

Problem F. Modern Announce Network

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

Today, modern teenagers use social networks to communicate with each other.

In a high school, N students are using an social network called ICPC (International Community for Programming Contest). Some pairs of these N students are “friends” on this system, and can send messages to each other. Among these N students, A first grade students, B second grade students, and C third grade students are members of the Programming Society. Note that there may be some students who are not the members of the Programming Society, so $A + B + C$ can be less than N .

There are good relationships between members of the same grade in the Society. Thus, there is a chat group in the social network for each grade, and the Society members of the same grade can communicate with each other instantly via their group chat. On the other hand, the relationships between any different grades are not so good, and there are no chat group for the entire Society and the entire high school.

In order to broadcast a message to all the Society members on the social network, the administrator of the Society came up with a method: the administrator tells the message to one of the N students and have them spread the message on the social network via the chat groups and their friends. (The administrator itself does not have an account for the social network.) As the members of the same grade can broadcast the message by the chat group for the grade, we can assume that if one of a grade gets the message, all other members of that grade also get the message instantly. Therefore, if the message is told to at least one member of each grade, we can assume that the message is broadcasted to the all members of the Society on the social network.

Because it is bothering to communicate between friends, we want to minimize the number of communications between friends. What is the minimum number of communications between friends to broadcast a message to all the Society members? Who is the first person to whom the administrator should tell the message to achieve the minimum communications?

Input

The first line of the input contains four integers N , A , B , and C . N ($3 \leq N \leq 10^4$) denotes the number of students in the social network, and A , B and C ($1 \leq A, B, C \leq N$ and $A + B + C \leq N$) denote the number of members of the first, second, and third grade respectively.

Each student on the social network is represented by a unique numeric ID between 1 and N . The second line contains A integers a_1, \dots, a_A ($1 \leq a_1, \dots, a_A \leq N$), which are the IDs of members of the first grade. The third line contains B integers b_1, \dots, b_B ($1 \leq b_1, \dots, b_B \leq N$), which are the IDs of members of the second grade. The fourth line contains C integers c_1, \dots, c_C ($1 \leq c_1, \dots, c_C \leq N$), which are the IDs of members of the third grade. You can assume that $a_1, \dots, a_A, b_1, \dots, b_B, c_1, \dots, c_C$ are distinct.

The fifth line contains an integer M ($2 \leq M \leq 5 \cdot 10^5$). M denotes the number of pairs of students who are friends in the social network. The i -th line of the following M lines contains two integers x_i and y_i ($1 \leq x_i, y_i \leq N$), which means the student with ID x_i and the student with ID y_i are friends in the social network. You can assume that $x_i \neq y_i$ ($1 \leq i \leq M$), and ($x_i \neq x_j$ or $y_i \neq y_j$)

and $(x_i \neq y_j \text{ or } y_i \neq x_j)$ if $i \neq j$ ($1 \leq i, j \leq M$). You can also assume that a message can be delivered from any student to any student in the social network via the friends and group chat.

Output

Output the minimum number of communications between friends (not including group chat) to broadcast a message among all the Society members, and the ID of the student to whom the administrator should tell the message in order to achieve the minimum number of communications, separated by a single space. If there are multiple students that satisfy the above constraints, output the minimum ID of such students.

Examples

standard input	standard output
<pre>4 2 1 1 1 2 3 4 3 1 2 2 4 3 4</pre>	<pre>2 1</pre>
<pre>4 1 1 1 2 3 4 4 1 2 1 3 1 4 2 4</pre>	<pre>3 1</pre>
<pre>8 1 2 2 5 4 6 3 8 7 1 2 2 3 3 4 5 6 6 7 7 8 2 6</pre>	<pre>2 3</pre>