

Problem A. Photon

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

There is a device installed on the satellite "Photon" for measuring the energy of cosmic rays. Every minute, the device sends non-negative integer number through a communication channel - the amount of energy produced in the last minute, measured in units. Time of the transmission itself is negligible. Find the minimum product of two readings in given series no less than 6 minutes apart from each other.

Input

There is a single integer N ($7 \leq N \leq 10^5$) on the first line of input - number of readings. Each of the following N lines contains single integer e_i ($0 \leq e \leq 10^4$) - energy measured in minute i .

Output

Write a single integer value to the output which is the described product of readings.

Examples

standard input	standard output
11 12 45 5 4 25 23 21 20 10 12 26	48

Problem B. Broadcast

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 64 megabytes

You work in TV network company that has a right to broadcast Olympic Games. The network is going to create numbers of channels that will permanently broadcast different types of competitions. There are rules for these channels:

- Each competition can be broadcasted by only one channel or not broadcasted at all
- Competition can be partly broadcasted, i.e. beginning or/and the final of a competition can be missed
- Each channel must permanently broadcast for the entire period of the Games

You have a schedule of the Olympic Games. For each competition you know the start (a_i) and the end (b_i) time. As well, you know that Olympic Games start at the moment 0 and end at the moment t . Find a maximum number of the channels allowed for broadcasting that complies with the rules.

Input

The first line contains a number of competitions n ($1 \leq n \leq 50$), the second line contains n numbers of a_i , the third line - n numbers of b_i ($0 \leq a_i < b_i \leq t$) and the fourth line contains a number t ($1 \leq t \leq 10^9$).

Output

Find one number — the maximum number of the channels.

Examples

standard input	standard output
5 0 1 1 1 0 2 2 3 3 3 3	2
1 0 1000 1000	1
5 0 1 2 3 4 1 2 3 4 5 5	1
1 1 2 2	0

Problem C. Quest

Input file: **standard input**
Output file: **standard output**
Time limit: **2 seconds**
Memory limit: **256 megabytes**

Association of Challenge Masters (ACM) sponsored by International Battle Merchandisers (IBM) is planning to create a series of new quest games. Brotherhood of Tired Virtual Adventurers (BoTVA) has stolen the scripts of the quests and now is planning to publish the solution guide for all the games.

In all quests the adventures take part in some building that has several rooms. Rooms are connected to each other by the doors. The doors are opened using the keys. Also there are characters, objects and items in the game. Keys are considered to be items.

The player in the quest can talk to any character. After he does, the character names several items that he needs to give the player some other items. After the player bring the requested items to him, he get the items promised. Some items can be found on the floor. Also the player may use items on objects. After doing so, he may get some other items.

Given the description of the quest world, create the solution guide for it — the sequence of actions one must do to complete the quest — save the princess.

Input

The first line of the input file contains n — the number of the rooms in the game. Next n lines contain the names of the rooms. Next line contains m — the number of the doors. Next m lines describe doors — each line contains the numbers of the rooms connected by the door and the name of the key to open the door.

The descriptions of the contents of the rooms follow. Each description starts with three integers: c — the number of characters in the room and o — the number of objects in the room and i — the number of items on the floor of the room.

Next lines contain descriptions of the characters. Each description consists of three lines. The first line contains the name of the character. Next line contains one or more item names — the items the character wants the player to bring to him. Last line also contains one or more item names — the names of the items the character would give to the player after he brings him the requested items. Item names are separated by commas. The descriptions of the objects in the same format follow. Note that the difference between objects and characters is that after the player gives some item to the character, it no longer belongs to him, while after using some item on object he keeps the item. Also one cannot talk to objects. Last i lines in the description of the room contain the names of the items on its floor.

Two last lines of the input file contain the name of the room the player starts the game in, and the name of the room where the princess is locked.

All names consist only of letters of English alphabet, digits and spaces. You must ignore leading and trailing spaces in all names. All names are case sensitive. All names are at most 100 characters long. All names are different.

The number of rooms is at least two and does not exceed eight. There is at most one door between any two rooms. All doors are two-way. The total number of characters, objects and items in the game does not exceed 200. You always start in the room other then the room where the princess is. No item is requested by more than one character, no item is simultaneously requested by some character and needed by some object. No item is provided by more than one character or object, or both, no item is both on the floor of some room and provided by some character or object.

Output

Output the sequence of the actions.

Remember that the player can: talk to character, give items to character (after talking to him), take items from character (immediately after giving him items he requests), use items on objects, take items from objects (immediately after using items needed on it), pick items from the floor, open the doors using the keys, walk from room to room (after opening the door that connects them), save the princess (if the player is in the room where the princess is).

Adhere to the format of the sample output. Print one action on a line. The player must always give all requested items to the character, use all needed items on the object, and take items from the character or the object in one action.

If it is impossible to win the game, output `dead princess` on the first line of the output file.

Examples

standard input	standard output
4 white room black room blue room green room 3 1 3 crystal key 1 4 esmerald key 2 3 strange key 0 0 2 crystal key oranges 0 0 0 2 1 0 Wild Joe rat, red pepper, coin strange key Dead man orange juice red pepper, esmerald key squeezer oranges orange juice 0 1 1 monkey oranges coin rat white room black room	pick crystal key pick oranges open door to blue room go to blue room use oranges on squeezer take orange juice from squeezer talk to Dead man give orange juice to Dead man take red pepper and esmerald key from Dead man go to white room open door to green room go to green room pick rat use oranges on monkey take coin from monkey go to white room go to blue room talk to Wild Joe give rat, red pepper and coin to Wild Joe take strange key from Wild Joe open door to black room go to black room save princess