7005 Constrained maximum average submatrix

Annie Sweety is studying the problem to select rectangular regions in a given image. She views an image being just a rectangular matrix with pixels as miniature rectangles sandwiched together. The rectangular regions Annie is interested are those rectangular *blocks* within the pixels matrix that are large enough and also with brightest possible averaged value pixels.

Formally, given an $m \times n$ integer matrix, you are asked to write a program to find the submatrix, so that the average is maximum on the condition that the total number of elements in the submatrix need to be no less than a given number k. The *submatrix* in request consists of continuous rows and columns of the given matrix. That is, it is a continuous rectangle region of the matrix in question. Here we define the average in a submatrix as the sum between all the elements on the submatrix divided by the number of elements evaluating. For example, given constraint $k = 4$ and the following 3×5 matrix:

```
9 2 6 3 9
7 7 5 7 8
4 7 8 7 5
```

The constrained maximum average submatrix is the following 2×3 submatrix

```
7 5 7
7 8 7
```

with size 6, while its average is $(7 + 5 + 7 + 7 + 8 + 7)/6 = 41/6 = 6.833\ \bullet\ \bullet\ \bullet$.

Technical Specification

- The row, m, of each matrix can be as large as 600, and column, n, can be as large as 10,000.
- The value of each element of the matrix is a nonnegative integer at most 5,000.
- $k \leq mn \leq 1,000,000$.

Input

The input consists of several instances of matrices with corresponding constrained sizes. The inputs are just a list of integers. The first input integer indicates the total number of input instances. For each instance of matrix and constraint, the first two integers are the row number, m, and column number n of the given matrix, representing a following $m \times n$ integer matrix. Following m, n, the third integer represents the constraint size k.

After (m, n, k), there will be m lines representing the m rows of the matrix; each line (row) contains exactly n integers. Thus, there is totally $m \cdot n$ integers for the particular matrix.

Output

For each matrix of the input, calculate its constrained maximum average submatrix and output the average value of the submatrix rounded to the nearest thousandth.

Sample Input

```
2
3  5  4
9  2  6  3  9
7  7  5  7  8
4  7  8  7  5
2  2  2
4  2
2  5
```

Sample Output

```
6.833
3.500
```