Problem E. Effective Management

Input file:	*standard input* or input.txt
Output file:	*standard output* or output.txt
Time limit:	1 second
Memory limit:	512 mebibytes

Ilona is the CEO of a big industrial company. The company is manufacturing various kinds of products. For each type of product, Ilona knows two parameters: the profit from a sale of one item of that kind, and the *pure production time* for one item of that kind. The production of some products may depend on others. For example, to make a bicycle, you need to make a frame and wheels; to make wheels, you need spokes and tires; for a frame and spokes, you need processed metal.

Ilona plans to accelerate the production conveyor and produce all products in parallel in the required quantities. In her model, the *actual production time* of the product is equal to the **maximum** of the product's own pure production time and the pure production times of all its dependencies (not only direct ones). In the case of bicycle, its actual production time would be the maximum of the pure production times of the bicycle, frame, wheels, spokes, tires, and processed metal.

The company strives to earn as much as possible, so Ilona asks you to list all the products with the maximal possible ratio of the profit from sales to the actual production time.

Input

The first line of the input contains one integer n ($1 \le n \le 10^5$) — the number of the product types. The types are enumerated by sequential integers between 1 and n, inclusively.

The second and the third lines contain n positive integers each. i-th integer in the second line is the profit from sale of the product of i-th type, and in the third line — the pure production time of the product of i-th type. Those integers do not exceed 10^9.

Then n lines follow, describing the production dependencies. i-th of those lines starts with the integer m_i ($0 \le m_i < n$) — the number of types of products that the production of the product of i-th type depends on. Then m_i integers follow, describing those types. You may assume that the sum of all m_i does not exceed 10^5.

You may assume that there are no cyclic dependencies in the production process, i.e. no type can depend on itself directly or indirectly.

Output

Print the indices of the production types that maximize the ratio of the profit from sales to the actual production time, one index per line. The types shall be printed in the increasing order.

Example

standard input or input.txt	*standard output* or output.txt
6 1 2 4 5 4 6 1 3 2 2 3 2 0 0 1 1 2 2 3 1 1 2 5 4	3 6