

Ticket

There are n people at the Railway Station who are to buy tickets to go to k different destinations. There are m ticket windows from which the ticket can be purchased. Each of the ticketing counter has an offer. If a person in the queue shares the same destination as the person in front of him/her, a 20% reduction in the ticket price is offered to him/her i.e.,

Say there are 3 people in the queue all with the same destination which costs 10 bucks, the first person in the queue pays 10 bucks. The 2nd and 3rd person get a discount of 20% on 10 bucks. So, they end up paying 8 bucks each instead of 10 bucks.

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

Say if the queue has 5 people, 1,2,3,4,5. During distributing people among various queues, 1 goes before 2 and 2 goes before 3. The order is maintained.

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)

k lines follow. Each line has a
 $place_i$ (alphanumeric) is the i^{th} destination
 $price_i$ is the ticket price to reach $place_i$

n lines follow each line containing (alphanumeric) string
 $destination_i$ is the destination of the i^{th} person.

$n\ m\ k$
 $place_1\ price_1$
 $place_2\ price_2$
...
 $place_k\ price_k$
 $destination_1$
 $destination_2$
...
 $destination_n$

Output Format

Output contains $n+1$ lines. The first line contains S , the total cost that is to be minimized. N lines follow each line containing the queue to which i^{th} person is going, if multiple answer exists, output any.

```
S
q1
q2
. .
qn
```

$1 \leq q_i \leq m$ and $1 \leq i \leq n$

Constaint

$1 \leq n \leq 500$

$1 \leq m \leq 10$

$1 \leq k \leq 100$

$0 \leq price_i \leq 100$

$n, m, k, price_i$ will be integers.

S may not be integer, error of upto 10^{-3} is allowed.

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 window one by one with 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 cost 12 bucks to go to NEWYORK, and #2 and #4 have previous customer with same destination, so they will get 20% off, will need $12 * (1 - 20\%) * 2 = 19.2$ bucks, and #5 has different destination with #4, so it will cost him 8 bucks to go to HAWAII.

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

Total cost = $12 + 19.2 + 8 + 10 = 49.2$.