Problem G. G

Time limit	1000 ms
Mem limit	131072 kB
OS	Linux

Single Source Shortest Path

For a given weighted graph $G = (V, E)$, find the shortest path from a source to each vertex. For each vertex u, print the total weight of edges on the shortest path from vertex 0 to u.

Input

In the first line, an integer n denoting the number of vertices in G is given. In the following n lines, adjacency lists for each vertex u are respectively given in the following format:

$u\ k\ v_1\ c_1\ v_2\ c_2\ ...\ v_k\ c_k$

Vertices in G are named with IDs $0, 1, ..., n - 1$. u is ID of the target vertex and k denotes its degree. $v_i (i = 1, 2, ...k)$ denote IDs of vertices adjacent to u and c_i denotes the weight of a directed edge connecting u and v_i (from u to v_i).

Output

For each vertex, print its ID and the distance separated by a space character in a line respectively. Print in order of vertex IDs.

Constraints

- $1 \leq n \leq 100$
- $0 \leq c_i \leq 100,000$
- $|E| \leq 10,000$
- All vertices are reachable from vertex 0

Sample Input 1

```
5
0 3 2 3 3 1 1 2
1 2 0 2 3 4
2 3 0 3 3 1 4 1
3 4 2 1 0 1 1 4 4 3
4 2 2 1 3 3
```

Sample Output 1

```
0 0
1 2
2 2
3 1
4 3
```

Reference

Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. The MIT Press.