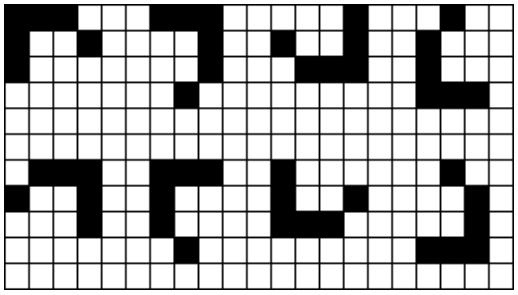
Problem A. Beautiful Sky

Little Mine is a naughty boy. He was once an excellent student and has won a great many prizes since the primary school. However, he's also addicted to video games. After he goes to college, when it comes to physics, his performance turns out the opposite way.

His teacher Mr. Wang is a nice person. When hearing about Littlemine's story, he decided to offer him an "opportunity". If he could solve the difficult problem, he wouldn't have to hand in his homework for the whole semester(ACTUALLY Mr.Wang WANTS HIM TO FIND A WAY BACK TO BE A GOOD STUDENT). Here is the problem:

This is a map consisting of multiple constellations(A constellation means a union of connected stars, each one of them has at least one star in its eight adjacent positions, and one constellation cannot be a part of another bigger constellation). Two constellations are similar if and only if they have same amount of stars and exact the same shape, ignoring the difference of their directions.



Here we use a n*m (0<=n,m<=100) matrix consisting of ones and zeros to denote the map. One means there's a star in its position (the total number of stars won't exceed 500), while zero means nothing. Given such a matrix, you need to use a lower-case letter to denote all the constellations. Similar constellations must be marked with the same letter. There are at most 26 different constellations and each one has at most 160 stars. Check the example below to learn more details.

But Little Mine doesn't buy it, he makes up his mind to put things "right" once and for all. So he asks you for help. Will you help him?

Input

The first line is an integer T (T <= 5) meaning there are T test cases. For each test case, the first two lines have two numbers, m and n, which represents the width and the height of the map. The next n lines describe the map, each line has exact m characters.

Output

For each test case, output the related marked map. If there are multiple solutions, output the one with minimum lexicographic order. There is at least one blank line between each two cases.

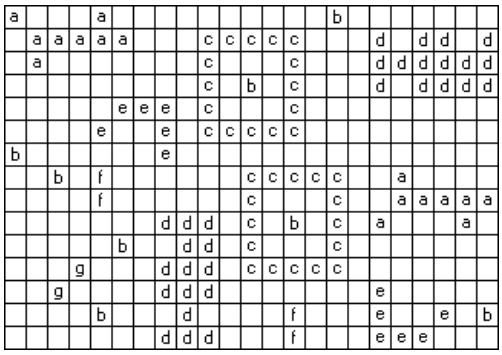
Sample Input

```
1
23
15
100010000000000010000000
011111000111110001011101
010000000100010001111111
000000000101010001011111
000001110100010000000000
000010010111111000000000
100000010000000000000000
001010000001111110010000
000010000001000100111111
000000011101010101000010
000001001101000100000000
000100011101111110000000
001000011100000000100000
000010001000010001001010
000000011100010001110000
```

Sample Output

```
a000a0000000000b0000000
0aaaaa000ccccc000d0dd0d
0a0000000c000c000dddddd
000000000c0b0c000d0dddd
00000eee0c000c000000000
0000e00e0ccccc000000000
b000000e000000000000000
00b0f000000ccccc00a0000
0000f000000c000c00aaaaa
0000000ddd0c0b0c0a000a0
00000b00dd0c000c0000000
000g000ddd0ccccc0000000
00g0000ddd0000000e00000
0000b000d0000f000e00e0b
0000000ddd000f000eee000
```

Hint



Source

Little mine

Problem B. ChessBoard

Given an N*N(N<=1000)chessboard where you want to place chess knights.
On this chessboard you have to apply M(M<=100000) operations:

Input

The first line contains a single integer T, the number of test cases.
For each case,
The first line contains integer N, M.
The next M lines contain the operation in following form.
C a b x: place chess knight on cell(a,b), the value of the knight is x. (1<=a,b<=n, 1<=x<=100000)
It grants that cell(a,b) has no knight before the operation.
Q a b: answer the maximum value of knight which is connected with knight(a,b), include itself.
If cell (a,b)has no knight, just answer -1. A knight is directly connected with the knight on the left, right, up and down. Two knights are connected if they have been directly connected or interconnected through some other connected knights.
The initial chessboard is empty.

Output

For each question, output the answer in one line.

Sample Input

1
3 7
C 2 2 1
Q 2 2
C 1 2 2
Q 2 2
C 3 3 3
Q 3 3
Q 1 1

Sample Output

1
2
3
-1

Source

laz

Problem C. Cutting rope

Inside a rope of length n, n-1 points are placed with distance 1 from each other and from the endpoints. Among these points, we choose m-1 points at random and cut the rope at these points to create m segments.

Let E(n, m) be the expected length of the shortest segment. Give n and m, find E(n, m).
Give your answer rounded to 5 decimal places behind the decimal point.

Input

The first line of input will be a positive integer T indicating how many data sets will be included. Each of the next T lines will contain two integers n, m ($1 \le n, m \le 100000$; $m \le n$) as mentioned before.

Output

For each test case, output E(n, m) rounded to 5 decimal places behind the decimal point in separate line.

Sample Input

3
2 2
4 2
100 10

Sample Output

1.00000
1.33333
1.52740

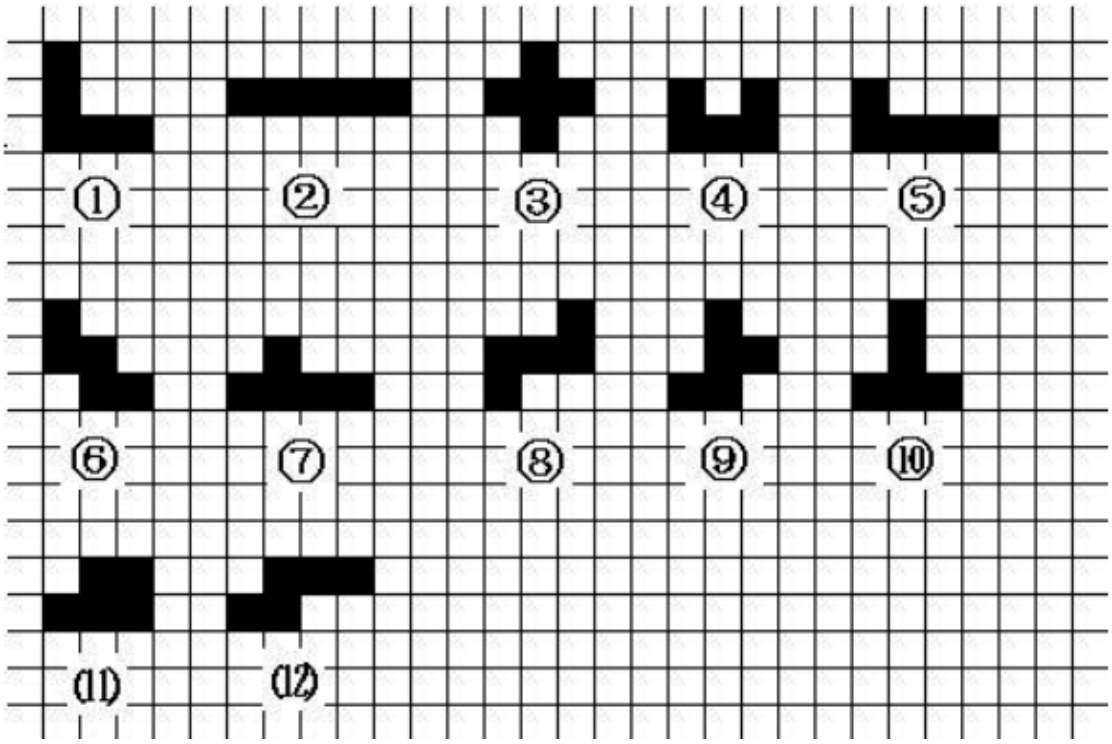
Source

Shucheng Zhong@HUST_ACM

Problem D. After Dating With Girl

After dating with girl, night is coming. Now the boy (Hellis is a little bad guy) and the girl want to papapa together.

Before papapa, the gril olders the boy to solve the following preblom.



There is a box of dominoes blocks. In the box, there are 12 different blocks, which are shown above. Tom is a boy who likes to do practice in intelligence, so he spends a whole afternoon in finishing two different rectangles with 3 * 20, which are shown below.

①⑤⑤⑤⑤⑨⑩⑩⑩⑥⑥⑧②②②②②③④④
①⑤⑿⑿⑨⑨⑨⑩⑥⑥⑦⑧⑧⑧⑾⑾③③③④
①①①⑿⑿⑿⑨⑩⑥⑦⑦⑦⑦⑧⑾⑾⑾③④④

①⑧⑦⑦⑦⑦⑥⑩⑨⑿⑿⑿②②②②②③④④
①⑧⑧⑧⑦⑥⑥⑩⑨⑨⑨⑿⑿⑤⑾⑾③③③④
①①①⑧⑥⑥⑩⑩⑩⑨⑤⑤⑤⑤⑾⑾⑾③④④

These are the only solutions for 3 * 20, and he has to know the number of solutions for M * N.

You should notice that if a solution will be the same as the other by some flip or rotate, these two solutions should be consider as the same.

It is an old problem so that everybody can solve it easily, and we

K is the ans of the old problem.

Then the difficult problem comes:

$$
\begin{cases}
kx + 10y + 20z + 30w <= A \\
10x + ky + 30z + 5w <= B \\
30x + 20y + kz + 10w <= C \\
15x + 20y + 10z + kw <= D \\
x, y, z, w >= 0 \\
f = x + y + z + w
\end{cases}
$$

(x, y, z, w can be decimals)
Hellis wants to papapa quickly, so you need to make the maximum value of f.

Input

The first line contains a single integer T, the number of test cases.
Each contains a single line with 6 positive integers M , N (which means the shape of M * N. Here M * N = 60) , A, B, C, D (A, B, C, D <50000).

Output

For each test case, output a line contains the maximum value of f accurate to 0.01 (Each coordinate keep 3 digits after decimal point) .

Sample Input

2
3 20 36 35 44 33
1 60 20 20 10000 20

Sample Output

2.66
2.00

Hint papapa means to do programming contest , nimendongde.

Source Hellis

Problem E. LowerBound

You are given a sequence A[1], A[2], ..., A[N] . (|A[i]| ⩽ 2*10^9, 1 ⩽ N ⩽ 100000). A query is defined as follows:

(L,R,V) : find the smallest number of A[i] such that L<=i<=R and A[i]>V, if not exist, output “not exist”.

Given M queries, your program must output the results of these queries.

Input

The first line contains a single integer T, the number of test cases.
For each case, there are two integers N and M (1<= N, M <=100000).
The next line contain N elements.
A1 A2 … AN
The next M lines contain the operation in following form.
L1 R1 V1
L2 R2 V2
…
LM RM VM

Output

For each question, output the answer in one line.

Sample Input

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

Sample Output

3
1
not exist
4
2

Problem F. Goddess

Because of the ugly wall near the east ninth building, Hung don't want to self-study anymore. Then he back to his dormitory. In the dormitory, His roommate named Gaofushuai is playing mobile phone games with Lily, Gaofuhushuai's girlfriend. After a while, Gaofushuai is asked by next door to play Dota, and leaving his girlfriend lonely.

It is really a golden chance for Hung. Hung fell in love with Lily when he met Lily in the first time. But he knows that he doesn't have lots of money. It is impossible for him to imitate Gaofushuai to buy precious gifts for Lily. Of course, he has confidence in one thing-his intelligence. As a result, Hung decides to invent a difficult game and show it to the Lily.

The game is played on a chessboard. The chessboard was divided to n*m blocks. Each block has a chess pieces on it initially. The task is to remove some chess pieces so there are no 5 continuous chess pieces in any line (including horizontal, vertical and diagonal). Less chess pieces removed, more grades players can get.

Though Hung invented it, he is so nervous that he forgot the fewest movements to solve it. Could you tell him? If you succeed, Hung will bg you at Dongyuan for thanks!

Input

The first line contains a single integer T (T <= 100), the number of test cases.
For each case, there are two integers n(5<=n <= 100) and m(5<=m<=100), which describe the size of chessboard.

Output

For each case, you should print one line with a integer , representing the minimal movements.

Sample Input

1
5 5

Sample Output

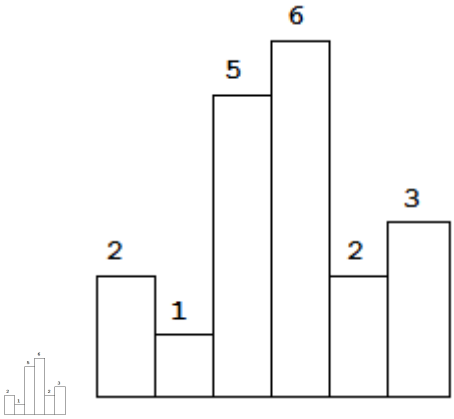
5

Hint

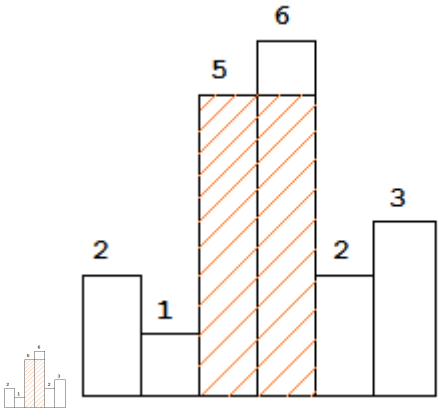
In the sample, we can remove the 5 chess pieces of the first row.

Problem G. largest rectangle

Given n positive integers representing the histogram's bar height where the width of each bar is 1, find the area of largest rectangle in the histogram.



Above is a histogram where width of each bar is 1, given height =[2,1,5,6,2,3].



The largest rectangle is shown in the shaded area, which has area = 10 unit.

Input

The first line of the input file contains an integer T (T<=50) specifying the number of test cases.

Each test case begins with a line containing an integer N (1<=N<=10000),The following N-1 lines each contain a integer A[i](1<=A[i]<=10000).

Output

For each query, output a single line containing largest area.

Sample Input

```
2
6
2
1
5
6
2
3
10
1
2
3
4
5
6
7
9
10
8
```

Sample Output

```
10
30
```

Problem H. Road System

There are M cities in a map.Alice wants to find some roads to make all of the cities can be reached if she starts her journey from other cities.With kind Bob's investigation and assessment, she got the resulting statistics about construction cost of some roads.However, her money is limited, so she askes you to make a plan which costs the least to meet her goal.Can you help her?

Input

The first line contains an integer t meaning that there are T test cases(T <= 20).

For each test case:

The first line contains two integers, N and M, indicating the number of roads and cities. (0<=N<=100, 1<=M<=100).Then for each of the following N lines, there are three non-negative A, B, W, meaning that if a road is built between a and b, it costs w.(0<=w<=1000).

Output

For each test case, you need output a line containing an integer indicating the least cost of the plan.Or if you can't get the answer with the information you're given, output "I'm not sure.".

Sample Input

2

3 3

1 2 1

1 3 2

2 3 4

1 3

2 3 2

Sample Output

3

I'm not sure.

Problem I. Sheep's Toy I

Sheep is a very clever boy in 2D world, and he has a square-shaped toy. One day he rotates the square on its center, and wants to know the total area that the square covers in the motion. Remember not to count a point more than once.

See sample for more details.

Input

The first line of the input contains an integer T (1<=T<=10^4) indicating the number of test cases.

For each test case:

There's only one line containing two numbers L(0<L<10^5), the side length of the square, and A(0<=A<10^5), the angle that Sheep rotates in degree.

Output

For each test case, output a single line containing the required area, rounded to two decimals.

Sample Input

2
10 0
10 90

Sample Output

100.00
157.08

Source

abczz

Problem J. Tree

LAZ has a tree of N nodes numbered from 1 to N, each node i contains a lowercase letter c(i). Let (a, b) represent a path from node a to node b, then we can get a string S(a,b) consisting of letters along the shortest path. For example, if (a1, a4) = a1->a2->a3->a4, then the string we get is S(a1,a4) =c(a1)c(a2)c(a3)c(a4). We define the value of (a, b) as F(S(a,b)), the length of (a, b) as L(a,b) whichequals the number of edges in the path , and the ith node appearing in the path as P(a,b,i), (i = 0,1, …, L(a,b)), then:

$$F(S(a,b)) = \left(\sum_{i=0}^{L(a,b)} c(P(a,b,i)) * 137^{L(a,b)-i} \right) mod\ 100007$$

Now please count how many (a, b) in the given tree satisfies L(a,b) = X, F(S(a,b)) = Y.

Input

The first line contains a single integer T indicating the number of test cases.
In each of the following T test cases:
The first line contains three integers N, X, Y. (0<N<=50000, 0<=X, Y<2*10^9)
The second line contains N lowercase letters c(1), c(2), …, c(N).
Then N – 1 lines follows, each line contains two integers ui, vi representing an edge between ui and vi.

Output

For each test case, output one line containing the number of (a, b) that satisfies L(a, b) = X, F(S(a,b)) = Y.

Sample Input

1
4 2 33853
a a a a
1 2
1 3
1 4

Sample Output

6

Hint

The 6 paths are (2,3) (2,4) (3,2) (3,4) (4,2) (4,3).

Source

laz