

ChatGPT 4o

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Calculate Fibonacci Series in R

Fibonacci Series Calculation R

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Certainly! Let's break down the problem and solution step by step.

Problem Explanation

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 goes like this:

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

Given a positive integer N , we need to generate the Fibonacci series starting from 0 and continuing until we reach or exceed the number N . If N is part of the series, we include it in the output.

Steps to Solve the Problem

1. Initialize the first two numbers of the Fibonacci series, which are 0 and 1.
2. Iterate to generate the next Fibonacci numbers until the number exceeds N .
3. Store the numbers in a list (or vector in R).
4. Return the list when the sequence reaches or exceeds N .

R Code Solution

Here's the R code that accomplishes this:

```
r
# Function to calculate the Fibonacci series up to N
fibonacci_till_n <- function(N) {
  # Initialize the first two Fibonacci numbers
  fib_sequence <- c(0, 1)

  # Continue generating Fibonacci numbers until we exceed N
  while(TRUE) {
    # calculate the next Fibonacci number
    next_fib <- tail(fib_sequence, 1) + tail(fib_sequence, 2)[1]

    # If the next Fibonacci number is greater than N, stop
    if(next_fib > N) {
      break
    }

    # Otherwise, add it to the sequence
    fib_sequence <- c(fib_sequence, next_fib)
  }

  return(fib_sequence)
}

# Example usage
N <- 21
result <- fibonacci_till_n(N)
print(result)
```


Explanation of the Code

1. Initialization:
 - We start with the first two numbers of the Fibonacci series stored in the vector `fib_sequence` as `c(0, 1)`.
2. Looping with a Condition:
 - The `while(TRUE)` loop continues indefinitely until we explicitly break out of it.
 - `tail(fib_sequence, 1)` gives us the last element of the sequence (the most recent Fibonacci number).
 - `tail(fib_sequence, 2)[1]` gives us the second to last element.
3. Stopping Condition:
 - If the next Fibonacci number (`next_fib`) is greater than N , the loop stops.
4. Appending to the Sequence:
 - If the next Fibonacci number is still less than or equal to N , we append it to `fib_sequence`.
5. Return the Result:
 - Finally, we return the Fibonacci sequence up to and including N (if N is a Fibonacci number).

Example Output

If N is 21, the output will be:

```
r  
[1] 0 1 1 2 3 5 8 13 21
```


 Code kopieren


This sequence includes all Fibonacci numbers up to and including 21.

Recap

The code generates the Fibonacci sequence up to a given number N . It ensures that N is included in the sequence if it is a Fibonacci number. The concepts covered include loops, conditions, vector manipulation, and basic function creation in R.

 Team-Arbeitsbereich
hinzufügen
Mit einem Teamtarif...





ChatGPT kann Fehler machen. Überprüfe wichtige Informationen.

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