

Fibonacci Sequence & Dynamic Programming

Fibonacci sequence: $f(n) = f(n - 1) + f(n - 2)$, $n > 2$ with $f(2) = f(1) = 1$

Dynamic Programming = Recursion + Memorization

```
1 def fib(n):  
2     if n <= 2: return 1  
3     return fib(n - 1) + fib(n - 2)
```

Recursion in $\mathcal{O}(2^n)$

```
1 def fib(n):  
2     memo = {1: 1, 2 : 1}  
3     def f(n):  
4         if n in memo:  
5             return memo[n]  
6         memo[n] = f(n - 1) + f(n - 2)  
7         return memo[n]  
8     return f(n)
```

Recursion + Memorization in $\mathcal{O}(n)$

Thanks for your attention!

Any Questions?

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