal's triangle.

Input Format
The first input integer is the number of rows
Output Format
The output prints the pascal's triangle.
Sample InputSample Output
6

```
     1
    1 1
   1 2 1
  1 3 3 1
 1 4 6 4 1
1 5 10 10 5 1
```

Solution

```
public class Main {
    public static void main(String[] args) {
        int numRows = 5;

        for (int i = 0; i < numRows; i++) {

            for (int k = numRows - i; k > 0; k--) {
                System.out.print(" ");
            }

            for (int j = 0; j <= i; j++) {
                System.out.print(ncr(i, j) + " ");
            }

            System.out.println();
        }
    }

    public static int ncr(int n, int r) {

        int res = 1;

        if (r > n - r) {
            r = n - r;
        }
```

```
        for (int i = 0; i < r; ++i) {
            res *= (n - i);
            res /= (i + 1);
        }
        return res;
    }
}
```

2. Problem Statement :
Lucas Sequence
a = 0, b=0, c=1 are the 1st three terms. All other terms in the Lucas sequence are generated by the sum of their 3 most recent predecessors. Write a program to generate the first n terms of a Lucas Sequence.
Input Format
The input contains an integer 'n' which denotes the given number
Output Format
Print the 'n' terms of the Lucas Sequence, separated by a single space. There are no leading or trailing spaces in the output.
Sample InputSample Output
5
0 0 1 1 2

Solution

```
import java.util.*;
public class Main
{
        public static void main(String[] args) {
                Scanner sc = new Scanner(System.in);
                int n = sc.nextInt();
                int a=0,b=0,c=1;
// lucas seq genrated sum of 3 most revent precedecessors
                for(int i=1;i<=n;i++){
                   System.out.println(a+" ");
                   int temp = a+b+c;
                   a=b;
                   b=c;
                   c=temp;

                }

        }
}
```

3. Problem Statement :

SPECIAL NUMBER
Write a program to find all special numbers between given range m and n(both inclusive). Assume that m and n are 2-digit numbers.

A 2-digit number is said to be a special number if the sum of its digits and the products of its digits is equal to the number itself.

For example, 19 is a special number.
The digits in 19 are 1 and 9. The sum of the digits is 10 and the product of the digits is 9. 10+9 = 19.
Input Format
The input consists of 2 integers m and n denotes the range
Output Format
Print the special numbers as shown in the sample output.
Sample InputSample Output
11
30
19
29

Solution

```
import java.util.*;
public class Main
{
        public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
           int start =sc.nextInt();
           int end = sc.nextInt();
            for(int i=start;i<=end;i++){
                int org=i;
                int n = i;
                int sum=0,prod=1;
                while(n>0)
                {
                int t = n%10;
                sum = sum +t ;
                prod = prod * t;
```

```
            n=n/10;

            }
        if((sum+prod)==org){
            System.out.println(org);
        }
        }

    }
}
```

4. Problem Statement :
Handshakes
It was Stefan's first day at school. His teacher Elena Gilbert asked the students to meet every other student in the class and introduce themselves. The teacher asked them to handshake each other when they meet. If there are n number of students in the class then find the total number of handshakes made by the students.
Input Format
The input consists of 1 integer. The first input corresponds to the total number of students.
Output Format
The output consists of 1 integer.
Sample InputSample Output
15
105
Sample InputSample Output
4
6

Solution

```
import java.util.*;
public class Main
{
    public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    int n = sc.nextInt();
    int c=0;
    for(int i=1;i<n;i++){
        for(int j=1;j<=i;j++){
            c++;
        }
    }
    System.out.println(c);}}
```