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Fibonacci Series Calculation

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Please consider this 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.

Provide an example solution for the problem in the Python language.

Certainly! Below is an example solution in Python that calculates the Fibonacci series up to a given positive integer N . If N is part of the series, it will include N as well.

```
python Code kopieren
def fibonacci_series_up_to_n(N):
    if N <= 0:
        return [] # Since N is supposed to be positive, we return an empty list for non-positive N.

    fibonacci_series = []
    a, b = 0, 1

    while a <= N:
        fibonacci_series.append(a)
        a, b = b, a + b

    return fibonacci_series

# Example usage:
N = 21
result = fibonacci_series_up_to_n(N)
print(f"The Fibonacci series up to {N} is: {result}")
```

Explanation:

1. Initialization: We start with `a = 0` and `b = 1`, which are the first two numbers in the Fibonacci series.
2. Loop: We continue generating Fibonacci numbers and appending them to the list `fibonacci_series` as long as `a` is less than or equal to N .
3. Update: In each iteration, we update `a` and `b` to the next Fibonacci numbers using the relation `a, b = b, a + b`.
4. Return: Once the loop finishes, the list `fibonacci_series` contains all Fibonacci numbers up to and including N if N is part of the series.

Example Output:

If $N = 21$, the output will be:

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

This code works for any positive integer N and will include N in the series if it is a Fibonacci number.

