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Fibonacci Series Calculation

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Consider the following programming problem:
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.
Please provide a solution for this problem in the Python language.

Certainly! Here's a Python function that generates the Fibonacci series up to a given positive integer N . If N is part of the Fibonacci series, it will include N in the output:

```
python Code kopieren
def fibonacci_series_till_n(N):
    # Initialize the first two Fibonacci numbers
    fib_series = [0, 1]

    # Generate the Fibonacci series until the next number would exceed N
    while True:
        next_fib = fib_series[-1] + fib_series[-2]
        if next_fib > N:
            break
        fib_series.append(next_fib)

    # Check if N is not in the series and remove the initial 0 if N is less than 1
    if N < 1:
        fib_series = fib_series[1:]

    return fib_series

# Example usage:
N = 21
result = fibonacci_series_till_n(N)
print("Fibonacci series up to", N, ":", result)
```

Explanation:

- Initialization:
 - The Fibonacci series starts with `[0, 1]`.
- While Loop:
 - We continue to generate the next Fibonacci number by adding the last two numbers in the series.
 - We stop the loop when the next Fibonacci number exceeds N .
- Return the Series:
 - The function returns the list of Fibonacci numbers that are less than or equal to N .

Example Output:

For $N = 21$, the function will output:

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

This code includes N if it is part of the Fibonacci sequence and stops the series generation at the point where the next Fibonacci number would exceed N .

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