

3235 ACM: Vice City

“Tommy, there will be a programming contest here in Vice City. One of the coaches has stolen a copy of the problem set. The chief judge wants it back. Take out the coach guy at his hotel and return the problems back. The address is taped under the phone. Do it now!”

Not a tough job for you, Tommy Vercetti! Getting the mission at the pay phone, you must head off the coach at WK Charriot Hotel before he leaves. You have to get there fast! Get there very fast indeed! Unfortunately, the vehicle you start with may not run fast enough. But there are some fixed locations in Vice City at which you can find certain vehicles, like Diaz’s Mansion where you can find an Infernus. This way, you may change your vehicle on your way to hotel several times. For example, in the first sample input, you ride from ‘PayPhone’ to ‘CarShowRoom’ on a ‘PCJ600’ and drive the rest of the path in a ‘HotRingRacer’. Don’t forget that it takes one minute each time you change your vehicle.

You are given the names of these locations in the city and the distances between each pair. At each location you can find a certain vehicle anytime you get there. Knowing the top speed of each vehicle, you want to find out the minimum time in which you can reach the hotel. For the sake of simplicity, assume that you always drive at top speed of your vehicle.

Input

The first line of the input contains a single integer t ($1 \leq t \leq 20$) which is the number of test cases in the input. Each test case has three parts. The first part consists of m lines ($1 \leq m \leq 100$) of the form ‘*vehicle speed*’ where *vehicle* is the unique name of a vehicle and *speed* is a positive integer giving the top speed of the vehicle measured in Km/h.

The next part of the test case identifies the locations in the city and is separated from the first part by exactly one blank line. It consists of n lines ($2 \leq n \leq 500$) of the form ‘*location vehicle*’ where *location* is the unique name of a location in the city and *vehicle* is the name of the vehicle available in that location. The list of locations always includes the starting location ‘PayPhone’ and the destination ‘WKCharriot’.

The third part of the test case identifies the roads between locations and is separated from the previous part by exactly one blank line. It consists of several lines of the form ‘*loc₁ loc₂ distance*’ indicating there is a (two-way) road of length *distance* between the locations *loc₁* and *loc₂*. Distances are expressed in kilometers and are positive integers. The test case is terminated by a line containing a single asterisk character (*).

All names (for vehicles and locations) are strings of at most 100 letters and digits with no space characters and are considered case sensitive. Items in an input line are separated by one or more space characters. Also, there may be arbitrary leading or trailing blanks except in empty lines used as separators.

Output

For each test case, there is one line in the output containing the minimum time (in minutes) you need to travel from ‘PayPhone’ to ‘WKCharriot’, or the word ‘UNREACHABLE’ if the destination is unreachable from the starting point. Print the results as numbers with exactly three decimal digits after decimal point. That is, the possible decimal digits after the third one should be ignored, and if there are less than three digits after decimal point, zero digits should be printed for missing digits.

Sample Input

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2Infernus      280
Cheetah        285
PCJ600         250
Stallion       180
HotRingRacer  300

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```

Mansion        Infernus
CarShowRoom    HotRingRacer
VicePort       Cheetah
NorthPointMall Infernus
PayPhone       PCJ600
WKCharriot     Stallion

```

```

PayPhone       CarShowRoom    10
PayPhone       VicePort          15
VicePort       WKCharriot       20
CarShowRoom    Mansion           15
Mansion        WKCharriot       15
Mansion        NorthPointMall   5
NorthPointMall WKCharriot       5

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*

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Caddy          80
MrWhoopie     60
Stretch       120
CubanHermes  160
Voodoo        170

```

```

CherryPoppy   MrWhoopie
Mansion       Stretch
PayPhone      CubanHermes
LittleHaiti   Voodoo
WKCharriot    Caddy

```

```

PayPhone       CherryPoppy    10
CherryPoppy    LittleHaiti    15
Mansion        WKCharriot    20

```

*

Sample Output

```

8.400
UNREACHABLE

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