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<=N<=500

0<=A,B<=500

1<=W<=100

0<=U,V<=500

1<=Q<=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
```

```
Query #4.
```

```
0->7= no path exist between 0 and 7
```