

Social Networks Resistance

Problem code: HS11SNI

Recently, Julia and Robert have become very interested in social networks and they often discuss issues related to the subject.

- "Do you trust recommendations given by people you do not know personally?" - asked Robert.

- "No."

- "But this is not the case when the source of the recommendation is someone you know?"

- "Indeed, that's different." - said Julia

- "Suppose now, that someone would like to influence the whole social network. If in the given network exists one member, say A , who is a friend of everyone else, then it is enough to control A 's account to influence the whole network."

- "Oh, do you suggest that whether the network is resistant to such attacks or not depends on its structure?"

- Exactly!

A few hours later they both agreed on the following model. There is a social network of n members with a symmetric friendship relation (that is if A is a friend of B then also B must be a friend of A). In addition, with each member A there is associated a positive integer $W(A)$. We consider $W(A)$ as the cost of taking over control of A 's account.

Now, they are looking for a subset of members D , such that every member of the network is in D or is a friend of someone in D , and the sum of $W(A)$ for all A in D is as small as possible. You are asked to help them to solve the problem!

Task: Write a program which is able to find such subsets efficiently.

Input

Given: n - the number of social network members and in the next n lines:

$name_i$ $W(name_i)$ - the name of the i -th member (a sequence of at most 15 characters) and the corresponding integer $1 \leq W(name_i) \leq 250$.

Next, m - the number of friendship relations, and in each of the following m lines

$name_x$ $name_y$ - the names of two linked members, $name_x \neq name_y$.

Output

In the first line print d , the number of members in D and in the following d lines: $name_i$ - the name of the i -th member in D . In the last line print one integer - the sum of $W(A)$ for all A in D .

Scoring

The score awarded to your program for a given test is computed as S/S_d , where S is the sum of $W(A)$ for all A in the network, while S_d is the sum of $W(A)$ for all A in D . The overall score of the program is the sum of scores obtained for correctly solved tests.

The number of points given in the ranking is scaled so that it is equal to 10 for the registered contestant whose solution has the highest score, and proportionally less for all solutions with lower scores.

Example

Input :

```
5
Robert 12
Julia 23
Adam 1
Carol 10
Daniel 4
5
Robert Julia
Robert Carol
Adam Robert
Daniel Adam
Daniel Julia
```

Output :

```
2
Daniel
Carol
14
```

Scoring:

The exemplary solution will score 50/14 points.

Input data sizes

t	n	m	l
1	100	99	2s
2	100	101	2s
3	100	105	2s
4	100	114	2s
5	100	130	2s
6	300	299	5s
7	300	302	5s
8	300	311	5s
9	300	339	5s
10	300	404	5s

t - testcase number
n - the number of social network members
m - the number of friendship relations
l - time limit

Please note

- Till the last week of the series, all submitted codes will be visible to all users and tested on temporary data sets only.
 - For the last week of the series, submissions will be visible to the submitting contestant, only, and tested on the full set of test cases. (All earlier solutions will be rejudged).
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Added by: Łukasz Kuszner

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Time limit: 2s-5s

Source limit:50000B

Languages: All except: ICK

Resource: High School Programming League