
Cool vector

X74873_en

To solve this problem you have to complete the code that you will find at the end of the statement. You have to replace each **???** with an expression of code. **Do not change anything else.** Download from the website of the problem the file `code.cc` with the code to be completed (click on the corresponding button ".CPP"), edit it and submit it to the judge. We also provide you with a file `main.cc` to help you when testing your solution, which you **must not** submit to the judge.

In this problem, we say that a vector with n integer numbers $v[0..n-1]$ is *cool* if $n \geq 2$, $v[0] < v[n-1]$, and there exists an index j between 0 and $n-2$ such that:

- $v[0] \geq \dots \geq v[j-1] \geq v[j]$,
- $v[j+1] \geq v[j+2] \geq \dots \geq v[n-1]$.

For instance, the vector [9, 5, 3, 3, 1, 20, 15, 12, 12] is cool (with $j = 4$).

Implement an *efficient* function

```
int search(int x, const vector<int>& v);
```

that returns the position of the *last occurrence* of x in a cool vector v . If x does not belong to v , return a -1.

Precondition

The vector v is cool.

```
#include <iostream>
#include <vector>
using namespace std;

int position(const vector<int>& v, int e, int d) {
    if (e+1 == d) return e;
    int m = (e+d)/2;
    if (???) return position(v, m, d);
    else      return position(v, e, m);
}

int search(int x, const vector<int>& v, int e, int d) {
    if (e > d) return -1;
    if (e == d) return (v[e] == x ? e : -1);
    int m = ??? // Pay attention when d == e + 1
    if (???) return search(x, v, e, ???);
    else      return search(x, v, ???, d);
}

int search(int x, const vector<int>& v) {
    int n = v.size();
```

```
int j = position (v, 0, n-1);
int p = search (x, v, 0, j);
if (p ≠ -1) return p;
return search (x, v, j+1, n-1);
}
```

Problem information

Author : Enric Rodríguez

Translator : Enric Rodríguez

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