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**Merge of inverted vectors**

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**X39285\_en**

Given two integer vectors  $u$  and  $v$  sorted as follows:

- Vector  $u$  is in *increasing* order.
- Vector  $v$  is in *decreasing* order.

Write a merge function `i_merge` returning a vector  $w$  with both  $u$  and  $v$  values in increasing order. The function code must stick to the pattern below.

The following code must be used in order to check your function.

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

//reads  vector u from cin
void read_vector(vector<int>& u) {
    int n = u.size();
    for (int i = 0; i < n; ++i) cin >> u[i];
}

//u is a non-empty vector
//writes vector u on cout
void write_vector(const vector<int>& u) {
    int n = u.size();
    cout << u[0];
    for (int i = 1; i < n; ++i) cout << ' ' << u[i];
    cout << endl;
}

//u is in increasing order, v is in decreasing order
//returns a vector w  with both u and v values in increasing order
vector<int> i_merge(const vector<int>& u, const vector<int>&v) {
    int n = u.size();
    int m = v.size();
    vector<int> w(n + m);
    //NO MORE VECTOR DECLARATIONS ARE ALLOWED
    //START YOUR CODE HERE

    //do not change any other part of the code

    //END YOUR CODE HERE
    return w;
}

int main() {
```

```

int n;
cin >> n;
vector<int> u(n);
read_vector(u);
int m;
cin >> m;
vector<int> v(m);
read_vector(v);
vector<int> w = i_merge(u, v);
write_vector(w);
}

```

**Exam score:** 2.500000 **Automatic part:** 0.000000%

## Input

The input consists of an integer  $n$  greater than zero followed by a sequence of  $n$  integers in increasing order. After that, it comes out an integer  $m$  greater than zero followed by a sequence of  $m$  integers in decreasing order.

## Output

The values of the two input sequences in increasing order.

### Sample input 1

```

5
-4 -1 2 5 8
7
6 4 4 3 2 1 0

```

### Sample output 1

```

-4 -1 0 1 2 2 3 4 4 5 6 8

```

### Sample input 2

```

3
-1 0 1
2
-2 -4

```

### Sample output 2

```

-4 -2 -1 0 1

```

### Sample input 3

```

1
5
4
7 6 4 3

```

### Sample output 3

```

3 4 5 6 7

```

## Observation

C++ `sort()` is forbidden.

It is also forbidden to declare any additional vector in function `i_merge`.

Your code has to take advantage from the fact that vectors  $u$  and  $v$  are already sorted. Implementing any type of general sorting algorithm is not optimal and it is discouraged.

**Problem information**

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