

3348 Forest Trek

Captain Picard and the Enterprise crew is under a mission to study an interesting culture in a distant planet called Ba'ku. They decide to build an invisible observation station where they can watch and record how Ba'ku people live, without revealing the crew's presence or in any way disturbing the Ba'ku people.

The Ba'ku people live on a continent almost fully covered by the trees and completely surrounded by the ocean. There are populated villages, connected by trails. The trail system covers the entire continent and divides the continent into many forests. It is one of these forests that Picard and his crew will choose to build the station in. According to past experience and some correlation study, the level of exploration by the inhabitants is directly proportional to the collective population of the surrounding villages, and inversely proportional to the area of the forest. Please help Picard find the forest which is least explored by the Ba'ku inhabitants.

Input

The input file consists of several test cases. Each test case begins with an integer V , $3 \leq V \leq 100$, the number of villages on the continent. Each of the next V lines contains 4 entries separated by spaces — the village name, the village population, and its position in x, y coordinates. The next line contains an integer E , $3 \leq E \leq 4950$, the number of trails connecting villages. Each of the next E lines contains 2 village names separated by spaces. The last test case is followed by a line consisting of a single '0'.

Every real number t in the input file has at most 3 digits after the decimal point and $-999.999 \leq t \leq 999.999$. The names of the villages are in all capitals, and the length of a name is between 1 and 8, inclusive.

The villages and the trails do not appear in any particular order in the input file. A trail between two villages, say 'ALF' and 'BET', will appear only once, either as 'ALF BET' or as 'BET ALF'. Trails do not meet each other except at the villages. Every village is directly or indirectly connected to every other village.

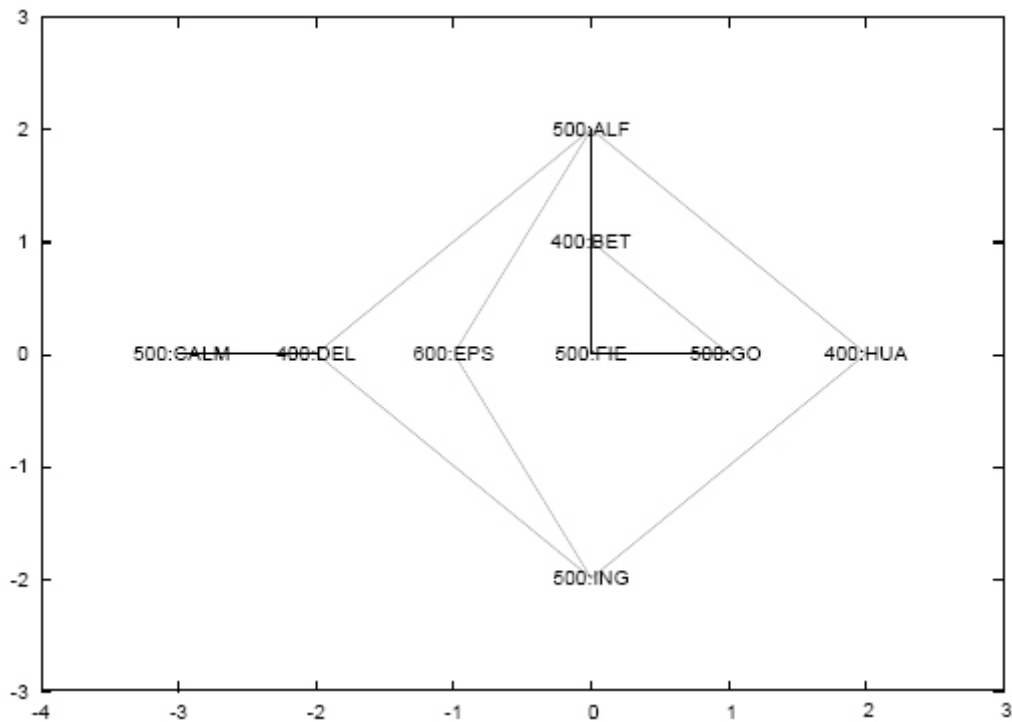
In computing the area of the forests, the trails are considered as straight line segments, and neither trails nor villages occupy significant areas. Assume that the outer rim of the trail system is built along the coast line.

Output

For each test case, print on one line the smallest population density rounded to 3 decimal places, along with the desired forest denoted by its surrounding villages. For the population, print the trailing 0's after the decimal place as necessary. For the village names, print them in counter-clockwise order. Suppose the desired forest is surrounded by k villages. Of all k possible output sequences, print the one beginning with the alphabetically first village. If there are more than one such sequences, print the one whose second city has the smallest alphabetical ordering. Thus we choose 'ALF BET ...' over 'ALF EPS ...' in the sample output.

Note: In the sample input there are three forests. We find their surrounding populations, areas, and densities to be the following, and therefore output information describing the second forest. Note that each of ALF and BET only contributes once to the collective population of the second forest.

population	area	density
2000	2.000	1000.000
3400	5.500	618.182
1400	0.500	2800.000



Sample Input

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9
ALF 500 0.000 2.000
BET 400 0.000 1.000
CALM 500 -3.000 0.000
DEL 400 -2.000 0.000
EPS 600 -1.000 0.000
FIE 500 0.000 0.000
GO 500 1.000 0.000
HUA 400 2.000 0.000
ING 500 0.000 -2.000
11
DEL CALM
ING DEL
ING HUA
ING EPS
ALF DEL
ALF HUA
ALF EPS
ALF BET
BET FIE
BET GO
FIE GO
0

```

Sample Output

618.182 ALF BET GO FIE BET ALF EPS ING HUA