



## Problem 1

### PC<sup>3</sup>

PC<sup>3</sup> is intended as a postprocessor for PC<sup>2</sup>, which is popular with ACMers, to allow for an alternative way of scoring to be used for our local contest. After a local guru has written a script for extracting necessary information from the PC<sup>2</sup> databases in the following format:

Team number Problem number Time of submission Judgment

we are now left with the job of identifying the winner according to the local scoring rules. The local scoring system, which totally ignores the time of submission, is based on adding the values associated with the solved problems for each team and then declares the team, or teams, with the highest score as winner, or winners. The values associated with each problem are selected by the contest organizer and are made public in advance.

Your task is to write a program to use the data extracted from the PC<sup>2</sup> database and declare the winner, or winners.

#### INPUT:

Input to this problem consists of a sequence of one or more contests. Each contest is described by several lines as follows:

- The first line consists of four integers: the contest label  $N$ ,  $0 < N < 10$ ; the number of problems,  $P$ ,  $0 < P < 12$ ; the number of teams,  $T$ ,  $1 < T < 300$ ; and the number of submissions,  $R$ ,  $0 < R < 1000$ . The integers are separated by a single space.
- The second line contains  $P$  integers, separated by single space, that describe the values for the  $P$  problems given in ascending order of problem numbers. Problems are numbered 1 to  $P$ , and their values will be less than or equal to 100.
- Each of the following  $R$  lines describes the data about one submission, which consists of four (4) integers separated by a single space. The four integers describe team number, problem number, time of submission in milliseconds from start of the five (5) hours contest, and the judge's decision (zero for accepted, and non-zero for rejected).

The input will be terminated by a line that consists of four zeros (0 0 0 0), separated by a single space. This line should not be processed.

OUTPUT:

For each contest, the output is one line that contains the contest label and numbers of the winning team numbers (sorted in increasing order) as shown in the EXAMPLE OUTPUT below.

EXAMPLE INPUT:

```
1 5 20 6
3 3 10 30 100
6 1 16024555 0
3 2 15895629 4
3 2 765629 0
17 4 1120132 0
3 2 1895629 3
6 3 9024555 0
2 5 20 7
3 10 10 30 100
6 1 16024555 0
3 2 15895629 5
3 2 765629 0
17 4 1120139 0
5 4 1895629 0
6 3 9024555 0
10 4 2895629 0
0 0 0 0
```

EXAMPLE OUTPUT:

```
Contest 1 Winner: Team 17
Contest 2 Winner: Team 5 and Team 10 and Team 17
```