3471 - ICPC Strikes Again

Latin America - South America - 2005/2006

International Concrete Projects Company (ICPC) is a construction company which specializes in building houses for the high-end market. The company is the most profitable company in the world due to a very efficient land division method which has been used in its housing development pro jects since last year. Recently there was a chaos at ICPC, because employees refused to work arguing that they did not earn enough. Worried about the loss in profit due to the strike, the company board proposed a new method to calculate the salaries which was luckily accepted by everyone.

The salary of a worker reflects the significance of the tasks that he/she has to perform and is influenced by the way tasks depend on each other.

A task X depends on a task Y if either (i) X depends directly on Y , or (ii) there exists a task T such that X depends directly on T and T depends on Y . Since in ICPC all tasks must be performed, there is no circularity in the task dependence relation. Also, a task may be performed by more than one worker.

A basic significance is associated with each task reflecting its importance (for example, developing the efficient land division method is more important than building the houses themselves). The significance of a task T is then defined as the basic significance of T plus the significance of every task which depends directly on T . Note that if no other tasks depend directly on task T , the basic significance and the significance of T are the same.

The salary of a worker is the sum of the significances of all the tasks he/she performs which do not depend on any other task performed by him/her. In other words, a value equal to the significance of task X will be added to the salary of a worker W that works in task X if there is no other task Y on which X depends, and W works also in Y .

ICPC wants you to help them to determine the salary of each of its employees.

Input

The input contains several test cases.

The first line of a test case contains two integers T and E indicating respectively the number of tasks and the number of employees ($1 \leq T \leq 1000$ and $1 \leq E \leq 1000$). Tasks are numbered from 1 to T and employees from 1 to E .

Then it will come a sequence of lines describing the tasks 1 to T in ascending order. Each task is described by two lines. The first of these lines contains three integers BS , ND and NE , representing respectively the basic significance of the task, the number of tasks that depend directly on it, and the number of employees who perform it ($1 \leq BS \leq 1000$, $0 \leq ND < T$ and $1 \leq NE \leq E$). The second line contains $ND + NE$ integers corresponding first to the ND directly dependent tasks and then the NE employees who perform the task.

The end of input is indicated by $T = E = 0$.

Output

Test cases must be answered in the order that they were presented. For each test case you must print:

- a single line containing five stars `*****' indicating the beginning of the case
- for each employee i , one line with two integers i and s , separated by a blank, meaning that i has a salary of s .

Sample Input

```
3 2
100 2 2
2 3 1 2
40 0 1
1
60 0 1
2
7 2
10 2 1
2 3 1
10 2 1
4 5 2
10 2 1
6 7 2
10 0 1
1
10 0 1
1
10 0 1
1
10 0 1
1
0 0
```

Sample Output

```
*****
1 200
2 200
*****
1 70
2 60
```

South America 2005-2006