动态规划题目较多，灵活多变，技巧性较强，还有针对不同的结构的变形，应多刷点题目练习练习。不过动态规划也是有基本套路的，熟能生巧。

第 12 题：poj1050 To the Max

To the Max

Description

Given a two-dimensional array of positive and negative integers, a sub-rectangle is any contiguous sub-array of size 1*1 or greater located within the whole array. The sum of a rectangle is the sum of all the elements in that rectangle. In this problem the sub-rectangle with the largest sum is referred to as the maximal sub-rectangle.
As an example, the maximal sub-rectangle of the array:

0 -2 -7 0
9 2 -6 2
-4 1 -4 1
-1 8 0 -2
is in the lower left corner:

9 2
-4 1
-1 8
and has a sum of 15.

Input

The input consists of an N * N array of integers. The input begins with a single positive integer N on a line by itself, indicating the size of the square two-dimensional array. This is followed by N^2 integers separated by whitespace (spaces and newlines). These are the N^2 integers of the array, presented in row-major order. That is, all numbers in the first row, left to right, then all numbers in the second row, left to right, etc. N may be as large as 100. The numbers in the array will be in the range [-127,127].

Output

Output the sum of the maximal sub-rectangle.

Sample Input

```
4
0 -2 -7 0 9 2 -6 2
-4 1 -4  1 -1

8  0 -2
```

Sample Output

```
15
```

题目大意：求一个最大为 100*100 矩阵中的子矩阵中元素之和的最大值

第 13 题：poj1088 滑雪

滑雪

Description

Michael 喜欢滑雪百这并不奇怪， 因为滑雪的确很刺激。可是为了获得速度，滑的区域必须向下倾斜，而且当你滑到坡底，你不得不再次走上坡或者等待升降机来载你。Michael 想知道载一个区域中最长底滑坡。区域由一个二维数组给出。数组的每个数字代表点的高度。下面是一个例子

 1 2 3 4 5

16 17 18 19 6

15 24 25 20 7

14 23 22 21 8

13 12 11 10 9

一个人可以从某个点滑向上下左右相邻四个点之一，当且仅当高度减小。在上面的例子中，一条可滑行的滑坡为 24-17-16-1。当然 25-24-23-...-3-2-1 更长。事实上，这是最长的一条。

Input

输入的第一行表示区域的行数 R 和列数 C(1 <= R,C <= 100)。下面是 R 行，每行有 C 个整数，代表高度 h，0<=h<=10000。

Output

输出最长区域的长度。

Sample Input

```
5 5
1 2 3 4 5
16 17 18 19 6
15 24 25 20 7
14 23 22 21 8
13 12 11 10 9
```

Sample Output

```
25
```

提示：最长下降子序列

第 14 题：poj1185

炮兵阵地

Description

司令部的将军们打算在 N*M 的网格地图上部署他们的炮兵部队。一个 N*M 的地图由 N 行 M 列组成，地图的每一格可能是山地（用"H" 表示），也可能是平原（用"P"表示），如下图。在每一格平原地形上最多可以布置一支炮兵部队（山地上不能够部署炮兵部队）；一支炮兵部队在地图上的攻击范围如图中黑色区域所示：

如果在地图中的灰色所标识的平原上部署一支炮兵部队，则图中的黑色的网格表示它能够攻击到的区域：沿横向左右各两格，沿纵向上下各两格。图上其它白色网格均攻击不到。从图上可见炮兵的攻击范围不受地形的影响。

现在，将军们规划如何部署炮兵部队，在防止误伤的前提下（保证任何两支炮兵部队之间不能互相攻击，即任何一支炮兵部队都不在其他支炮兵部队的攻击范围内），在整个地图区域内最多能够摆放多少我军的炮兵部队。

Input

第一行包含两个由空格分割开的正整数，分别表示 N 和 M；
接下来的 N 行，每一行含有连续的 M 个字符('P'或者'H')，中间没有空格。按顺序表示地图中每一行的数据。N <= 100；M <= 10。

Output

仅一行，包含一个整数 K，表示最多能摆放的炮兵部队的数量。

Sample Input

```
5 4
PHPP
PPHH
PPPP
PHPP
PHHP
```

Sample Output

```
6
```

提示：状态压缩 DP

第 15 题：poj1636 Prison rearrangement

Prison rearrangement

Time Limit: 3000MS   Memory Limit: 10000K
Total Submissions: 3465 Accepted: 1443

Description

In order to lower the risk of riots and escape attempts, the boards of two nearby prisons of equal prisoner capacity, have decided to rearrange their prisoners among themselves. They want to exchange half of the prisoners of one prison, for half of the prisoners of the other. However, from the archived information of the prisoners' crime history, they know that some pairs of prisoners are dangerous to keep in the same prison, and that is why they are separated today, i.e. for every such pair of prisoners, one prisoners serves time in the first prison, and the other in the second one. The boards agree on the importance of keeping these pairs split between the prisons, which makes their rearrangement task a bit tricky. In fact, they soon find out that sometimes it is impossible to fulfil their wish of swapping half of the prisoners. Whenever this is the case, they have to settle for exchanging as close to one half of the prisoners as possible.

Input

On the first line of the input is a single positive integer n, telling the number of test scenarios to follow. Each scenario begins with a line containing two non-negative integers m and r, 1 < m < 200 being the number of prisoners in each of the two prisons, and r the number of dangerous pairs among the prisoners. Then follow r lines each containing a pair xi yi of integers in the range 1 to m,which means that prisoner xi of the first prison must not be placed in the same prison as prisoner yi of the second prison.

Output

For each test scenario, output one line containing the largest integer k <= m/2 , such that it is possible to exchange k prisoners of the first prison for k prisoners of the second prison without getting two prisoners of any dangerous pair in the same prison.

Sample Input

```
3
101 0
3 3
1 2
1 3
1 1
8 12
1 1
1 2
1 3
1 4
2 5
3 5
4 5
5 5
6 6
7 6
8 7
8 8
```

Sample Output

```
50
0
3
```

题目大意：

  有两个监狱，每个监狱里面有 n 个囚犯，现在希望交换 n/2 对囚犯。但是考虑有一些原本在不同监狱的囚犯对在一起是很危险的，所以希望经过交换后他们还是不在一个监狱里面。那么如果保证这个条件，希望尽可能多的交换囚犯。

Naptime

Description

Goneril is a very sleep-deprived cow. Her day is partitioned into N (3 <= N <= 3,830) equal time periods but she can spend only B (2 <= B < N) not necessarily contiguous periods in bed. Due to her bovine hormone levels, each period has its own utility U_i (0 <= U_i <= 200,000), which is the amount of rest derived from sleeping during that period. These utility values are fixed and are independent of what Goneril chooses to do, including when she decides to be in bed.

With the help of her alarm clock, she can choose exactly which periods to spend in bed and which periods to spend doing more critical items such as writing papers or watching baseball. However, she can only get in or out of bed on the boundaries of a period.

She wants to choose her sleeping periods to maximize the sum of the utilities over the periods during which she is in bed. Unfortunately, every time she climbs in bed, she has to spend the first period falling asleep and gets no sleep utility from that period.

The periods wrap around in a circle; if Goneril spends both periods N and 1 in bed, then she does get sleep utility out of period 1.

What is the maximum total sleep utility Goneril can achieve?

Input

* Line 1: Two space-separated integers: N and B

* Lines 2..N+1: Line i+1 contains a single integer, U_i, between 0 and 200,000 inclusive

Output

The day is divided into 5 periods, with utilities 2, 0, 3, 1, 4 in that order. Goneril must pick 3 periods.

```
5  3
2
0
3
1
4
```

```
6
```

Hint

INPUT DETAILS:

The day is divided into 5 periods, with utilities 2, 0, 3, 1, 4 in that order. Goneril must pick 3 periods.

OUTPUT DETAILS:

Goneril can get total utility 6 by being in bed during periods 4, 5, and 1, with utilities 0 [getting to sleep], 4, and 2 respectively.

提示：要考虑跨越一天的情况。

题目大意：
　　一天由 n 个小时构成，在第 i 个小时睡觉能够恢复 Ui 点体力。有一头牛要休息 b 个小时，可以不连续，但休息的第 1 个小时无法恢复体力。前一天的最后一个小时和第二天的第一个小时是连在一起的，求这头牛能恢复的体力最大值。