

Q14. Finding the Largest Square (20 marks):

In a binary matrix, all elements are either 0 or 1. Create a programme that reads a binary matrix and finds the largest square with all 1's. For the example given in Figure Q14, the binary matrix contains a square of 1's with an edge length of 2.

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 | 1 |

Figure Q14: The square of 1's in a binary matrix

Please note that the edge length of the square must be at least 2. If there is no square with an edge length of at least 2 in the binary matrix, a message of "No Square" will be the output.

Write a program to

Input, in sequence, one (1) line and one (1) matrix as follows:

The first line consists of two integers that indicate the number of rows, R , and the number of columns, C , respectively, of the binary matrix, where $3 \leq R, C \leq 6$.

The second line onwards is the given binary matrix.

Output the edge length of the largest square containing only 1's in the given binary matrix. Note that the edge length should be at least 2. If no square with edge length of at least 2 can be found from the binary matrix, then output "No Square".

试题 14. 寻找最大的正方形 (20 分) :

在一个二元矩阵里，所有的元素只能是 0 或 1。编写一程式，以输入一个二元矩阵，并在矩阵里寻找最大、由 1 组成的正方形。如图 Q14 的例子中，此二元矩阵里有一个边长为 2、由 1 组成的正方形。

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 | 1 |

图 Q14: 在二元矩阵里，由 1 组成的正方形

请注意，正方形的边长必须至少为 2。假如在此二元矩阵中，没有符合边长至少为 2 的正方形，则输出“No Square”。

试写一程式以

依序输入， 一行以及一个二元矩阵，其中规则如下：

第一行有两个整数，分别为矩阵的行数，R，和列数，C，已知 $3 \leq R, C \leq 6$ 。

第二行及之后的输入就是给定的二元矩阵。

输出， 在此二元矩阵中最大、由 1 组成的正方形的边长。必须注意的是，正方形的边长至少为 2。假如在矩阵中没有边长至少为 2 的正方形，则输出 “No Square”。

Example (例子)

| Input (输入) | Output (输出) |
|---|-------------|
| 5 5 1 1 1 1 0 1 1 1 0 0 1 1 1 0 0 1 1 0 0 0 0 1 0 1 0 | 3 |
| 6 6 1 1 1 0 1 0 1 1 1 0 0 1 1 0 1 1 0 1 1 1 1 1 0 1 0 1 0 1 0 0 1 1 1 0 0 0 | 2 |
| 4 4 1 0 1 0 0 1 0 1 1 1 0 0 0 0 1 1 | No Square |
| 4 6 1 | 4 |

All Test Cases (所有测试用的例子):

| Input (输入) | Output (输出) |
|---|-------------|
| 5 5 1 1 1 1 0 1 1 1 0 0 1 1 1 0 0 1 1 0 0 0 0 1 0 1 0 | 3 |
| 6 6 1 1 1 0 1 0 1 1 1 0 0 1 1 0 1 1 0 1 1 1 1 1 0 1 0 1 0 1 0 0 1 1 1 0 0 0 | 2 |
| 4 4 1 0 1 0 0 1 0 1 1 1 0 0 0 0 1 1 | No Square |
| 6 6 1 1 1 0 1 0 1 1 1 1 0 0 1 1 1 1 1 0 0 1 1 1 1 0 0 0 1 1 1 1 0 0 0 0 1 0 | 3 |
| 4 5 1 1 0 0 1 1 1 1 0 0 1 1 1 0 1 1 1 0 1 0 | 2 |
| 4 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 4 |

| | |
|--------------------------------|-----------|
| 1 1 1 1 1 | |
| 3 3 0 0 0 0 0 0 0 0 0 | No Square |