Central reverse of a matrix X58992_en

Given a matrix v (of characters) with dimensions $n \times m$, we want to perform the central reverse of v. The central reverse is obtained by performing the horizontal reverse followed by the vertical reverse (the opposide order gives the same result). The horizontal reverse of a matrix consists in reversing each row of the matrix. The vertical reverse consists in reversing each column of the matrix.
For example, given the matrix:

```
dqsc
dxrj
mowf
```

by applying the horizontal reverse we obtain:

```
csqd
jrxd
fwom
```

and finally, by applying the vertical reverse we obtain:

```
fwom
jrxd
csqd
```

Complete the function `central_reverse` of the following code to achieve this goal, so that we obtain a program that treats several cases of reversing matrices.

```
#include <iostream>
#include <vector>

using namespace std;

typedef vector<vector<char> > Mat;

Mat read_mat()
{
  int n,m;
  cin>>n>>m;
  Mat v(n,vector<char> (m));
  for (int i=0;i<n;i++)
    for (int j=0;j<m;j++)
      cin>>v[i][j];
  return v;
}

void write_mat(const Mat& v)
{
  int n=int(v.size());
```

```
  int m=int(v[0].size());
  for (int i=0;i<n;i++) {
    for (int j=0;j<m;j++)
      cout<<v[i][j];
    cout<<endl;
  }
  cout<<endl;
}

// Add other functions if you consider it convenient.
...

// Pre: v is a non-empty matrix of chars.
// Post: Returns the result of applying a central reverse to v.
// NOTE: SINCE v IS A NON-CONSTANT PARAMETER PASSED PER VALUE,
// WE CAN MODIFY ITS VALUE DIRECTLY AND RETURN IT.
Mat central_reverse(Mat v)
{
  ...
}

int main()
{
  int c;
  cin>>c;
  for (int k=0;k<c;k++) {
    Mat v=read_mat();
    write_mat(central_reverse(v));
  }
}
```

Exam score: 2.5 **Automatic part:** 20%

Input

The input starts with the number of cases c, followed by a blank line. Next, there are c descriptions of matrices. Each one has the dimensions $n, m \geq 1$ in a first line, and is followed by the contents of the matrix, that are n lines with m lowercase English letters at each line. Each two consecutive descriptions of matrices are separated by a blank line.

Output

For each case, print the resulting matrix of computing the central reverse of the given matrix, in the same format as above (the dimensions must not be written) followed by a blank line.

Sample input

```
5

2 4
lrbb
mqbh

3 3
arz
```

```
owk
kyh

3 4
dqsc
dxrj
mowf

4 3
sjy
bld
bef
sar

4 1
y
n
e
c
```

Sample output

```
hbqm
bbrl

hyk
kwo
zra

fwom
jrxd
csqd

ras
feb
dlb
yjs

c
e
n
y
```

Problem information

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