

Local Programming Contest

2021 Sep.

*The problems are originally from SPOJ.

A - Problem A [SPOJ - FACTCG2](#)

The task in this problem is to write a number in a multiplication of prime numbers separated by “ x ”. You need to put the number 1 in this multiplication.

Input

The input consists of several lines.

Each line consists of one integer N ($1 \leq N \leq 10^7$).

Output

For each line you need to output the factorization separated by “ x ” and including 1.

Sample

Input

```
1
2
4
8
```

Output

```
1
1 x 2
1 x 2 x 2
1 x 2 x 2 x 2
```

B - Problem B [SPOJ - CUBEFR](#)

A cube free number is a number whose none of the divisor is a cube number (A cube number is a cube of a integer like $8 (2 * 2 * 2)$, $27 (3 * 3 * 3)$). So cube free numbers are 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 17, 18 etc (we will consider 1 as cube free). 8, 16, 24, 27, 32 etc are not cube free number. So the position of 1 among the cube free numbers is 1, position of 2 is 2, 3 is 3 and position of 10 is 9. Given a positive number you have to say if its a cube free number and if yes then tell its position among cube free numbers.

Input

First line of the test case will be the number of test case $T (1 \leq T \leq 100000)$. Then T lines follows. On each line you will find a integer number $n (1 \leq n \leq 1000000)$.

Output

For each input line, print a line containing "Case I: ", where I is the test case number. Then if it is not a cube free number then print "Not Cube Free". Otherwise print its position among the cube free numbers.

Example

Sample Input:

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

Sample Output:

```
Case 1: 1
Case 2: 2
Case 3: 3
Case 4: 4
```

C - Problem C [SPOJ - ANTP](#)

Mr. Ant has 3 boxes and the infinite number of marbles. Now he wants to know the number of ways he can put marbles in these three boxes when the following conditions hold.

- 1) Each box must contain at least 1 marble.
- 2) The summation of marbles of the 3 boxes must be in between X and Y inclusive.

Now you are given X and Y. You have to find the number of ways Mr. Ant can put marbles in the 3 boxes.

Input

Input starts with an integer T, denoting the number of test cases. Each test case contains two integers X and Y.

Constraints

$$1 \leq T \leq 1000000$$

$$1 \leq X \leq Y \leq 1000000$$

Output

For each test case, print the required answer modulo **100000007**.

Sample Input	Sample Output
1	9
4 5	

Explanation for the first test case

1	1	2
---	---	---

Way 01

1	1	3
---	---	---

Way 02

1	2	1
---	---	---

Way 03

1	3	1
---	---	---

Way 04

2	1	1
---	---	---

Way 05

3	1	1
---	---	---

Way 06

1	2	2
---	---	---

Way 07

2	1	2
---	---	---

Way 08

2	2	1
---	---	---

Way 09

D - Problem D

SPOJ - SMPCIRC [↗](#)

Given two circles: O_1 with the center $o_1 = (x_{o_1}, y_{o_1})$ and a radius r_1 and O_2 with the center $o_2 = (x_{o_2}, y_{o_2})$ and radius r_2 , please compute if O_1 is inside O_2 or if O_2 is inside O_1 .

Input description

First $t < 1000$, the number of test cases. In each of the following t lines, 6 integers: $x_{o_1} y_{o_1} r_1 x_{o_2} y_{o_2} r_2$.
Where $0 \leq x_{o_1}, y_{o_1}, x_{o_2}, y_{o_2} \leq 10000$ and $0 < r_1, r_2 \leq 10000$.

Output description

For each test case print one character:

I, if O_1 is inside O_2 (or if O_2 is inside O_1),

E, if O_1 is internally tangent to O_2 (or if O_2 is internally tangent to O_1),

O, in other cases.

Example

Input:

```
2
103 104 5 100 100 10
103 104 10 100 100 10
```

Output:

```
E
O
```


E - Problem E [SPOJ - QTREE3](#)

[English](#)

[Vietnamese](#)

You are given a tree (an acyclic undirected connected graph) with N nodes. The tree nodes are numbered from 1 to N . In the start, the color of any node in the tree is white.

We will ask you to perform some instructions of the following form:

- $0\ i$: change the color of the i -th node (from white to black, or from black to white);
or
- $1\ v$: ask for the id of the first black node on the path from node 1 to node v . if it doesn't exist, you may return -1 as its result.

Input

In the first line there are two integers N and Q .

In the next $N-1$ lines describe the edges in the tree: a line with two integers $a\ b$ denotes an edge between a and b .

The next Q lines contain instructions " $0\ i$ " or " $1\ v$ " ($1 \leq i, v \leq N$).

Output

For each " $1\ v$ " operation, write one integer representing its result.

Example

Input :

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

```
0 8
1 6
1 7
0 2
1 9
0 2
1 9
```

Output :

```
-1
8
-1
2
-1
```

Constraints & Limits

There are 12 real input files.

For 1/3 of the test cases, $N=5000$, $Q=400000$.

For 1/3 of the test cases, $N=10000$, $Q=300000$.

For 1/3 of the test cases, $N=100000$, $Q=100000$.

F - Problem F [SPOJ - SUBSUMS](#)

Given a sequence of N ($1 \leq N \leq 34$) numbers S_1, \dots, S_N ($-20,000,000 \leq S_i \leq 20,000,000$), determine how many subsets of S (including the empty one) have a sum between A and B ($-500,000,000 \leq A \leq B \leq 500,000,000$), inclusive.

Input

The first line of standard input contains the three integers N , A , and B . The following N lines contain S_1 through S_N , in order.

Output

Print a single integer to standard output representing the number of subsets satisfying the above property. Note that the answer may overflow a 32-bit integer.

Example

Input:

```
3 -1 2
1
-2
3
```

Output:

```
5
```

The following 5 subsets have a sum between -1 and 2:

- $0 = 0$ (the empty subset)
- $1 = 1$
- $1 + (-2) = -1$
- $-2 + 3 = 1$
- $1 + (-2) + 3 = 2$

G - Problem G [SPOJ - DISQUERY](#)

[English](#)

[Vietnamese](#)

The traffic network in a country consists of N cities (labeled with integers from 1 to N) and $N-1$ roads connecting the cities. There is a unique path between each pair of different cities, and we know the exact length of each road.

Write a program that will, for each of the K given pairs of cities, find the length of the shortest and the length of the longest road on the path between the two cities.

Input

The first line of input contains an integer N , $2 \leq N \leq 100\,000$. Each of the following $N-1$ lines contains three integers A , B and C meaning that there is a road of length C between city A and city B .

The length of each road will be a positive integer less than or equal to $1\,000\,000$.

The next line contains an integer K , $1 \leq K \leq 100\,000$. Each of the following K lines contains two different integers D and E – the labels of the two cities constituting one query.

Output

Each of the K lines of output should contain two integers – the lengths from the task description for the corresponding pair of the cities.

Sample

input :

```
5
2 3 100
4 3 200
1 5 150
1 3 50
3
2 4
3 5
```

1 2

output:

100 200

50 150

50 100

input:

7

3 6 4

1 7 1

1 3 2

1 2 6

2 5 4

2 4 4

5

6 4

7 6

1 2

1 3

3 5

output:

2 6

1 4

6 6

2 2

2 6

H - Problem H [SPOJ - TRVCOST](#)

The government of **Spoj_land** has selected number of locations in the city for road construction and numbered those locations as 0,1,2,3,.....500.

Now, they want to construct roads between various pairs of location(say **A** and **B**) and have fixed the cost for travelling between those pair of locations from either end as **W** unit.

Now , Rohit being a curious boy wants to find the minimum cost for travelling from location **U** (source) to **Q** number of other locations (destination).

Input

First line contains **N** ,the number of roads that government constructed.

Next **N** line contains three integers **A** ,**B**, and **W**.

A and **B** represent the locations between which the road was constructed and **W** is the fixed cost for travelling from **A** to **B** or from **B** to **A**.

Next line contains an integer **U** from where Rohit wants to travel to other locations.

Next line contain **Q** , the number of queries (finding cost) that he wants to perform.

Next **Q** lines contain an integer **V** (destination) for which minimum cost is to be found **from U**.

Output

Print the required answer in each line.

If he can't travel from location **U** to **V** by any means then, print '**NO PATH**' without quotes.

Example

Input :

7

```
0 1 4
0 3 8
1 4 1
1 2 2
4 2 3
2 5 3
3 4 2
0
4
1
4
5
7
```

Output:

```
4
5
9
NO PATH
```

Constraints:

$1 \leq N \leq 500$

$0 \leq A, B \leq 500$

$1 \leq W \leq 100$

$0 \leq U, V \leq 500$

$1 \leq Q \leq 500$

Explanation:

Query #1.

0->1: cost =4

Query #2.

0->4= 0->1->4 cost=4+1=5

Query #3.

0->5= 0->1->2->5 cost=4+2+3=9

截图(Alt + A)

I - Problem I

SPOJ - MTRIAREA [↗](#)

[English](#)

[Vietnamese](#)

Given n distinct points on a plane, your task is to find the triangle that have the maximum area, whose vertices are from the given points.

Input

The input consists of several test cases. The first line of each test case contains an integer n , indicating the number of points on the plane. Each of the following n lines contains two integer x_i and y_i , indicating the i th points. The last line of the input is an integer -1 , indicating the end of input, which should not be processed. You may assume that $1 \leq n \leq 50000$ and $-10^4 \leq x_i, y_i \leq 10^4$ for all $i = 1 \dots n$.

Sample Input

```
3
3 4
2 6
2 7
5
2 6
3 9
2 0
8 0
6 5
-1
```

Output

For each test case, print a line containing the maximum area, which contains two digits after the decimal point. You may assume that there is always an answer which is greater than zero.