**题目使用文件输入输出**

**提交程序文件名每道题有写在题目名字右侧，读入文件xxx.in，输出文件xxx.out，提交文件xxx.cpp**

**一22 二10 三11 四21**

第一题 （cowrow）

Problem 1: Cows in a Row [Brian Dean, 2012]

Farmer John's N cows (1 <= N <= 1000) are lined up in a row. Each cow is

identified by an integer "breed ID"; the breed ID of the ith cow in the

lineup is B(i).

FJ thinks that his line of cows will look much more impressive if there is

a large contiguous block of cows that all have the same breed ID. In order

to create such a block, FJ decides remove from his lineup all the cows

having a particular breed ID of his choosing. Please help FJ figure out

the length of the largest consecutive block of cows with the same breed ID

that he can create by removing all the cows having some breed ID of his

choosing.

PROBLEM NAME: cowrow

INPUT FORMAT:

\* Line 1: The integer N.

\* Lines 2..1+N: Line i+1 contains B(i), an integer in the range

0...1,000,000.

SAMPLE INPUT (file cowrow.in):

9

2

7

3

7

7

3

7

5

7

INPUT DETAILS:

There are 9 cows in the lineup, with breed IDs 2, 7, 3, 7, 7, 3, 7, 5, 7.

OUTPUT FORMAT:

\* Line 1: The largest size of a contiguous block of cows with

identical breed IDs that FJ can create.

SAMPLE OUTPUT (file cowrow.out):

4

OUTPUT DETAILS:

By removing all cows with breed ID 3, the lineup reduces to 2, 7, 7, 7, 7,

5, 7. In this new lineup, there is a contiguous block of 4 cows with the

same breed ID (7).

题意是有一个农场，里面住着一个农夫，农夫养了n头牛，将这n头牛排成一列，将它们编号（不一定要按照次序，编号也可重复），此时农夫要做一件事，拿走所有编号为m1的牛，将剩余的合并，此时设f(m1)为同一编号的最大连续数，记下此时的f(m1)，恢复原来n头牛排序的状态。取走编号为m2的牛，……

比如：2, 7, 3, 7, 7, 3, 7, 5, 7. ，拿走3后，重新排序为2，7，7，7，7，5，7，此时2与5中间有连续4个7，此3为最优解。

第二题 （bookshelf\_silver）

Problem 2: Bookshelf (Silver) [Neal Wu / Traditional, 2012]

When Farmer John isn't milking cows, stacking haybales, lining up his cows,

or building fences, he enjoys sitting down with a good book. Over the

years, he has collected N books (1 <= N <= 2,000), and he wants to build

a new set of bookshelves to hold them all.

Each book i has a width W(i) and height H(i). The books need to be added

to a set of shelves in order; for example, the first shelf should contain

books 1...k for some k, the second shelf should start with book k+1, and so

on. Each shelf can have a total width of at most L (1 <= L <=

1,000,000,000). The height of a shelf is equal to the height of the

tallest book on that shelf, and the height of the entire set of bookshelves

is the sum of the heights of all the individual shelves, since they are all

stacked vertically.

Please help FJ compute the minimum possible height for the entire set of

bookshelves.

PROBLEM NAME: bookshelf

INPUT FORMAT:

\* Line 1: Two space-separated integers: N and L.

\* Lines 2..1+N: Line i+1 contains two space-separated integers: H(i)

and W(i). (1 <= H(i) <= 1,000,000; 1 <= W(i) <= L).

SAMPLE INPUT (file bookshelf.in):

5 10

5 7

9 2

8 5

13 2

3 8

INPUT DETAILS:

There are 5 books. Each shelf can have total width at most 10.

OUTPUT FORMAT:

\* Line 1: The minimum possible total height for the set of

bookshelves.

SAMPLE OUTPUT (file bookshelf.out):

21

OUTPUT DETAILS:

There are 3 shelves, the first containing just book 1 (height 5, width 7),

the second containing books 2..4 (height 13, width 9), and the third

containing book 5 (height 3, width 8).

当农夫约翰闲的没事干的时候，他喜欢坐下来看书。多年过去，他已经收集了 N 本书 (1 <= N <= 100,000)， 他想造一个新的书架来装所有书。

每本书 i 都有宽度 W(i) 和高度 H(i)。书需要按顺序添加到一组书架上；比如说，第一层架子应该包含书籍1 ... k，第二层架子应该以第k + 1本书开始，以下如此。每层架子的总宽度最大为L（1≤L≤1,000,000,000）。每层的高度等于该层上最高的书的高度，并且整个书架的高度是所有层的高度的总和，因为它们都垂直堆叠。

请帮助农夫约翰计算整个书架的最小可能高度。

有N(1 <= N <= 100000)本书，每本书有一个宽度W(i)，高度H(i)，(1 <= H(i) <= 1,000,000; 1 <= W(i) <= L)。

现在有足够多的书架，书架宽度最多是L (1 <= L <= 1,000,000,000)，把书按顺序（先放1，再放2.....）放入书架。某个书架的高度是该书架中所放的最高的书的高度。

将所有书放入书架后，求所有书架的高度和的最小值？

第三题 （tied）

Problem 3: Tied Down [Brian Dean, 2012]

As we all know, Bessie the cow likes nothing more than causing mischief on

the farm. To keep her from causing too much trouble, Farmer John decides

to tie Bessie down to a fence with a long rope. When viewed from above,

the fence consists of N posts (1 <= N <= 10) that are arranged along

vertical line, with Bessie's position (bx, by) located to the right of this

vertical line. The rope FJ uses to tie down Bessie is described by a

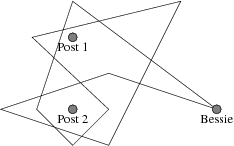
sequence of M line segments (3 <= M <= 10,000), where the first segment

starts at Bessie's position and the last ends at Bessie's position. No

fence post lies on any of these line segments. However, line segments may

cross, and multiple line segments may overlap at their endpoints.

Here is an example of the scene, viewed from above:



To help Bessie escape, the rest of the cows have stolen a saw from the

barn. Please determine the minimum number of fence posts they must cut

through and remove in order for Bessie to be able to pull free (meaning she

can run away to the right without the rope catching on any of the fence posts).

All (x,y) coordinates in the input (fence posts, Bessie, and line segment

endpoints) lie in the range 0..10,000. All fence posts have the same x

coordinate, and bx is larger than this value.

PROBLEM NAME: tied

INPUT FORMAT:

\* Line 1: Four space-separated integers: N, M, bx, by.

\* Lines 2..1+N: Line i+1 contains the space-separated x and y

coordinates of fence post i.

\* Lines 2+N..2+N+M: Each of these M+1 lines contains, in sequence, the

space-separated x and y coordinates of a point along the rope.

The first and last points are always the same as Bessie's

location (bx, by).

SAMPLE INPUT (file tied.in):

2 10 6 1

2 3

2 1

6 1

2 4

1 1

2 0

3 1

1 3

5 4

3 0

0 1

3 2

6 1

INPUT DETAILS:

There are two posts at (2,3) and (2,1). Bessie is at (6,1). The rope goes

from (6,1) to (2,4) to (1,1), and so on, ending finally at (6,1). The shape

of the rope is the same as in the figure above.

OUTPUT FORMAT:

\* Line 1: The minimum number of posts that need to be removed in order

for Bessie to escape by running to the right.

SAMPLE OUTPUT (file tied.out):

1

OUTPUT DETAILS:

Removing either post 1 or post 2 will allow Bessie to escape.

牛被拴着。平面上有n个柱子，x坐标相等，且都小于牛的x坐标。牛在由m条边形成的闭合多边形组成的绳子上。问最少要锯掉几个柱子牛才能逃脱。

第四题 （subsets）

Problem 3: Balanced Cow Subsets [Neal Wu, 2012]

Farmer John's owns N cows (2 <= N <= 20), where cow i produces M(i) units

of milk each day (1 <= M(i) <= 100,000,000). FJ wants to streamline the

process of milking his cows every day, so he installs a brand new milking

machine in his barn. Unfortunately, the machine turns out to be far too

sensitive: it only works properly if the cows on the left side of the barn

have the exact same total milk output as the cows on the right side of the

barn!

Let us call a subset of cows "balanced" if it can be partitioned into two

groups having equal milk output. Since only a balanced subset of cows can

make the milking machine work, FJ wonders how many subsets of his N cows

are balanced. Please help him compute this quantity.

PROBLEM NAME: subsets

INPUT FORMAT:

\* Line 1: The integer N.

\* Lines 2..1+N: Line i+1 contains M(i).

SAMPLE INPUT (file subsets.in):

4

1

2

3

4

INPUT DETAILS:

There are 4 cows, with milk outputs 1, 2, 3, and 4.

OUTPUT FORMAT:

\* Line 1: The number of balanced subsets of cows.

SAMPLE OUTPUT (file subsets.out):

3

OUTPUT DETAILS:

There are three balanced subsets: the subset {1,2,3}, which can be

partitioned into {1,2} and {3}, the subset {1,3,4}, which can be

partitioned into {1,3} and {4}, and the subset {1,2,3,4} which can be

partitioned into {1,4} and {2,3}.

给n个数，从中任意选出一些数，使这些数能分成和相等的两组。   
求有多少种选数的方案。

Data Constraint   
n≤20