

Recursion - Basic Problem Solving

13 June 2022 19:58

Q Fibonacci

\downarrow \downarrow \downarrow
~~0~~ 1 1 2 3 5 8 13
 0th 1th 2nd 3rd 4th 5th 6th 7th
 1 1 2 3

 $n=3$ Output \rightarrow 2 $n=4$ Output \rightarrow 3find n th fibonacci no. n thBigger Problem $(n-1)$ th $(n-2)$ thSmaller Problem

$$f(n) = f(n-1) + f(n-2)$$

Recursive
Solution

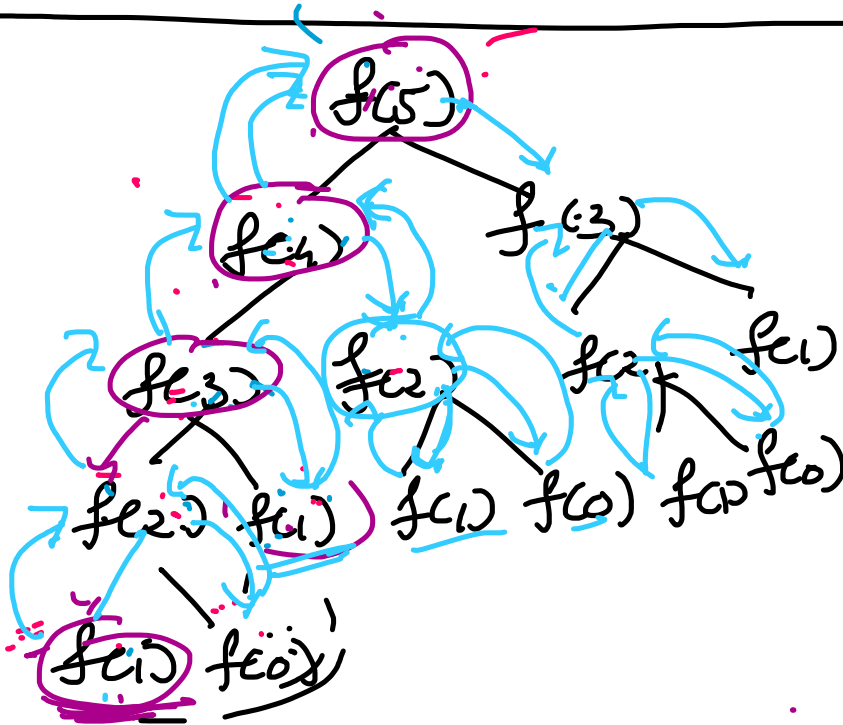
1. Base case
2. Recursive call

We'd love your feedback! ×
 We have just two questions for you.

Self work

0th \rightarrow 0
1th \rightarrow 1

Base case



$f(0)$
 $f(1)$
 $f(2)$
 $f(3)$
 $f(4)$
 $f(5)$



a b d e

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array of size n

Check if array is sorted ascending?

IP [5, 4, 3, 2, 1]

O/P false

IP [1, 2, 3, 4, 5]

O/P true

[1, 2, 3, 4, 5] }
5 elements

Bigger problem

Dipanshu (1)

↳ Priyanshu (2)

[2, 3, 4, 5]

↳ Ekta

[3, 4, 5]

↳

[4]

↳

[5]

X false
[3] < [4]

(4 < 5)

f(arr, i) → Bigger problem
↓

f(arr, i+1) → Smaller problem
yes ✓ no

no

if (arr[i] < arr[i+1])

[1, 2, 3]

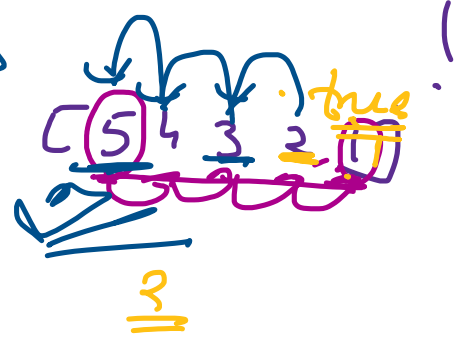
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Q. 203 3 < 4 5

```

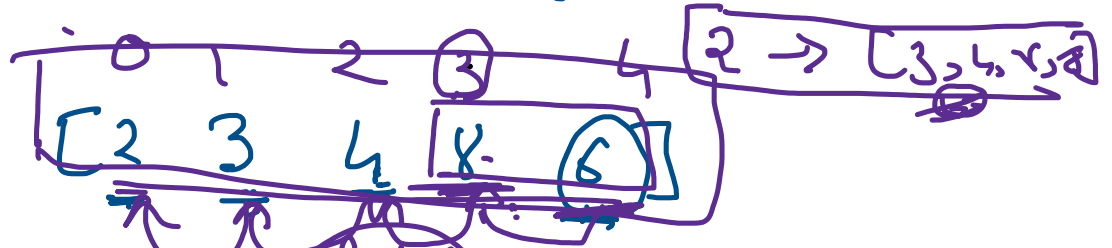
debugger;
function isSorted(arr,i){
  //base case
  if(i == arr.length-1){
    return true;
  }
  //recursive call
  let val = isSorted(arr,i+1);
  //self work
  if(val && arr[i] < arr[i+1]){
    return true;
  }
  else{
    return false;
  }
}
console.log(isSorted([1,2,3,4,5],0))
//[1,2,3,4,5]
    
```



3 < 4

prev call && 4 < 5
true

prev call && true
true



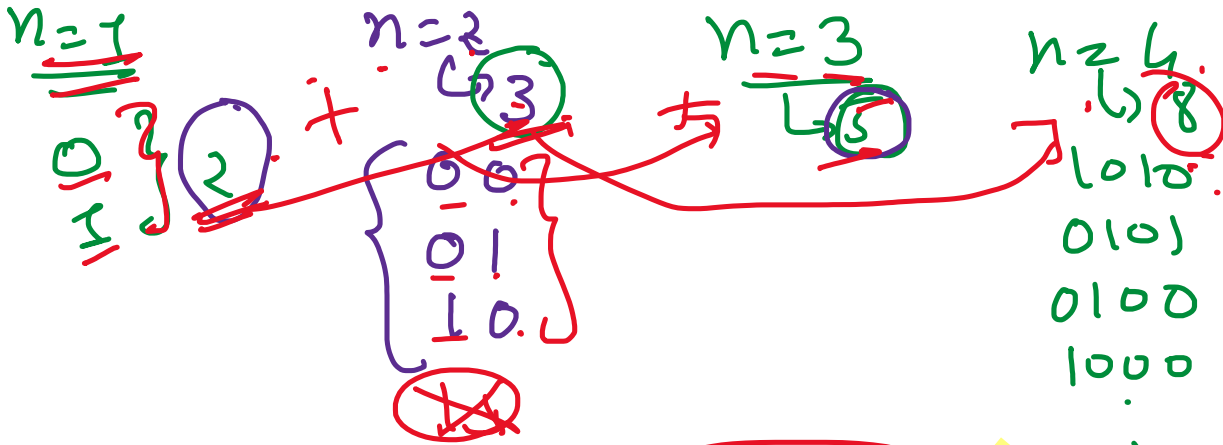
false

true && 8 < 6
false

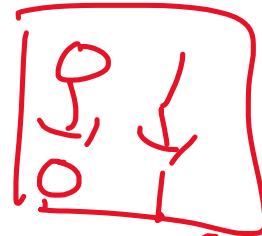
0	0	0
0	1	0
1	0	0
1	1	1

Return true

Q. number n
Calc total no. of binary strings
→ not have consecutive 0

2-8I/P $n=3$ O/P: 5 (101, 100, 010, 001, 000)

↓ ↓
2 3

 $(n-1) + (n-2)$

H/W

Subsequence

arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]



Subsequence: may not be contiguous but maintain relative order.

Elements in the subsequence appear in the same order as in original array. Only difference is that they might not be contiguous.

[4, 5, 6, 7] → subarray / subsequence ✓

[4, 6, 7] → subarray / subsequence ✓

[1, 9, 10] → X

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X

$\{1, 2, 3\} \rightarrow X$
 $\{1, 4, 7, 3\} \rightarrow X$

Q Given an array, find all subsequences.

I/P $\{1, 2, 3\}$ \Rightarrow $[1]$
 O/P $[2]$
 $[3]$
 $[1, 2]$
 $[1, 3]$
 $[1, 2, 3]$
 $[2, 3]$
 $[]$

For any array of length n
the total no. of subsequences $\Rightarrow 2^n$

$[2, 3] \rightarrow$ $\begin{cases} [2] \\ [3] \\ [2, 3] \\ [] \end{cases} \Rightarrow 4$
 $2^2 \Rightarrow 4$

Ekta
 $[1, 2, 3]$
 Subsequence
 (Bigger Prob)
 $[1, 2, 3]$
 $[1, 2]$
 $[2, 3]$
 $[1]$
 $[2]$
 $[3]$

Base case
 Aradhy
 $\{[3]\}$
 $\{[]\}$
 $\{[3]\}$

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[1, 2]

[1, 3]

[1]

[2, 3]

[2]

[3]

[., '']

· [., '']