Greetings From Globussoft

- Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.

- These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP

- To solve these 3 questions you've max. 3 hours.

- While Solving these questions you are not allowed to use any **Search Engine** like Google, Yahoo, Bing …

All the best for your test

Globussoft

QUESTION - 1

Air Bovinia is planning to connect the N farms (1 <= N <= 200) that the cows live on. As with any airline, K of these farms (1 <= K <= 100, K <= N) have been selected as hubs. The farms are conveniently numbered 1..N, with farms 1..K being the hubs.

Currently there are M (1 <= M <= 10,000) one-way flights connecting these farms. Flight i travels from farm u_i to farm v_i, and costs d_i dollars (1 <= d_i <= 1,000,000).

The airline recently received a request for Q (1 <= Q <= 10,000) one-way trips. The ith trip is from farm a_i to farm b_i. In order to get from a_i to b_i, the trip may include any sequence of direct flights (possibly even visiting the same farm multiple times), but it must include at least one hub (which may or may not be be the start or the destination). This requirement may result in there being no valid route from a_i to b_i. For all other trip requests, however, your goal is to help Air Bovinia determine the minimum cost of a valid route.

Input :

* Line 1: Four integers: N, M, K, and Q.

* Lines 2..1+M: Line i+1 contains u_i, v_i, and d_i for flight i.

* Lines 2+M..1+M+Q: Line 1+M+i describes the ith trip in terms of a_i and b_i

Output :

* Line 1: The number of trips (out of Q) for which a valid route is possible.

* Line 2: The sum, over all trips for which a valid route is possible, of the minimum possible route cost.

SAMPLE INPUT :

3 3 1 3

3 1 10

1 3 10

1 2 7

3 2

2 3

1 2

SAMPLE OUTPUT :

2

24

QUESTION – 2

Maggu and Coder were playing a game with strings. In each turn of the game, Maggu gives Coder a string. Coder can replace m consecutive 'a' in the string by n consecutive 'b' any number of times. This way he has to create 2 strings, one of maximum possible length and one of minimum possible length.

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Input

First line of input contains a single integer T : number of test cases.(1<=T<=100).
For each test case there are exactly two lines.
First line contains a string s (1 <= length(s) <= 10^5) containing letters only from 'a' to 'z'.
Second line contains two space separated integers representing m and n respectively.(1 <= m,n <= 10^5).
Sum of length(s) over all test cases is <= 10^6.

Output

For each test case, print in a single line containing two space separated integers representing minimum and maximum length of string s that Coder can obtain.

Example

Input:

```
3
abc
1 2
```

```
aa
1 2
aba
1 1
```

Output:

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

QUESTION – 3

Leo didn't do all the job in his last problem, somebody gave him the numbers in a convenient base. It was the bottleneck of the problem... Now your task is to do this job.

Input

The first line of input contains three integers ***T***, the number of test cases, ***B1***, the first base, ***B2***, the second base.
Follow 2×***T*** lines.
For each test case, on the first line your are given one integer ***k***.
On the second line you are given ***k*** integers : the digits of ***N*** in base ***B1***.

$$N = a_0 \times B1^0 + \ldots + a_i \times B1^i + \ldots + a_{k-1} \times B1^{k-1}$$

Output

For each test case, you have to print the number ***N*** in base ***B2***. See sample for details.

Example

Input:

```
1 10 100
5
5 4 3 2 1
```

Output:

```
3
45 23 1
```

QUESTION – 4

For his training, Digo is asked to solve the following challenge.

There is a mock terrorist situation. There are N terrorists and Digo is teamed up with his friend Sharry. They have to kill all the terrorists. Since this was too easy a task for this dynamic duo, Digo decided to have some fun with this challenge. At any given instant, Digo wants that the number of terrorists killed by him should be more than those killed by Sharry. The terrorists come in a fixed order. Any terrorist can be killed by either Digo or Sharry. Give the total number of ways in which the terrorists can be killed by them such that at every instant terrorists killed by Digo is more than the number of terrorists killed by Sharry. Give your answer modulo 10^9+7.

Input Format:-

The first line consists of a single integer T, denoting the number of test cases.
T lines follow each consisting of an integer N denoting the total number of terrorists.

Output Format:-

For each test case print the total number of possible ways modulo 10^9 + 7.

Constraints:-

1 <= t <= 100000
1 <= n <= 1000000

Sample Input:-

2
1
3

Sample Output:-

1
2

QUESTION – 5

Digo is given a rooted tree where nodes are numbered from 1 to N (1 is the root node) and asked some queries on it.
There are two types of queries
1) Given node number U, two integers X, K which means add X to the given node , X+K to its children , X+2*K

to children of its children and so on..
2) Given a node number U print the sum of nodes in the subtree rooted at U (including node U).

Since the answer can be too long, print the answer 10^9 + 7
Initially each node contains zero.

Input Format:

First line contains a single integer N denoting the number of nodes in the tree.
Next N-1 lines denotes the parent node of nodes 2 to N. (1 is the root node it has no parent)
Next line contains M (Number of queries).
In each of the next M lines first integer is T which means the type of the query.
If T is ,1 it is followed by three integers U, X, K as explained in the question.
If T is 2, it is followed by a single integer U.

Output Format:-

For each query of type 2, output a single line containing the required answer.

Constraints:-

1 <= N <= 100000
1 <= M <= 100000
1 <= X , K <=1000000000

Sample Input:

```
7
1
1
2
2
3
3
5
1 1 1 2
2 1
2 3
1 3 2 1
2 3
```

Sample Output:

27
13
21