Trip (Easy Version)

Time Limit: 1 Second
Memory Limit: 2048 MB

You just arrived in a new country to start your exciting trip! The country consists of several cities connected by planes (P), ferries (F), trains (T), and coaches (C). You plan to travel from the current city a to another city b, where you will meet an old friend. However, you soon discovered that planning this trip might become quite annoying because

- Flight tickets in this country are quite expensive, and you can only afford taking k flights.
- You have seasickness so you cannot travel by ferry for two continuous legs.
- You can buy a single ticket for multiple legs only if the legs are provided by the same company, and the destination of each leg is the origin of the next leg.

Booking tickets is really tiring, so you want to know how many tickets you will need to buy. With the given constraints, find out the minimum number of tickets you need in order to arrive in city b. It is guaranteed that at least one such route exists.

Input

The first line of input contains a single integer m ($1 \leq m \leq 1000$) - the number of routes between cities.

The second line contains two strings a and b containing only letters and numbers, followed by an integer k ($0 \leq k \leq 10$) - denoting the current city, the target city, and the maximum number of flight tickets you can buy.

The next m lines describe the routes. Each line is in the following format:

```
T   company   x   y
```

where `T` is one of P (plane), F (ferry), T (train), or C (coach), denoting the type of the route. `company` is a string denoting the company providing the service, `x` and `y` are two strings indicating the two ends of the route (you can travel in either way). It is guaranteed that `x` and `y` are different. All strings only contain letters and numbers.

Output

Output a single integer denoting the number of tickets you need to buy to travel from city a to city b.

Sample Inputs

```
6
Champaign Orlando 2
C PeoriaCharter Champaign Chicago
P UnitedAirlines Chicago Dallas
P DeltaAirlines Dallas Atlanta
P UnitedAirlines Atlanta Orlando
T Amtrak Atlanta Miami
T Amtrak Miami Orlando
```

Sample Outputs

```
4
```