

# Write a program to print Pascal's Triangle in Python

In this article, TipsMake.com will learn with you how to write a program to print Pascal's Triangle in Python.

**Problem :** Write a program to print Pascal's Triangle with a given number of rows.

**For example :** The number of rows is 5, then Pascal's Triangle will be printed as follows:

Input: n = 5 Output: 1 1 1 1 2 1 1 3 3 1 1 4 6 4 1

Pascal's triangle is also a question frequently used by large companies when recruiting programmers. In this article, TipsMake.com will learn with you how to write a program to print Pascal's Triangle in Python.

## Method 1: Use the formula $nCr$ ie $n!/(nr)!r!$

After using the  $nCr$  formula, the graphical representation becomes:

0C0 1C0 1C1 2C0 2C1 2C2 3C0 3C1 3C2 3C3

Algorithm:

1. Get the number of rows to be printed, let's say it is n.
2. Do the outer iteration i from 0 to n times to print the rows.
3. Do the inner iteration for j from 0 to (N-1).
4. Print a space "".
5. Close inner loop (j loop) //required for left spacing.
6. Do the inner iteration for j from 0 to i.
7. Print  $nCr$  of i and j.
8. Close the inner loop.
9. Print the newline character ( $\n$ ) after each inner iteration.

Here is sample code:

```
# Print Pascal's Triangle in Python from math import factorial # input n n = 5 f
```

## Method 2:

We can optimize the above code using the following binomial coefficient concept, the i-th item in a line is the binomial coefficient  $C(\text{line}, i)$  and all lines start with the value 1. Here , we have to implement the idea of ?? computing  $C(\text{line}, i)$  using  $C(\text{line}, i-1)$ .

The sample code is as follows:

```
# Print Pascal's Triangle in Python # input n n = 5 for i in range(1, n+1): for
```

### Method 3:

This is the most optimal way to print Pascal triangle. This method is based on powers of 11.

```
11**0 = 1 11**1 = 11 11**2 = 121 11**3 = 1331
```

The sample code is as follows:

```
# Print Pascal's Triangle in Python # input n n = 5 # iterate upto n for i in r
```

However, the disadvantage is that this method can only be applied up to n=5.

TipsMake.com hopes that this article will be useful to you.

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