

**2004/2005 SOUTHERN CALIFORNIA REGIONAL
ACM INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST**

**Problem 5
Swamp County Vote**

Due to massive confusion on the last County election, the Supervisors appointed a committee to recommend changes in the election process. The committee's first choice was to change to an 'instant runoff' system in which each voter ranks all candidates in a race, specifying 1st, 2nd, 3rd, etc. choices for candidates. This has the advantage of saving the county money, since only one election is required — there is no need for both a primary and a general election. However, focus groups of county voters disliked the idea of having to rank all candidates.

The voter focus groups preferred listing head-to-head contests between every possible pairing of candidates for an office. In this model, for four candidates A, B, C, and D, the ballot lists the following pairings:

A vs. B, A vs. C, A vs. D
B vs. C, B vs. D
C vs. D

The voter marks his/her preference for each of these 'forced choice' scenarios.

This model rapidly becomes unwieldy as the race grows beyond four candidates. A five-candidate race would have ten head-to-head pairings. Therefore, if more than four candidates qualify for a race, a primary election will be held in which the top four candidates by plurality vote will advance to the general election. The resulting head-to-head general election will not exceed six pairings.

In the order they are to be applied, the rules for winning are:

- 1 If a candidate beats all opponents, that candidate wins.
- 2 Add up the total votes for a candidate in all the head-to-head races. Drop the candidate with the fewest votes. If there is a tie, remove all candidates with that total. If there are any candidates remaining, remove the contests not involving them and start over with step 1.
- 3 Declare a tie, the winner will be decided by a card game.

Input

Input is a series of races terminated by end-of-file. Each race starts with the name of the office, an alphanumeric string on 1 line. The next line will be the votes for each candidate in that race. There are three possible formats: 1, 3, or 6 pairs of numbers. Each number is separated by a blank. Each line will be at most 80 characters long.

n_{12} n_{21}
 n_{12} n_{21} n_{13} n_{31} n_{23} n_{32}
 n_{12} n_{21} n_{13} n_{31} n_{14} n_{41} n_{23} n_{32} n_{24} n_{42} n_{34} n_{43}

Where n_{ij} is the number of votes for candidate i against candidate j in that head-to-head contest.

Output

Print two lines for each contest. Print the name of the office on first line. Print the candidate number of the winner on the second line. If there is a tie, print the candidate numbers involved in the tie, sorted by candidate number (lowest first) and separated by one blank.

Problem 5
Swamp County Vote (continued)

Sample Input

```
frog catcher
100 50 100 50 50 100 100 40 100 45 100 50
gator catcher
445 445 445 445 445 445 445 445 445 445 445 445
pond manager
12287 13876
chairtoad
127 99 54 67 184 157
```

Output for the Sample Input

```
frog catcher
1
gator catcher
1 2 3 4
pond manager
2
chairtoad
2
```