1 Fill the matrix

Description

Write a program that fills and prints a matrix of size `(n, n)` as shown below.

Input

- On the first line you will receive the number N
- On the second line you will receive a character (`a`, `b`, `c`, `d`*) which determines how to fill the matrix

Output

- Print the matrix
  - Numbers on a row must be separated by a single spacebar
  - Each row must be on a new line

Constraints

- 1 <= N <= 128
- Time limit: 0.1s
- Memory limit: 16MB

Sample tests

Input	Output

4
a

1	5	9	13
2	6	10	14
3	7	11	15
4	8	12	16

4
b

1	8	9	16
2	7	10	15
3	6	11	14
4	5	12	13

4
c

7	11	14	16
4	8	12	15
2	5	9	13
1	3	6	10

4 d	<table><tr><td>1</td><td>12</td><td>11</td><td>10</td></tr><tr><td>2</td><td>13</td><td>16</td><td>9</td></tr><tr><td>3</td><td>14</td><td>15</td><td>8</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>

2 Maximal sum

Description

Write a program that reads a rectangular matrix of size `N x M` and finds in it the square `3 x 3` that has maximal sum of its elements. Print that sum.

Input

- On the first line you will receive the numbers N and M separated by a single space
- On the next N lines there will be M numbers separated with spaces - the elements of the matrix

Output

- Print the maximal sum of `3 x 3` square

Constraints

- 3 <= N, M <= 1024

- Numbers in the matrix will be in the interval `[ -1000, 1000 ]`
- Time limit: 0.1s
- Memory limit: 16MB

Sample tests

Input	Output
3 3 4 3 5 2 6 4 8 2 7	41
5 5 1 1 3 3 5 -6 -7 2 -3 -1 3 0 -4 5 9 7 -7 0 1 0 -7 -6 -4 -4 9	19

3 Sequence in matrix

Description

We are given a matrix of strings of size `N x M`. Sequences in the matrix we define as sets of several neighbour elements located on the same line, column or diagonal. Write a program that finds the longest sequence of equal strings in the matrix and prints its length.

Input

- On the first line you will receive the numbers N and M separated by a single space
- On the next N lines there will be M strings separated with spaces - the strings in the matrix

Output

- Print the length of the longest sequence of equal equal strings in the matrix

Constraints

- 3 <= N, M <= 128
- Time limit: 0.1s
- Memory limit: 16MB

Sample tests

Input	Output
6 6 92 11 23 42 59 48 09 92 23 72 56 14 17 63 92 46 85 95 34 12 52 69 23 95 26 88 78 71 29 95 26 34 16 63 39 95	4

4 Binary search

Description

Write a program, that reads from the console an array of `N` integers and an integer `K`, sorts the array and using the method `Array.BinSearch()` finds the largest number in the array which is ≤ `K`.

5 Sort by string length

Description

You are given an array of strings. Write a method that sorts the array by the length of its elements (the number of characters composing them).

6 Matrix class

Description

Write a class `Matrix`, to hold a matrix of integers. Overload the operators for adding, subtracting and multiplying of matrices, indexer for accessing the matrix content and `ToString()`.

7 Largest area in matrix

Description

Write a program that finds the largest area of equal neighbour elements in a rectangular matrix and prints its size.

Input

- On the first line you will receive the numbers N and M separated by a single space
- On the next N lines there will be M numbers separated with spaces - the elements of the matrix

Output

- Print the size of the largest area of equal neighbour elements

Constraints

- 3 <= N, M <= 1024
- Time limit: 0.35s
- Memory limit: 24MB

Sample tests

Input	Output
5 6 1 3 2 2 2 4 3 3 3 2 4 4 4 3 1 2 3 3 4 3 1 3 3 1 4 3 3 3 1 1	13

Hint: you can use the algorithm Depth-first search or Breadth-first search.