DMPG '15 S6 - Apples to Oranges

Time limit: 1.4s   **Memory limit:** 256M

They say you cannot compare apples to oranges, but you actually can! In fact, by using money as a medium of exchange, we can compare anything in terms of value. Sun has a single apple. Being the incredibly talented person he is, he visits a variety of markets with different rates of exchange for his apple. His goal is to obtain infinite apples, and therefore total control of the fruit market.

Suppose the rates of exchange are:

- 1 orange → 0.5 apples
- 1 apple → 2 oranges

Then it is easy to see that it is in fact impossible to obtain more than one apple through exchanges.

However, if the exchange is:

- 1 orange → 2 apples
- 1 apple → 0.5 oranges
- 1 apple → 1 grape
- 1 grape → 1 orange

Then Sun can exchange his original apple for a grape, a grape for an orange, and an orange for 2 apples! He can then repeat this to get infinite apples.
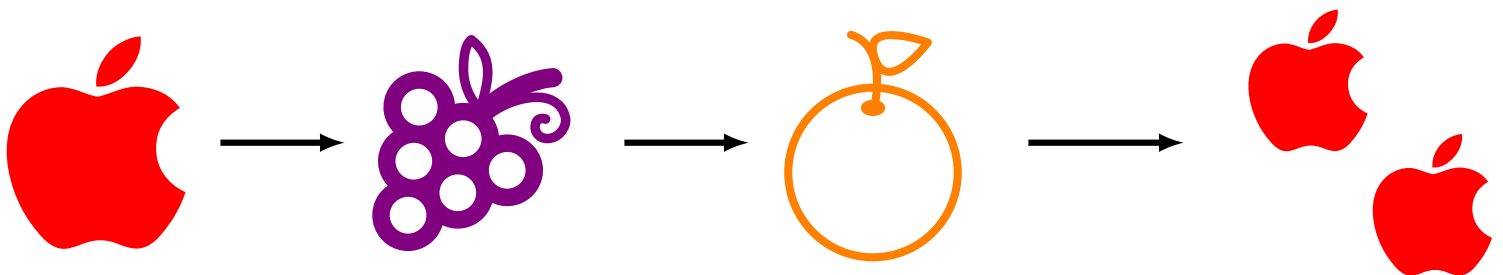
The next trivial step is to note that he can now dominate and control the entire apple market.

Your goal is to find out if Sun's fruit market domination scheme is feasible.

Input Specification

The first line of input will contain two space-separated integers N $(2 \leq N \leq 500)$, the number of different types of fruit, and M $(2 \leq M \leq 4\,000)$, the number of exchange rates.

The next N lines will each contain the name of a fruit, no longer than 25 alphanumeric characters long. Note that Sun starts with one apple, so APPLES will always be a type of fruit given.

Finally, the last M lines will contain an exchange in the space-separated form of a, b, c, indicating that fruit a may be exchanged for c $(0.0 < c \leq 20\,000\,000.0)$ units of fruit b.

Note that c will be given to 10 decimal places.

Output Specification

Output YA on a single line if Sun can get infinite apples, or NAW if he can not.

Sample Input

```
3 4
APPLES
ORANGE
GRAPE
ORANGE APPLES 2.0000000000
APPLES ORANGE 0.5000000000
APPLES GRAPE 1.0000000000
GRAPE ORANGE 0.5000000000
```

Sample Output

```
NAW
```