Problem F: Topic Selection

Advanced Algorithms for Programming Contests

Restrictions

Time: 2 seconds
Memory: 512 MB

Problem description

You are currently creating math learning software for high school students, and in the process of doing so, encountered a rather difficult problem: There are countless topics in mathematics, far more than could be included in your software. Furthermore, a topic can either benefit the students learning about it or cause them brain damage (e.g. geometry) and while studies have shown for each topic how much it helps or hurts students, you can't just take only the most valuable topics, as their contents might depend on other topics too. Instead you need to find a subset of the contemplable topics that maximizes the overall benefit for the students (which is the sum of the values for the chosen topics) and is self-contained in that none of the chosen topics depend on any non-chosen topics.

Input

The input consists of

- one line containing n ($1 \leq n \leq 500$) – the number of topics to be considered
- n lines describing the topics, where the i-th description begins with integers x_i and d_i ($|x| \leq 10^6, 0 \leq d_i < n$) – the first being the benefit or damage associated with topic i and the second being the number of topics that topic i depends on – and continues with d_i integers $b_{i,1}, ..., b_{i,d_i}$ ($1 \leq b_{i,j} \leq n, b_{i,j} \neq i$) – the list of topics that topic i depends on. It is guaranteed that there are no cyclic dependencies.

Output

First output the maximum overall benefit as described above. Then output the indices of the topics that should be chosen to achieve this benefit (in any order, separated by spaces).

Sample input and output

Input	Output
4 -3 0 5 2 1 3 2 1 4 10 0	14 4 3 2 1
7 2 1 4 -3 1 1 5 1 2 -3 0 20 1 4 -16 1 5 14 1 6	21 5 4 3 2 1
1 -100 0	0