

Python Program to Print Series 1, 3, 7, 15, 31 ... N - B Tech Geeks

1 3 7 15 31: In the previous article, we have discussed Python Program to Print Series 2, 4, 7, 2, 21, ... N Given a number N and the task is to print the series (1, 3, 7, 15, 31 ... N) till the given number N in Python.

Examples:

Example1:

Input:

Given Number (Limit) = 5

Output:

The above series till the given number { 5 } is : 1 3 7 15 31

- Python Program to Print Series 6, 9, 14, 21, 30, 41, 54 ... N
- Python Program to Print Series 0 2 6 12 20 30 42...N
- Python Program to Find Sum of Series $5^2 + 10^2 + 15^2 + \dots + N^2$

Example2:

Input:

Given Number (Limit) = 9

Output:

The above series till the given number { 9 } is : 1 3 7 15 31 63 127 255 511

Below are the ways to print the series (1, 3, 7, 15, 31 ... N) till the given number N in Python:

- Using While Loop (Static Input)
- Using While loop (User Input)

Method #1: Using While Loop (Static Input)

Approach:

- Give the number N (Limit) as static input and store it in a variable.
- Take a variable to say itr and initialize its value to 1.
- Take another variable say previous_val and initialize its value to 0.
- Loop until the above-declared variable itr value is less than or equal to the given number using the while loop.
- Inside the loop, Multiply the variable previous_val with 2 and add 1 to the result.
- Store it in the same variable previous_val.
- Print the value of the above previous_val separated by spaces.
- Increment the above itr value by 1.
- The Exit of the Program

Below is the implementation:

```
# Give the number N as static input and store it in a variable. gvn_numb = 5 # Take a variable to say itr and initialize its value to 1. itr = 1 # Take another variable say previous_val and initialize its value to 0. previous_val = 0 print("The above series till the given number{'', gvn_numb, '} is :') # Loop until the above-declared variable itr value is less than or equal to the # given number using the while loop. while itr <= gvn_numb: # Inside the loop, Multiply the variable previous_val with 2 and add 1 to the result. # Store it in the same variable previous_val. previous_val = (previous_val * 2) + 1 # Print the value of the above previous_val separated by spaces. print(previous_val, end='') # Increment the above itr value by 1. itr += 1
```

Output:

The above series till the given number { 5 } is : 1 3 7 15 31

Method #2: Using While loop (User Input)

Approach:

- Give the number N (Limit) as user input using the `int(input())` function and store it in a variable.
- Take a variable to say `itr` and initialize its value to 1.
- Take another variable say `previous_val` and initialize its value to 0.
- Loop until the above-declared variable `itr` value is less than or equal to the given number using the while loop.
- Inside the loop, Multiply the variable `previous_val` with 2 and add 1 to the result.
- Store it in the same variable `previous_val`.
- Print the value of the above `previous_val` separated by spaces.
- Increment the above `itr` value by 1.
- The Exit of the Program.

Below is the implementation:

```
# Give the number N (Limit) as user input using the int(input()) function and # store it in a variable. gvn_numb = int(input("Enter some Random Number = ")) # Take a variable to say itr and initialize its value to 1. itr = 1 # Take another variable say previous_val and initialize its value to 0. previous_val = 0 print("The above series till the given number{'', gvn_numb, ''} is :") # Loop until the above-declared variable itr value is less than or equal to the # given number using the while loop. while itr <= gvn_numb: # Inside the loop, Multiply the variable previous_val with 2 and add 1 to the result. # Store it in the same variable previous_val. previous_val = (previous_val * 2) + 1 # Print the value of the above previous_val separated by spaces. print(previous_val, end=" ") # Increment the above itr value by 1. itr += 1
```

Output:

Enter some Random Number = 9 The above series till the given number{ 9 } is : 1 3 7 15 31 63 127 255 511

If you are new to the Python Programming Language then practice using our Python Programming Examples for Beginners as our expert team has designed them from scratch.

- Python Program to Calculate Volume and Surface Area of Hemisphere
- Python Program for Minimum Height of a Triangle with Given Base and Area
- Python Program for Maximum Number of Squares that Can Fit in a Right Angle Isosceles Triangle
- Python Program for Triangular Matchstick Number

What is the rule to the pattern 1 3 7 15 31? - Answers

What is the rule for the number pattern 1 6 16 31?

The rule is 5, 10, 15 and so the next number will be $20+31 = 51$

What is the pattern rule for this pattern 1 4 7 11 15?

Add 3 each time

What pattern is 3 7 15 31?

You double the number before it and add 1.

What is the rule for this pattern 1-3-2-6-5-15-14-42-41?

multiplication pattern

What is the rule of the pattern 1 6 16 31 51?

The gaps are 5, 10, 15, 20, The rule becomes add $5(n-1)$ to the previous number So that the second number is found by adding 5 times (2-1) to 1 = $5+1 = 6$ and the third number is found by adding 5 times (3-1) to 6 = $10+6 = 16$ and the fourth number is found by adding 5 times (4-1) to 16 = $15+16 = 31$ and so on....

What three numbers can add up to 31?

$15+15+1=31$

What is the pattern rule for pattern 35-21-1-13-15-34?

One possible rule is: $Un = (219n^5 - 3755n^4 + 24075n^3 - 70645n^2 + 92166n - 36960)/120$ for $n = 1, 2, 3,$ etc

What is the pattern rule for this pattern 1-3-2-6-5-15-14-42-41?

Start at 1. Multiply by 3. Subtract 1. Multiply by 3. Subtract 1. Repeat this pattern.

What are the factors of 31 and 45?

The factors of 31 are 1 and 31. The factors of 45 are 1, 3, 5, 9, 15, and 45.

What is the gcd of 15 and 31?

The Greatest Common Factor (GCF) of 15 and 31 is 1.

What is the rule for this pattern 2 6 15 31 56 92?

The pattern at each stage is the addition of a square number of increasing value to the previous term. $1 + 1 = 2$, $2 + 4 = 6$, $6 + 9 = 15$, $15 + 16 = 31$, $31 + 25 = 56$, $56 + 36 = 92$. The formula for the n th term is, $a(n) = \frac{n^3}{3} + \frac{n^2}{2} + \frac{n}{6} + 1$ or it can be written $a(n) = \frac{1}{6}(2n^3 + 3n^2 + n + 6)$. So the 7th term = $\frac{1}{6}(686 + 147 + 7 + 6) = \frac{1}{6} \times 846 = 141$ ($= 92 + 49$) NOTE : The rule is the same as the sum of the squared numbers plus one. So another way of presenting the formula is, $a(n) = \frac{1}{6}[n(n+1)(2n+1)] + 1$

What is the rule for this pattern 111359173157?

The rule of this pattern is obfuscated by the omission of spaces, giving the impression that this is the number "111,359,173,157". However, the underlying pattern follows the function of the Fibonacci series, but adding sets of 3 instead of sets of 2. So, $1+1+1=3$, $1+1+3=5$, $1+3+5=9$, $3+5+9=17$, $5+9+17=31$, $9+17+31=57$.