

# Social Networks Resistance II

Recently, Julia and Robert have made a series of experiments with their Network Resistance model and have discovered that a recommendation given by only one friend is often too weak to achieve real influence.

Thus, having the previous model with 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  $A$ ) and a positive integer  $W(A)$  associated with each member  $A$ , they are looking for a different subset of members.

Now the requested subset  $D'$  should have the property that every member of the network either is in  $D'$ , or has at least half of his/her friends in  $D'$ . The sum of  $W(A)$  for all  $A$  in  $D'$  should be as small as possible.

**Task:** Write a program 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  
Adam  
Robert  
13

**Scoring:**

The exemplary solution will score 50/13 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).