‘傲游杯’ 2013 ACM-ICPC 全国程序设计邀请赛

2013 ACM-ICPC China Tonghua Invitational Programming Contest

2013.05.26

A. Tutor

Description

Lilin was a student of Tonghua Normal University. She is studying at University of Chicago now. Besides studying, she worked as a tutor teaching Chinese to Americans. So, she can earn some money per month. At the end of the year, Lilin wants to know his average monthly money to decide whether continue or not. But she is not good at calculation, so she ask for your help. Please write a program to help Lilin to calculate the average money her earned per month.

Input

The first line contain one integer T, means the total number of cases.

Every case will be twelve lines. Each line will contain the money she earned per month. Each number will be positive and displayed to the penny. No dollar sign will be included.

Output

The output will be a single number, the average of money she earned for the twelve months. It will be rounded to the nearest penny, preceded immediately by a dollar sign without tail zero. There will be no other spaces or characters in the output.

Sample Input

```
2
100.00
489.12
12454.12
1234.10
823.05
109.20
5.27
1542.25
839.18
83.99
1295.01
1.75
```

100.00

100.00

100.00

100.00

100.00

100.00

100.00

100.00

100.00

100.00

100.00

100.00

Sample Output

$1581.42

$100

B. Teamwork

Description

Some locations in city A has been destroyed in the fierce battle. So the government decides to send some workers to repair these locations. There are m kinds of workers that were trained for different skills. Each location need some number of some kinds of workers and has a schedule that at what time can the repair begins, and the time cost of repair. Any job cannot begin until all the workers required arrived.

For example, location 1 needs 2 workers of type 1 and 3 workers of type 2, and the beginning time and time cost is 100 minute and 90 minute correspondingly, then 5 workers that satisfy the requirement should arrive before 100 minute, start working at 100 minute and get the job done at 190 minute. Notice that two different types of workers cannot replace each other, so with 3 workers of type 1 and only 2 workers of type 2, this job cannot be done.

Workers can go from one location to another after their jobs are done. You can take the Euclidean distance between locations as the time workers need to travel between them. Each worker should be sent from a depot initially at 0 minute. Now your task is to determine the minimum number of workers needed to be sent from depot so that all the jobs can be done.

Input

There are multiple test cases, the integer on the first line T (T<25) indicates the number of test cases.

Each test case begins with two integers n (<=150), the number of location(including the depot) and m(<=5), the number of different skills.

The next line gives two integers x0, y0 indicates the coordinate of depot.

Then follows n - 1 lines begins with 4 integer numbers: xi, yi, bi(bi>0), pi(pi>0), (xi, yi) gives the coordinate of the i-th location, bi gives the beginning time and pi gives the time cost. The rest of the line gives m non-negative integers v1, v2, ..., vm, of which the i-th number indicates the the number of workers of type i needed (for all vi, 0<=vi<10, each location at least requires one worker).

All integers are less than 1000000 (10^6).

Output

For each test cases output one line, the minimum workers to be sent. It is guaranteed that there's always a feasible solution that all the jobs can be done.

Sample Input

```
2
4 1
0 0
0 1 1 1 3
1 1 3 3 4
1 0 10 1 5
4 1
0 0
0 1 1 1 3
1 1 3 3 4
1 0 3 1 5
```

Sample Output

```
5
9
```

C. Rectangle

Description:

Given a rectangle which contains N rows and each of them contains a string length of M.

You must find out a symmetrical isosceles right triangle (with two equal edges and a right angle) with two edges parallel two side of the rectangle. Symmetry means the value should be the same according to the shortest altitude of the triangle. And just output the area of the triangle.

Input

The first line of the input contains an integer T (1 <= T <= 20), which mean there are T test case follow.

For each test case, the first line contains two integer number N and M (1 <= N, M <= 500) which means described above.

And then N lines follow, which contains a string of length M. The string only contains letters or digits.

Output

For each test case, output a single integer that is the answer to the problem described above.

Sample input

```
1
4 4
abab
dacb
adab
cabb
```

Sample output

```
6
```

D． D-City

Description

Luxer is a really bad guy. He destroys everything he met.

One day Luxer went to D-city. D-city has N D-points and M D-lines. Each D-line connects exactly two D-points. Luxer will destroy all the D-lines. The mayor of D-city wants to know how many connected blocks of D-city left after Luxer destroying the first K D-lines in the input.

Two points are in the same connected blocks if and only if they connect to each other directly or indirectly.

Input

First line of the input contains two integers N and M.

Then following M lines each containing 2 space-separated integers u and v, which denotes an D-line.

Constraints:

0 < N <= 10000

0 < M <= 100000

0 <= u, v < N.

Output

Output M lines, the ith line is the answer after deleting the first i edges in the input.

Sample Input

```
5 10
0 1
1 2
1 3
1 4
0 2
2 3
0 4
0 3
3 4
2 4
```

Sample Output

1

1

1

2

2

2

2

3

4

5

Hint

The graph given in sample input is a complete graph, that each pair of vertex has an edge connecting them, so there's only 1 connected block at first. The first 3 lines of output are 1s because after deleting the first 3 edges of the graph, all vertexes still connected together. But after deleting the first 4 edges of the graph, vertex 1 will be disconnected with other vertex, and it became an independent connected block. Continue deleting edges the disconnected blocks increased and finally it will became the number of vertex, so the last output should always be N.

E. GCD and LCM

Description

Given two positive integers G and L, could you tell me how many solutions of (x, y, z) there are, satisfying that gcd(x, y, z) = G and lcm(x, y, z) = L?

Note, gcd(x, y, z) means the greatest common divisor of x, y and z, while lcm(x, y, z) means the least common multiple of x, y and z.

Note 2, (1, 2, 3) and (1, 3, 2) are two different solutions.

Input

First line comes an integer T (T <= 12), telling the number of test cases.

The next T lines, each contains two positive 32-bit signed integers, G and L.

It's guaranteed that each answer will fit in a 32-bit signed integer.

Output

For each test case, print one line with the number of solutions satisfying the conditions above.

Sample Input

```
2
6 72
7 33
```

Sample Output

```
72
0
```

F. Function Curve

Description

Given sequences of k_1, k_2, … k_n, a_1, a_2, …, a_n and b_1, b_2, …, b_n. Consider following function:

$$F(x) = \min\{\, 100.0, min\{\, k_i(x-a_i)^2 + b_i \mid 0 < i \leq n \,\}\,\}$$

Then we draw F(x) on a xy-plane, the value of x is in the range of [0,100]. Of course, we can get a curve from that plane.

Can you calculate the length of this curve?

Input

The first line of the input contains one integer T (1<=T<=15), representing the number of test cases.

Then T blocks follow, which describe different test cases.

The first line of a block contains an integer n (1 <= n <= 50).

Then followed by n lines, each line contains three integers ki, ai, bi (0<=ai, bi<100, 0<ki<100) .

Output

For each test case, output a real number L which is rounded to 2 digits after the decimal point, means the length of the curve.

Sample Input

```
2
3
1 2 3
4 5 6
7 8 9
1
4 5 6
```

Sample Output

```
215.56
278.91
```

Hint

All test cases are generated randomly.

G. Cannon

Description

In Chinese Chess, there is one kind of powerful chessmen called Cannon. It can move horizontally or vertically along the chess grid. At each move, it can either simply move to another empty cell in the same line without any other chessman along the route or perform an eat action. The eat action, however, is the main concern in this problem.

An eat action, for example, Cannon A eating chessman B, requires two conditions:

1、A and B is in either the same row or the same column in the chess grid.

2、There is exactly one chessman between A and B.

Here comes the problem.

Given an N x M chess grid, with some existing chessmen on it, you need put maximum cannon pieces into the grid, satisfying that any two cannons are not able to eat each other. It is worth nothing that we only account the cannon pieces you put in the grid, and no two pieces shares the same cell.

Input

There are multiple test cases.

In each test case, there are three positive integers N, M and Q (1<= N, M<=5, 0<=Q <= N x M) in the first line, indicating the row number, column number of the grid, and the number of the existing chessmen.

In the second line, there are Q pairs of integers. Each pair of integers X, Y indicates the row index and the column index of the piece. Row indexes are numbered from 0 to N-1, and column indexes are numbered from 0 to M-1. It guarantees no pieces share the same cell.

Output

There is only one line for each test case, containing the maximum number of cannons.

Sample Input

```
4 4 2
1 1 1 2
5 5 8
0 0 1 0 1 1 2 0 2 3 3 1 3 2 4 0
```

Sample Output

```
8
9
```

H. Play Game

Description

Alice and Bob are playing a game. There are two piles of cards. There are N cards in each pile, and each card has a score. They take turns to pick up the top or bottom card from either pile, and the score of the card will be added to his total score. Alice and Bob are both clever enough, and will pick up cards to get as many scores as possible. Do you know how many scores can Alice get if he picks up first?

Input

The first line contains an integer T (T≤100), indicating the number of cases.

Each case contains 3 lines. The first line is the N (N≤20). The second line contains N integer ai (1≤ai≤10000). The third line contains N integer bi (1≤bi≤10000).

Output

For each case, output an integer, indicating the most score Alice can get.

Sample Input

```
2

1
23
53

3
10 100 20
2 4 3
```

Sample Output

```
53
105
```

I. Difference

Description

A graph is a difference if every vertex vi can be assigned a real number ai and there exists a positive real number T such that

(a) |ai| < T for all i and

(b) (vi, vj) in E <=> |ai - aj| >= T,

where E is the set of the edges.

Now given a graph, please recognize it whether it is a difference.

Input

The first line of input contains one integer TC(1<=TC<=25), the number of test cases.

Then TC test cases follow. For each test case, the first line contains one integer N(1<=N<=300), the number of vertexes in the graph. Then N lines follow, each of the N line contains a string of length N. The j-th character in the i-th line is "1" if (vi, vj) in E, and it is "0" otherwise. The i-th character in the i-th line will be always "0". It is guaranteed that the j-th character in the i-th line will be the same as the i-th character in the j-th line.

Output

For each test case, output a string in one line. Output "Yes" if the graph is a difference, and "No" if it is not a difference.

Sample Input

```
3
4
0011
0001
1000
1100
4
0111
1001
1001
1110
3
000
```

000

000

Sample Output

Yes

No

Yes

Hints

In sample 1, it can let T=3 and a1=-2, a2=-1, a3=1, a4=2.

J. Dice

Description

Given a normal dice (with 1, 2, 3, 4, 5, 6 on each face), we define:

F(N) to be the expected number of tosses until we have a number facing up for N consecutive times.

H(N) to be the expected number of tosses until we have the number '1' facing up for N consecutive times.

G(M) to be the expected number of tosses until we have the number '1' facing up for M times.

Given N, you are supposed to calculate the minimal M1 that G (M1) >= F (N) and the minimal M2 that G(M2)>=H(N)

Input

The input contains multiple cases.

Each case has a positive integer N in a separated line. (1<=N<=1000000000)

The input is terminated by a line containing a single 0.

Output

For each case, output the minimal M1 and M2 as required in a single line, separated by a single space.

Since the answer could be very large, you should output the answer mod 2011 instead.

Sample Input

```
1
2
0
```

Sample Output

```
1 1
2 7
```