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PAINLESS

## CountTriangles

START

Count the number of triangles that can be built from a given set of edges.

Programming language: C++ ▼

A zero-indexed array  $A$  consisting of  $N$  integers is given. A triplet  $(P, Q, R)$  is *triangular* if it is possible to build a triangle with sides of lengths  $A[P]$ ,  $A[Q]$  and  $A[R]$ . In other words, triplet  $(P, Q, R)$  is triangular if  $0 \leq P < Q < R < N$  and:

- $A[P] + A[Q] > A[R]$ ,
- $A[Q] + A[R] > A[P]$ ,
- $A[R] + A[P] > A[Q]$ .

For example, consider array  $A$  such that:

$$\begin{array}{lll} A[0] = 10 & A[1] = 2 & A[2] = 5 \\ A[3] = 1 & A[4] = 8 & A[5] = 12 \end{array}$$

There are four triangular triplets that can be constructed from elements of this array, namely  $(0, 2, 4)$ ,  $(0, 2, 5)$ ,  $(0, 4, 5)$ , and  $(2, 4, 5)$ .

Write a function:

```
int solution(vector<int> &A);
```

that, given a zero-indexed array  $A$  consisting of  $N$  integers, returns the number of triangular triplets in this array.

For example, given array  $A$  such that:

$$\begin{array}{lll} A[0] = 10 & A[1] = 2 & A[2] = 5 \\ A[3] = 1 & A[4] = 8 & A[5] = 12 \end{array}$$

the function should return 4, as explained above.

Assume that:

- $N$  is an integer within the range  $[0..1,000]$ ;
- each element of array  $A$  is an integer within the range  $[1..1,000,000,000]$ .

Complexity:

Sieve of  
Eratosthenes

*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  
2015 challenge

*Lesson 91*

Tasks from  
Indeed Prime  
2016 challenge

*Lesson 92*

Tasks from  
Indeed Prime  
2016 College  
Coders  
challenge

*Lesson 99*

- expected worst-case time complexity is  $O(N^2)$ ;
- expected worst-case space complexity is  $O(N)$ , beyond input storage (not counting the storage required for input arguments).

Elements of input arrays can be modified.

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