

AVAILABLE  
LESSONS:*Lesson 1*  
Iterations*Lesson 2*  
Arrays*Lesson 3*  
Time Complexity*Lesson 4*  
Counting  
Elements*Lesson 5*  
Prefix Sums*Lesson 6*  
Sorting*Lesson 7*  
**Stacks and  
Queues***Lesson 8*  
Leader*Lesson 9*  
Maximum slice  
problem*Lesson 10*  
Prime and  
composite  
numbers*Lesson 11*

PAINLESS

## Brackets

START

Determine whether a given string of parentheses is properly nested.

Programming language: C++ ▼

A string  $S$  consisting of  $N$  characters is considered to be *properly nested* if any of the following conditions is true:

- $S$  is empty;
- $S$  has the form " $(U)$ " or " $[U]$ " or " $\{U\}$ " where  $U$  is a properly nested string;
- $S$  has the form " $VW$ " where  $V$  and  $W$  are properly nested strings.

For example, the string " $\{ [ ( ) ( ) ] \}$ " is properly nested but " $( [ ( ) ] )$ " is not.

Write a function:

```
int solution(string &S);
```

that, given a string  $S$  consisting of  $N$  characters, returns 1 if  $S$  is properly nested and 0 otherwise.

For example, given  $S = "\{ [ ( ) ( ) ] \}"$ , the function should return 1 and given  $S = "( [ ( ) ] )"$ , the function should return 0, as explained above.

Assume that:

- $N$  is an integer within the range  $[0..200,000]$ ;
- string  $S$  consists only of the following characters: " $($ ", " $\{$ ", " $[$ ", " $]$ ", " $\}$ " and/or " $)$ ".

Complexity:

- expected worst-case time complexity is  $O(N)$ ;
- expected worst-case space complexity is  $O(N)$  (not counting the storage required for input arguments).

Sieve of  
Eratosthenes

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*Lesson 12*

Euclidean  
algorithm

*Lesson 13*

Fibonacci  
numbers

*Lesson 14*

Binary search  
algorithm

*Lesson 15*

Caterpillar  
method

*Lesson 16*

Greedy  
algorithms

*Lesson 17*

Dynamic  
programming

*Lesson 90*

Tasks from  
Indeed Prime  
2016 challenge

*Lesson 99*

Future training

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