

ChatGPT 4o

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Fibonacci Series Calculation

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Calculate Fibonacci Series

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Neuer Chat

You are a tutor for an entry-level programming course at a university.

Make sure your answers are easily understandable for students in an entry-level course. Therefore explain all concepts that are used.

Please provide a solution for the following problem in the Python language.

Given a positive integer N. Calculate the Fibonacci series till the number N. If N is a part of the series, include N as well.

Sure! Let's break down the problem and solve it step by step.

What is the Fibonacci series?

The Fibonacci series is a sequence of numbers where each number is the sum of the two preceding ones, usually starting with 0 and 1. The sequence typically looks like this:

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0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

Problem Statement

You are given a positive integer `N`. You need to generate the Fibonacci series up to `N`. If `N` is part of the series, you should include `N` in the output as well.

Example

If `N = 21`, the Fibonacci series up to `N` would be:

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0, 1, 1, 2, 3, 5, 8, 13, 21

If `N = 10`, the Fibonacci series up to `N` would be:

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0, 1, 1, 2, 3, 5, 8

Steps to Solve

1. Start with the first two Fibonacci numbers: 0 and 1.
2. Iterate to calculate the next Fibonacci number by summing the last two numbers in the series.
3. Continue this process until the next Fibonacci number would exceed `N`.
4. Stop when the Fibonacci number is greater than `N`.

Python Code

Here's how you can implement this in Python:

python

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```
def fibonacci_series_upto_n(N):  
    # Initializing the first two Fibonacci numbers  
    fib_series = [0, 1]  
  
    # Generating Fibonacci numbers until the next number exceeds N  
    while True:  
        next_fib = fib_series[-1] + fib_series[-2]  
        if next_fib > N:  
            break  
        fib_series.append(next_fib)  
  
    # If N is part of the Fibonacci series, include it  
    return fib_series  
  
# Test the function with an example  
N = 21  
result = fibonacci_series_upto_n(N)  
print(f"Fibonacci series up to {N}: {result}")
```

Explanation of the Code

- `fib_series = [0, 1]`: This initializes the list with the first two Fibonacci numbers, 0 and 1.
- `while True:`: This creates an infinite loop. We'll use this loop to keep generating Fibonacci numbers.
- `next_fib = fib_series[-1] + fib_series[-2]`: This calculates the next Fibonacci number by adding the last two numbers in the `fib_series` list.
- `if next_fib > N:`: This checks if the newly calculated Fibonacci number exceeds `N`. If it does, we break out of the loop.
- `fib_series.append(next_fib)`: This adds the new Fibonacci number to the series.
- Finally, the function returns the Fibonacci series list up to `N`.

Running the Code

If you run the provided code with `N = 21`, it will print:

CSS

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```
Fibonacci series up to 21: [0, 1, 1, 2, 3, 5, 8, 13, 21]
```

This means the Fibonacci series up to 21 is correctly calculated.

You can test the function with different values of `N` to see how it works!

If you have any questions or need further clarification, feel free to ask!

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ChatGPT kann Fehler machen. Überprüfe wichtige Informationen.



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