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 i go to the same window and i < j, then person i should still be ahead of person i 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
- $oldsymbol{\cdot}$ 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 :

- ullet \mathbf{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 $\mathrm{destination}_i$ which is the destination of the i^{th} person.

Constraints

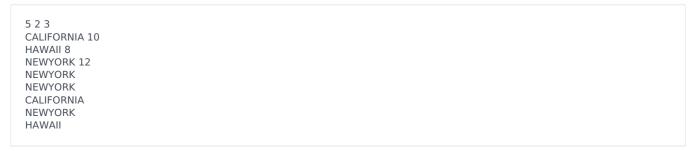
- $1 \le n \le 500$
- $1 \le m \le 10$
- $1 \le k \le 100$
- ullet The $oldsymbol{k}$ available destinations have nonempty and distinct names.
- ullet Each person's destination appears in the list of $oldsymbol{k}$ available destinations.
- $0 \leq \operatorname{price}_i \leq 100$

Output Format

Output n+1 lines. The first line contains S, the total cost that is to be minimized. In the $i^{\rm th}$ following line, print the ticket window which the $i^{\rm th}$ 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



Sample Output

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49.2
1
1
2
1
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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 <code>NEWYORK</code>, 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 <code>HAWAII</code>.

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