1001 I love cube

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 512 megabytes

Give you a cube with a side length of $n-1$.

Find the number of equilateral triangles with three points on the cube point.

Each side must be parallel to a certain surface of Oxy, Oxz, Oyz.

Now you need to count how many such triangles there are.

Each point can only be on the boundary or inner point of the cube, and the three coordinates x, y, and z of each point must be integers.

Input

The first line contains an positive integer $T(T \leq 10^5)$. Then T test cases follow.

Each test case contains a single Integer $n(1 \leq n \leq 10^{18})$.

Output

For each case, print an integer, which is the answer modulo 10^9+7

Sample Input

```
2
1
2
```

Sample Output

```
0
8
```

1002 I love tree

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 512 megabytes

Given a tree with n nodes and q operations, there are two kinds of operations.

$1\ a\ b$: for a chain <a, b>, increase the value of x^2 to the x-th point on this chain for example the chain from a to b=$(x1, x2, x3, x4, x5)$,after the operation,
$x1+=1, x2+=4, x3+=9, x4+=16, x5+=25$

$2\ x$:asks the value of x-th node

Input

There is only one test case for this question.

The first line contains one integer $n(1 \leq n \leq 10^5)$.

The next $n-1$ line contains two integers u,v,which means that there is an edge between u and v.

The next line contains one integer $q(1 \leq q \leq 10^5)$.

The i-th of the following q lines is in one of the 2 formats:

$1\ a\ b\ (1 \leq a, b \leq n)$

$2\ x\ (1 \leq x \leq n)$

Output

Each line output one integer represents the answer.

Sample Input

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

Sample Output

```
1
5
0
```

1003 I love playing games

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 512 megabytes

Alice and Bob play a game on an undirected graph G consisting of n vertices numbered 1 to n, and m edges.

Before the game starts, Alice is at vertex x, Bob is at vertex y. The game rules as follows:

- Alice goes first, then Bob. with moves alternating each turn.
- They try to get the vertex z. At the end of a turn, if Alice arrives but Bob does not, Alice wins; If Bob arrives but Alice does not, Bob wins; If both arrive or both fail to arrive, it will be considered a draw.
- In a move, the current player can choose not to move or move to a vertex adjacent to the current vertex, if there is an edge between the two vertex.
- The player cannot be on the same vertex at the same time except the start position and end position.
- Both of them play in the optimal way. (i.e If there is a strategy to win, win; if not, try to get to a draw)

Your task is to determine who wins if both of them choose the best operation in their rounds.

Input

There is only one test case for this question.

The first line contains an integer $T(T \leq 10000)$. Then T test cases follow.

Each test case contains $m + 2$ lines.

The first line contains two integers n and m $(n \leq 10^3)$ — numbers of vertices and edges in graph respectively.

The second line contains three integers x,y and z — the initial position of Alice,the initial position of Bob and the end position of them.

The next m lines contain edges descriptions. Each line contains two integers x and y ($1 \leq x \leq n, 1 \leq y \leq n$)— denoting that there is an undirected edge between the vertices numbered x and y.

It is guaranteed that the sum of n over all test cases doesn't exceed 10^5 and the sum of m over all test cases doesn't exceed $2 * 10^5$. The given graph may contain loops and multi-edges.

Output

Print T integer, for each case, determine who wins. Output

- an integer 1 if Alice wins.
- an integer 2 if draw. i.e no one wins.
- an integer 3 if Bob wins.

Sample Input

```
2
10 13
8 1 10
1 2
1 3
2 4
2 5
3 5
8 9
9 4
9 5
4 6
5 6
6 10
5 7
7 10
8 9
2 3 8
1 2
2 6
2 7
6 4
7 5
4 3
5 3
6 8
7 8
```

Sample Output

```
1
1
```

1004 I love counting

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 256 megabytes

Mr W likes interval counting.

One day,Mr W constructed a sequence of length n, each position of this sequence has a weight c ($c \leq n$).

There are a total of Q queries, and each query is given an interval (l, r) and two parameters a, b, and ask how many $kinds\ of\ weights$ of this interval satisfy $c \bigoplus a \leq b$ where $\bigoplus$ is the binary Bitwise XOR operation.

Input

There is only one test case for this question.

In the first line contains a positive integer n ($n \leq 100000$) represents the length of the sequence.

In the second line contains n positive integers, The i-th number in the sequence represents the weight c_i ($1 \leq c_i \leq n$)of the i-th position.

In the third line, a positive integer Q ($Q \leq 100000$) represents the number of queries.

In the next Q line, each line has four positive integers l, r, a, b ($1 \leq l \leq r \leq n, a \leq n, b \leq n$), which represent the parameters of the query.

Output

For each query, output an integer on a line to represent the number of weights that meet the conditions.

Sample Input

```
5
1 2 2 4 5
4
1 3 1 3
2 4 4 2
1 5 2 3
4 5 3 6
```

Sample Output

```
2
1
2
1
```

1005 I love string

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 512 megabytes

Mr X likes to play string games.

Mr X has an operation sequence. This operation sequence can be written as a string. For each operation, the next character of the operation sequence can be inserted before or after the current string. For example, my operation sequence is "$aabac$", suppose The sequence obtained after the first four operations is "$baaa$", then after the last operation, the string may become "$baaac$" or "$cbaaa$". It can be seen that there is only one operation method for the first operation. For other operations, there are only two methods of operation.

For each operation method, there will be a score. The smaller the lexicographic order of the final string, the higher the final score.

Then, for a given operation sequence, how many operation methods can get the maximum score.

The two operation methods are different. If and only if there is a certain operation (not the first operation), one operation will be inserted before the current string, and the other operation will be inserted after the current string.

Input

Enter a positive integer T ($T \leq 10$) on the first line to represent the number of test cases.

For each test case:

the first line contains a integer n ($1 \leq n \leq 100000$) to represent the length of the string.

the second line contains a string of lowercase letters , which represents the sequence of operations.

Output

For each test case, output a line of a positive integer to represent the number of schemes, and the answer is modulo 1000000007

Sample Input

```
1
5
abcde
```

Sample Output

```
1
```

1006 I love sequences

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 512 megabytes

Given three sequences $a = [a_1, a_2, \dots a_n]$, $b = [b_1, b_2, \dots b_n]$ and $c = [c_1, c_2, \dots c_n]$ each containing n non-negative integers. You need to compute the value of $\sum_{p=1}^{n} \sum_{k=1}^{n} d_{p,k} * c_p^k$.

And the sequence $d = [d_{p,1}, d_{p,2} \dots d_{p,n}]$ is calculated by the following rule:

For every integer p $(1 \le p \le n)$, every integer k $(1 \le k \le n)$, $d_{p,k} = \sum_{k=i \oplus j} a_i * b_j$, **(the range of i, j is $1 \le i \le \frac{n}{p}$, $1 \le j \le \frac{n}{p}$)**. Wherein,the notation $\oplus$ represents an operation in which the value of each bit of K in the ternary representation is equal to the greatest common divisor of the corresponding bit of I, J in the ternary representation. Formally speaking, decimal numbers $(K)_{10}$, $(I)_{10}$, $(J)_{10}$ can be respectively represented as three ternary numbers $(k_{m-1}k_{m-2}\dots k_0)_3$, $(i_{m-1}i_{m-2}\dots i_0)_3$, $(j_{m-1}j_{m-2}\dots j_0)_3$. For every integer t in $(1 \le t \le m)$, $k_t = gcd(i_t, j_t)$, where $gcd(x, y)$ is the greatest common divisor of x and y, specially, we define that $gcd(x, 0) = gcd(0, x) = x$. For example, if $x = (5)_{10} = (012)_3$, $y = (10)_{10} = (101)_3$, then $k = (111)_3 = (13)_{10}$

Output the answer mod $10^9 + 7$.

Input

There is only one test case for this question.

The first line contains an integer n $(n \le 2 * 10^5)$ — length of the sequence a, b, c.

The second line contains n integers $a_1, a_2, \dots, a_n$ $(1 \le a_i \le 10^9)$.

The third line contains n integers $b_1, b_2, \dots, b_n$ $(1 \le b_i \le 10^9)$.

The fourth line contains n integers $c_1, c_2, \dots, c_n$ $(1 \le c_i \le 10^9)$.

Output

Print an integer, which is the answer modulo $10^9 + 7$

Sample Input

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

Sample Output

```
1643486
```

1007 I love data structure

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 3 seconds
>
> Memory limit: 512 megabytes

This is a simple data structure problem.

In this problem, you need to maintain a sequence of numbers. Each position of the sequence has two parameters a and b.

Now there are m operations, and these operations can be divided into four types.

Type 1: Given interval (l, r) and x, and mark 0/1 represents a parameter or b parameter, for each position in the interval, add x to the a parameter or b parameter at this position.

Type 2: Given interval (l, r), for each position in the interval, the a parameter of this position becomes $3a + 2b$, and the b parameter becomes $3a - 2b$.For example, originally $a = 1, b = 2$, after the operation becomes $a = 7, b = -1$.

Type 3: Given interval (l, r), for each position in the interval, exchange the two parameters a, b corresponding to this position.

Type 4: Given interval (l, r), query$\sum_{i=l}^{r} a_i * b_i$

This question is very simple, can you finish it?

Input

There is only one test case for this question.

In the first line, a positive integer n ($n \leq 200000$) represents the length of the sequence.

In the next n lines, the i-th line have two numbers in each line to represent the two parameters a_i and b_i($1 \leq a_i, b_i \leq 1000000000$) at each position

In the next line, a positive integer q ($q \leq 200000$) represents the number of operations.

For the next q lines

$1\ tag\ l\ r\ x$($0 \leq tag \leq 1, 1 \leq x \leq 1000000000$)means a or b plus x in every position of this interval

$2\ l\ r$ Let a become $3a + 2b$ and b become $3a - 2b$ in every position of this interval

$3\ l\ r$ exchange the weight of a and b in every position of this interval

$4\ l\ r$ Query the sum of value of $a * b$ in every position of this interval

Output

For each type 4 query, output a line of a positive integer to represent the result of the query, and the answer is modulo 1000000007.

Sample Input

```
5
1 4
3 2
4 1
3 6
7 3
6
1 0 2 4 2
2 2 4
4 1 4
3 3 5
1 1 4 5 3
4 1 4
```

Sample Output

```
614
623
```

1008 I love exam

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 128 megabytes

Student Z doesn't love exams

The exam was about to be done soon, but student Z didn't even read the book, He had collapsed.

Student Z has a total of n exams, and there are still t days before the start of the exam, which means he still has t days to review.

But student Z couldn't even read the textbooks, and couldn't review it at all. Fortunately, a kind classmate gave it m sets of review materials. The i set of materials can improve the grades of the s_i course. The i set of materials needs to be studied for y_i days. You can increase x_i points later (the upper limit of each course is 100 points, so after it is upgraded to 100 points, there will be no further increase).and note that each set of review materials can only be used once.

Student Z now has a zero-point level in every course. it is impossible to review all the materials, so he needs to choose some materials to review, but he can fail at most p courses in this semester (if the score of one course is less than 60 points will fail), otherwise he will be talked to by the professor.

Student Z now wants to know the maximum points he can get in all courses under the premise of fail no more than p courses this semester. If he cannot meet the conditions, please output -1 .

Input

A positive integer T ($T \leq 10$) in the first line represents the number of test cases.

For each test case:

The first line contains a positive integer n ($n \leq 50$) represents the total number of courses in this semester.

The second line contains n strings which length is no more than 15, representing the course name of each course in this semester.

The third line contains a positive integer m ($m \leq 15000$) represents the number of review materials he obtained.

In the next m lines, each line have a string s and two positive integers x($1 \leq x \leq 10$) and y($1 \leq y \leq 10$) , representing the course of this set of materials review, the improved scores and The number of days required for learning(data assurance this course was studied this semester).

The last line has two integers t, p($1 \leq t \leq 500, 0 \leq p \leq 3$) represents the number of review days that student Z has and the upper limit of the number of failed courses in this semester.

Output

For each test case, output a line with a positive integer representing the maximum score that student Z can obtain in the case of meeting the conditions .If he must be talked to by the professor, output -1。

Sample Input

```
1
3
mathematics physics signals
20
physics 10 1
physics 10 1
physics 10 1
physics 10 1
physics 10 1
physics 10 1
physics 10 1
mathematics 10 1
mathematics 10 1
mathematics 10 1
mathematics 10 1
mathematics 10 1
mathematics 10 1
mathematics 10 1
signals 10 1
signals 10 1
signals 10 1
signals 10 1
signals 10 1
signals 10 2
19 1
```

Sample Output

```
190
```

1009 I love triples

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 256 megabytes

Now Mr.I has an array a consisting of n integers.

He now wants to know how many triples (i, j, k) satisfy $i < j < k$ and $a_i * a_j * a_k$ is a square number .

The definition of a square number is a number that can be expressed as the product of two identical integers.

For example, 1, 4, 9, 16, 25, and 36 are square numbers, but 2, 3, and 6 are not.

Input

The first line contains an integer $T(T \leq 6)$. Then T test cases follow.

Each test case contains two lines.

The first one contains an integer $n(1 \leq n \leq 10^5)$ — length of the array a.

The second one contains n integers $a_1, a_2, \ldots, a_n(1 \leq a_i \leq 10^5)$

Output

For each test case, output a single line containing a single integer — the number of triples that meet the conditions.

Sample Input

```
1
6
1 2 4 8 16 32
```

Sample Output

```
10
```

1010 I love permutation

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 64 megabytes

Mr.I has a positive integer a and an odd prime number P, satisfying $a < P$.

Mr.I creates a sequence $b_x = ax(modP)$ of length $P-1$,where$1 \leq x \leq P-1$。

Now Mr.I wants to know how many reversed pairs there are in this sequence.

Since the answer may be very large, you only need to output the value of the answer pair modulo 2.

The definition of a reverse pair is a two-tuple (i, j) that satisfies $i < j$ and $b_i > b_j$.

Input

The first line contains an integer $T(T \leq 10^5)$. Then T test cases follow.

Each test case contains two integers $a, P(1 \leq a < P \leq 10^{18})$.

Output

For each test case, output a single line contain the answer for the test case.

Sample Input

```
4
2 7
3 7
4 7
5 7
```

Sample Output

```
0
1
0
1
```

1011 I love max and multiply

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 64 megabytes

Mr.I has two sequence A_i and B_i of length n,$(0 \leq i \leq n-1)$.

Define an array C of length n, where $C_k = max\{A_i B_j\}$, satisfying $(i\&j \geq k)$.

$\&$ is the button under binary Bitwise AND operation.

Please calculate the value of $\sum_{i=0}^{n-1} C_i$, modulo 998244353.

Input

The first line contains an integer T . Then T test cases follow.

Each test case contains three lines.

The first one contains an integer $n(1 \leq n \leq 2^{18})$ — length of the array a.

The second one contains n integers $a_0, a_2, \ldots, a_{n-1}(|a_i| \leq 10^9)$

The third one contains n integers $b_0, b_2, \ldots, b_{n-1}(|b_i| \leq 10^9)$

$\sum n \leq 2^{19}$

Output

For each test case, output a single integer ans,where $ans = \sum_{i=0}^{n-1} C_i$ modulo 998244353.

Sample Input

```
1
4
9 1 4 1
5 4 1 1
```

Sample Output

```
54
```

1012 I love 114514

> Input file: standard input
>
> Output file: standard output
>
> Time limit: 1 seconds
>
> Memory limit: 64 megabytes

Mr.I loves 114514 very much.

Now Mr.I has a string, if this "114514" is a substring of this string, then Xiaoi will also love this string.

Please judge whether Xiaoi loves this string, if Xiaoi loves this string, output "AAAAAA", otherwise output "Abuchulaile".

Input

The first line contains an integer $T(T \leq 10)$. Then T test cases follow.

Each test case contains a string $s(1 \leq |S| \leq 10^5)$.

Output

For each test case, output a single line contain the answer for the test case.

Sample Input

```
2
114514
1919810
```

Sample Output

```
AAAAAA
Abuchulaile
```