

Algorithm prefixSums(A, n)

In: Array A storing n integers

Out: ??

```
if n = 0 then return A[0] } C1
else {
  A[n] ← A[n] + prefixSums(A, n-1)
  return A[n]
}
```

Let  $f(n)$  = # operations performed by the algorithm when input has size  $n$

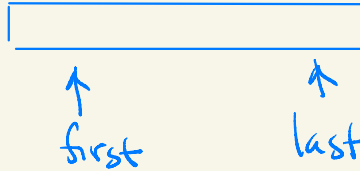
$$f(0) = C_1$$

$$f(n) = C_2 + f(n-1), \quad n > 0$$

Algorithm rev (A, first, last)  
 In: Array A integers first, last denoting  
 indices of first and last values in A.

Out: ??

$\left. \begin{array}{l} c_1 \\ c_2 \end{array} \right\} \begin{array}{l} \text{if first} \geq \text{last then return}^* \\ \text{else } \{ \\ \quad \text{tmp} \leftarrow A[\text{first}] \\ \quad A[\text{first}] \leftarrow A[\text{last}] \\ \quad A[\text{last}] \leftarrow \text{tmp} \\ \quad \text{rev}(A, \text{first}+1, \text{last}-1) \\ \} \end{array}$



	first						last	
A	7	3	8	1	3	5	6	9
	0	1	2	3	4		n-2	n-1

Let  $f(n)$  = # operations performed by the algorithm when input has size  $n$

$$f(0) = c_1$$

$$f(1) = c_1$$

$$f(n) = c_2 + f(n-2) \quad n > 1$$

Algorithm test (A, n)

In: Array A of size  $n \geq 1$

Out: ??

$\left. \begin{array}{l} \text{if } n=1 \text{ then } A[n] \leftarrow 0 \\ \text{else } \{ \end{array} \right\} C_1$

$\min \leftarrow 0$

$\text{for } i \leftarrow 0 \text{ to } n-1 \text{ do } \{$

$\text{if } A[i] < A[\min] \text{ then } \min \leftarrow i$

$A[0] \leftarrow A[\min]$

$\text{test}(A, \frac{n}{2})$

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$\}$

$\left. \begin{array}{l} \} C_3 \\ \} f(\frac{n}{2}) \end{array} \right\} C_3 + f(\frac{n}{2})$

$C_3 + f(\frac{n}{2})$

$n(C_3 + f(\frac{n}{2}))$

Let  $f(n) = \# \text{ operations performed by the algorithm when input has size } n$

$$f(1) = C_1$$

$$f(n) = C_2 + n(C_3 + f(\frac{n}{2})) \quad n \geq 1$$