Wanderlust

You are a traveller who wishes to visit different destinations in a sequence. There are N destinations located in a row. Each destination has an associated number t_i denoting its tourism quotient.

Further, for each destination i, you have a list of travel packages $l_i = \{P_1^i, P_2^i, \ldots, P_{k_i}^i\}$ available, where k_i is the number of travel packages for destination i. A travel package consists of package name and the cost of the package. As a traveller, you aim to visit all the destinations in the given sequence by selecting exactly one of the available packages.

You respect the tourism quotients of the destinations and thus plan to follow the following constraints. If two adjacent destinations have different tourism quotient, then the money you spend on destination with higher tourism quotient should be more than what you spend on destination with lower tourism quotient. If two adjacent destinations have same tourism quotient, then the relative amount you spend on them does not matter.

Given the number of destinations, tourism quotient of the destinations (in the order you will visit them) and the travel packages available for each destination, find the minimum cost sequence of travel packages you would buy.

Your code should make use of *Package* and *Destination* classes, as mentioned in detail in the PDF.

Input Format

First line contain an integer N, the number of destinations.

Second line contains N space separated integers denoting the tourism quotients $\{t_1, t_2, \ldots, t_N\}$ of the N destinations.

Following N lines contain the travel packages available for the N destinations. Format of each line is:
$< P_{1,name}^i \ P_{1,cost}^i \ P_{2,name}^i \ P_{2,cost}^i \ \cdots \ P_{k_i,name}^i \ P_{k_i,cost}^i >$

Constraints

$1 \le N \le 10^6$.

Tourism quotients l_i are integers, $1 \le l_i \le 10^6$, $\forall i$.

The number of travel packages for a destination, $1 \le k_i \le 10^5$, $\forall i$.

Name of travel packages are strings with length < 50.

Cost of travel packages are integers, $1 \le P_{j,cost}^i \le 10^8$, $\forall i, j$.

Output Format

If it is impossible to find the sequence of travel packages which satisfy the given constraints, print -1.

Otherwise, in first line print the minimum cost you will have to spend on your travel. In second line print the sequence of N (space-separated) names of travel packages you choose.

Sample Input 0

```
4
1 2 3 1
package-11 1 package-12 2 package-13 3 package-14 4
package-21 1 package-22 2 package-23 3 package-24 4
package-31 1 package-32 2 package-33 3 package-34 4
package-41 1 package-42 2 package-43 3 package-44 4
```

Sample Output 0

```
7
package-11 package-22 package-33 package-41
```

Sample Input 1

```
6
1 5 5 16 9 7
package-11 10 package-12 20 package-13 30 package-14 40
package-21 10 package-22 20 package-23 30
package-31 30 package-32 40
package-41 10 package-42 20 package-43 30 package-44 40
package-51 10 package-52 20 package-53 30 package-54 40
package-61 10 package-62 40
```

Sample Output 1

```
130
package-11 package-22 package-31 package-44 package-52 package-61
```