Ticket

There are n people at the railway station, and each one wants to buy a ticket to go to one of k different destinations. The n people are in a queue.

There are m ticket windows from which tickets can be purchased. The n people will be distributed in the windows such that *the order is maintained*. In other words, suppose we number the people 1 to n from front to back. If person i and person j go to the same window and $i < j$, then person i should still be ahead of person j in the window.

Each ticketing window has an offer. If a person in the queue shares the same destination as the person immediately in front of him/her, a 20% reduction in the ticket price is offered to him/her.

For example, suppose there are 3 people in the queue for a single ticket window, all with the same destination which costs 10 bucks. Then the first person in the queue pays 10 bucks, and the 2nd and 3rd persons get a discount of 20% on 10 bucks, so they end up paying 8 bucks each instead of 10 bucks.

Try to distribute the n people across the m windows such that the total cost S paid by all n people is minimized.

Input Format

The first line contains 3 integers:

- n is the number of people
- m is the number of ticket windows
- k is the number of destinations separated by a single space (in the same order)

Then k lines follow. The i^{th} line contains an alphanumeric string place_i and an integer price_i:

- place_i is the i^{th} destination
- price_i is the ticket price for place_i

Then n lines follow. The i^{th} line contains an alphanumeric string destination_i which is the destination of the i^{th} person.

Constraints

- $1 \leq n \leq 500$
- $1 \leq m \leq 10$
- $1 \leq k \leq 100$
- The k available destinations have nonempty and distinct names.
- Each person's destination appears in the list of k available destinations.
- $0 \leq \text{price}_i \leq 100$

Output Format

Output $n + 1$ lines. The first line contains S, the total cost that is to be minimized. In the i^{th} following line, print the ticket window which the i^{th} person goes to. The windows are indexed 1 to m. There may be multiple ways to distribute the people among the windows such that the total cost is minimized; any one will be accepted.

The answer S will be accepted if it is within an error of 10^{-3} of the true answer.

Sample Input

```
5 2 3
CALIFORNIA 10
HAWAII 8
NEWYORK 12
NEWYORK
NEWYORK
CALIFORNIA
NEWYORK
HAWAII
```

Sample Output

```
49.2
1
1
2
1
1
```

Explanation

At the beginning, all the people are in the same queue, and will go to the ticket windows one by one in the initial order.

- $\{1, 2, 4, 5\}$ will buy ticket in the first window.
- $\{3\}$ will buy ticket in the second window.

In the first ticket window, #1 will pay 12 bucks to go to `NEWYORK`, and #2 and #4 have the same destination with the person in front of them, so they will get 20% off, and will pay 9.6 bucks each. #5 has a different destination, so it will cost him 8 bucks to go to `HAWAII`.

In the second ticket window, #3 will pay 10 bucks to go to `CALIFORNIA`.