

## 4267 Finding The Heaviest Path

*Rooted trees* are one of the most frequently used data structures. The type of rooted tree with an weight assigned on each node is called a *weighted rooted tree*. This problem asks you to find a path from the root to a leaf with a given property in a weighted rooted tree where each node has a positive integer weight.

Assume the nodes of the input rooted tree are numbered from 0 to  $n - 1$ ,  $0 \leq n < 10000$ . Note that each node is assigned with a distinct node number. Hence there are a total of  $n$  nodes in the input tree. Each node has a weight that is a positive integer within  $w$ ,  $1 \leq w \leq 10000$ . Given a node  $u$  in the rooted tree  $T$ , let  $T_u$  be the subtree of  $T$  rooted at  $u$ . That is,  $T_u$  consists of  $u$  and the nodes whose ancestor is  $u$ . We define  $weight(T_u)$  to be the sum of the weights for all the nodes in  $T_u$ . The *heaviest path*  $P_w$  in a weight rooted tree  $T$  is defined as follows.

- The root of  $T$  is in  $P_w$ .
- If a node  $u$  is in  $P_w$  and  $u$  is not a leaf, then one child  $v$  of  $u$  is also in  $P_w$ , where
  - $weight(T_v) \geq weight(T_s)$  for each child  $s$  of  $u$  that is not  $v$
  - if  $weight(T_v) = weight(T_s)$  for a child  $s$  of  $u$  that is not  $v$ , then the node number of  $v$  is larger than the node number of  $s$ .

It is cleared that given a weighted rooted tree, its heaviest path is unique. Your task is to find such a path by listing the nodes in the path from the root in sequence.

### Technical Specification

1.  $0 \leq n \leq 9999$
2.  $1 \leq w \leq 10000$

### Input

The first line of the input file contains an integer indicating the number of test cases to follow. Each test case consists of  $n + 1$  lines. The first line consists of  $n$  and the node number of the root. The  $(i + 2)$ -th line describes the information for the node numbered  $i$  which are its node weight, the number of children and the children listed one by one. A node without children is a leaf.

### Output

For each test case, first output a line with the total weight of the nodes in the heaviest path. Then start a new line to output the node numbers in the heaviest path from top to the bottom starting from the root. There is exactly one space between two numbers. Output exactly 10 numbers in a one line with the remaining less-than-10 numbers, if any, at the last line.

### Sample Input

```
3
6 0
3 3 1 2 3
5 0
```

```
1 2 4 5
7 0
8 0
6 0
6 0
3 3 1 2 3
5 0
1 2 4 5
7 0
8 0
8 0
13 0
100 1 1
100 1 6
20 3 3 4 5
24 0
25 0
23 0
1 1 7
1 1 8
1 1 9
1 1 10
1 1 11
1 1 12
1 1 2
```

### Sample Output

```
12
0 2 4
12
0 2 5
252
0 1 6 7 8 9 10 11 12 2
4
```