A: Banana

time limit

200ms

memory limit

131072KB

Bananas are the favoured food of monkeys.

In the forest, there is a Banana Company that provides bananas from different places.

The company has two lists.

The first list records the types of bananas preferred by different monkeys, and the second one records the types of bananas from different places.

Now, the supplier wants to know, whether a monkey can accept at least one type of bananas from a place.

Remenber that, there could be more than one types of bananas from a place, and there also could be more than one types of bananas of a monkey's preference.

Input Format

The first line contains an integer T, indicating that there are T test cases.

For each test case, the first line contains two integers N and M, representing the length of the first and the second lists respectively.

In the each line of following N lines, two positive integers i, j indicate that the i-th monkey favours the j-th type of banana.

In the each line of following M lines, two positive integers j, k indicate that the j-th type of banana could be find in the k-th place.

All integers of the input are less than 50.

Output Format

For each test case, output all the pairs x, y that the x-the monkey can accept at least one type of bananas from the y-th place.

These pairs should be outputted as ascending order. That is say that a pair of x, y which owns a smaller x should be output first.

If two pairs own the same x, output the one who has a smaller y first.

And there should be an empty line after each test case.

Sample Input

```
1
6 4
1 1
1 2
2 1
2 3
3 3
4 1
1 1
1 3
2 2
3 3
```

Sample Output

```
1 1
1 2
1 3
2 1
2 2
2 3
3 3
4 1
4 3
```

B: Out-out-control cars

time limit

2500ms

memory limit

131072KB

Two out-of-control cars crashed within about a half-hour Wednesday afternoon on Deer

Park Avenue. This accident alarmed the district government.

It jumpstarted a vibrant new technology to predict potential car accidents.

Engineers depicted a moving vehicle as a triangle with directional movement.

Three two dimeniaonal points (x_1, y_1), (x_2, y_2) and (x_3, y_3) restrict the span of a vehicle.

Its moverment is a uniform linear motion described by a vector (d_x, d_y).

That is say that after one second, the i-th endpoint of the emulational vehicle, the triangle, should be at $(x_i + d_x, y_i + d_y)$.

The core function of this technology is simple.

For two given triangles, corresponding to two vehicles, predict that if they would collide in the near future.

Two triangles are considered collided, if they touched in some points or their intersection is not empty.

The first line of the input contains an integer t specifying the number of test cases.

Each test case is consist of two lines and each line contains eight integers x_1, y_1, x_2, y_2, x_3, y_3 and d_x, d_y, to describe a vehicle and its movement.

The absolute value of each input number should be less than or equal to 10^9.

For each test case output the case number first. Then output YES if they would collide in the near future, or NO if they would never touch each other.

Sample Input

```
3

0 1 2 1 1 3 1 0
9 2 10 4 8 4 -1 0

0 1 2 1 1 3 2 0
9 2 10 4 8 4 3 0

0 1 2 1 1 3 0 0
0 4 1 6 -1 6 1 -2
```

Sample Output

```
Case #1: YES
Case #2: NO
Case #3: YES
```

C: Coconut

time limit

200ms

memory limit

131072KB

Coconut is Captain Gangplank's favourite fruit. That is why he needs to drink coconut juice from b coconuts each day.

On his next trip, he would pass through N citis.

His trip would begin in the 1-st city and end in the N-th city.

The journey from the i-th city to the $(i+1)$-th city costs D_i days.

Initially, there is no coconut on his ship. Fortunately, he could get supply of C_i coconuts from the i-th city.

Could you tell him, whether he could drink coconut juice every day during the trip no not?

Input Format

The first line contains an integer T, indicating that there are T test cases.

For each test case the first line contains two integers N and b as described above.

The second line contains N integers $C_1, C_2, \cdots, C_N$.

The third line contains $N-1$ integers $D_1, D_2, \cdots, D_{N-1}$.

All integers in the input are less than 1000.

Output Format

For each case, output Yes if Captain Gangplank could drink coconut juice every day, and otherwise output No.

Sample Input

```
2
4 1
3 2 1 4
1 2 3
4 2
2 4 6 8
3 2 1
```

Sample Output

```
Yes
No
```

D: Hack Portals

time limit

200ms

memory limit

131072KB

We all have much to be proud of.

As a player of the game Ingress, IloveMATH is proud of these portals on the road in front of his campus.

Here is a brief introduction of this mobile game. Ingress, as a sandbox game, connects the actual world around us with the virtual battleground.

Those strategic fortress points, we call portals, correspond to the real buildings, sculptures, statues and other objects that can easily be discoverd.

If you read the virtual map of the Ingress world, a neat row of portals along the road in front of Xtended Domain University (XDU) could catch your eye immediately.

The total length of the road is L metres, and there are N portals on the road.

The distance between the left side of the road and the i-th portal is X_i, where $0 \leq X_i \leq L$ and X_i is an integer.

The gate of XDU is situated on K, where K is an integr and $0 \leq K \leq L$ as well.

To get more virtual supplies and properties in the game, IloveMATH should hack these portals.

Hacking a portal can get some items randomly such as missiles, shields and turrets.

However, hacking would heat the portal and the player could not hack it again until the portal finished the process of cooling.

Now IloveMATH stands at the left side of the road (located on 0).

He knows the end time of cooling for each portal.

His mission is to visit and hack each portal at least once and go back to the school gate.

The time consumption of moving from i to j is $|i - j|$ and the hacking is instantaneous (its time consumption is 0).

Help IloveMATH finish the mission as soon as possible. It's time to move.

Input Format

The input of this problem contains several test cases.

The first line of the input provides the total number of test cases.

Each test case is consists of $N+1$ lines and the first lines provides three integers N $(N \leq 1000)$, L $(L \leq 1000)$ and K $(0 \leq K \leq L)$.

The following N lines correspond to N portals and the i-th line contains the location of the portal, and its end time of cooling.

All input numbers should be small than 32768.

Output Format

For each test case output the case number first. Then output the best time for completing the mission.

Sample Input

```
1

4 10 3
8 9
4 21
3 16
8 12
```

Sample Output

```
Case #1: 22
```

E: Half-consecutive Numbers

time limit

2000ms

memory limit

131072KB

The numbers 1, 3, 6, 10, 15, 21, 28, 36, 45 and $t_i = \frac{1}{2}i(i+1)$, are called half-consecutive.

For given N, find the smallest r which is no smaller than N such that t_r is square.

Input Format

The input contains multiple test cases.

The first line of a multiple input is an integer T followed by T input lines.

Each line contains an integer N $(1 \leq N \leq 10^{16})$.

Output Format

For each test case, output the case number first.

Then for given N, output the smallest r.

If this half-consecutive number does not exist, output -1.

Sample Input

```
4
1
2
9
50
```

Sample Output

```
Case #1: 1
Case #2: 8
Case #3: 49
Case #4: 288
```

F: Islands

time limit

1000ms

memory limit

131072KB

On the mysterious continent of Tamriel, there is a great empire founded by human.

To develope the trade, the East Empire Company is set up to transport goods from place to place.

Recently, the company wants to start their business in Solstheim, which is consists of N islands.

Luckily, there are already M sea routes.

All routes are one-way, and the i-th route can transport person and goods from island u_i to v_i.

Now, the company nominates you a particular job to plan some new routes to make sure that person and goods can be transported between any two islands.

Furthermore, because the neighboring regions are under attack by an increasing number of dragons, limited resources can be used to set up new routes.

So you should plan to build new routes as few as possible.

Input Format

The first line contains an integer T, indicating that there are T test cases.

For each test case, the first line includes two integers N $(N \leq 10000)$ and M $(M \leq 100000)$, as described above.

After that there are M lines. Each line contains two integers u_i and v_i.

Output Format

For each test case output one integer, represent the least number of routes required to new.

Sample Input

```
2
4 3
1 2
2 3
3 4
4 4
1 2
1 4
3 2
3 4
```

Sample Output

```
1
2
```

G: Query on a string

time limit

500ms

memory limit

131072KB

You have two strings S and T in all capitals.

Now an efficient program is required to maintain a operation and support a query.

The operation $C\ i\ ch$ with given integer i and capital letter ch, changes the i-th character of S into ch.

The query $Q\ i\ j$ asks the program to find out, in the substring of S from the i-th character to the j-th one, the total number of T appearing.

Input Format

The first line contains an integer T, indicating that there are T test cases.

For each test case, the first line contains an integer $N\ (N \leq 100000)$.

The second line is the string $S\ (|S| \leq 100000)$ and the third line is the string $T\ (|T| \leq 10)$.

Each of the following N lines provide a operation or a query as above descriptions.

Output Format

For each query, output an integer correponding to the answer.

Output an empty line after each test case.

Input Format

The first line contains an integer T, indicating that there are T test cases.

For each test case, the first line includes two integers N $(N \leq 10000)$ and M $(M \leq 100000)$, as described above.

After that there are M lines. Each line contains two integers u_i and v_i.

Output Format

For each test case output one integer, represent the least number of routes required to new.

Sample Input

```
1
5
AABBABA
AA
Q 1 3
C 6 A
Q 2 7
C 2 B
Q 1 5
```

Sample Output

```
1
2
0
```

H: Skiing

time limit

1000ms

memory limit

131072KB

In this winter holiday, Bob has a plan for skiing at the mountain resort.

This ski resort has M different ski paths and N different flags situated at those turning points.

The i-th path from the S_i-th flag to the T_i-th flag has length L_i.

Each path must follow the principal of reduction of heights and the start point must be higher than the end point strictly.

An available ski trail would start from a flag, passing through several flags along the paths, and end at another flag.

Now, you should help Bob find the longest available ski trail in the ski resort.

Input Format

The first line contains an integer T, indicating that there are T cases.

In each test case, the first line contains two integers N and M where $0 < N \leq 10000$ and $0 < M \leq 100000$ as described above.

Each of the following M lines contains three integers S_i, T_i, and L_i $(0 < L_i < 1000)$ describing a path in the ski resort.

Output Format

For each test case, ouput one integer representing the length of the longest ski trail.

Sample Input

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

Sample Output

```
6
```

I: Colored Graph

time limit

1000ms

memory limit

131072KB

In graph theory, graph colouring is a special case of graph labelling.

It is an assignment of labels traditionally called colours to edges of a graph.

Here we consider the simplest form.

Given an undirected simple complete graph G with n nodes, this problem asks

about a black-and-white edge-colouring of G, which contains the smallest total number of pure-coloured triangles.

A pure-coloured triangle in G is a set of three different nodes with three same-coloured edges between them.

Input Format

The input has several test cases and the first line provides the total number of test cases.

For each test case, a line with an integer n $(n \leq 500)$ indicates that the given graph G is an undirected simple complete graph with n nodes.

Output Format

For each test case, output $n+1$ lines.

The first line contains the smallest number of pure-coloured triangles.

The following n lines describes an adjacent matrix $A=(a_{ij})$ of graph G.

The answer may not be unique and you can output anyone.

If the edge between i and j is white, a_{ij} and a_{ji} should be 1.

If the edge between i and j is black, a_{ij} and a_{ji} should be 2.

Elements of the main diagonal should be 0.

Sample Input

```
2
3
6
```

Sample Output

```
0

0 1 1
1 0 2
1 2 0
2
0 2 2 1 1 1
2 0 2 1 1 1
2 2 0 1 1 1
1 1 1 0 2 2
1 1 1 2 0 2
1 1 1 2 2 0
```

J: Our Journey of Dalian Ends

time limit

4000ms

memory limit

131072KB

Life is a journey, and the road we travel has twists and turns, which sometimes lead us to unexpected places and unexpected people.

Now our journey of Dalian ends. To be carefully considered are the following questions.

Next month in Xian, an essential lesson which we must be present had been scheduled.

But before the lesson, we need to attend a wedding in Shanghai.

We are not willing to pass through a city twice.

All available expressways between cities are known.

What we require is the shortest path, from Dalian to Xian, passing through Shanghai.

Here we go.

Input Format

There are several test cases.

The first line of input contains an integer t which is the total number of test cases.

For each test case, the first line contains an integer m $(m \leq 10000)$ which is the number of known expressways.

Each of the following m lines describes an expressway which contains two string indicating the names of two cities and an integer indicating the length of the expressway.

The expressway connects two given cities and it is bidirectional.

Output Format

For eact test case, output the shortest path from Dalian to Xian, passing through Shanghai, or output -1 if it does not exist.

Sample Input

```
3
2
Dalian Shanghai 3
Shanghai Xian 4
5
Dalian Shanghai 7
Shanghai Nanjing 1
Dalian Nanjing 3
Nanjing Xian 5
Shanghai Xian 8
3
Dalian Nanjing 6
Shanghai Nanjing 7
Nanjing Xian 8
```

Sample Output

```
0
0 1 1
1 0 2
1 2 0
2
0 2 2 1 1 1
2 0 2 1 1 1
2 2 0 1 1 1
1 1 1 0 2 2
1 1 1 2 0 2
1 1 1 2 2 0
```