Critical Network Lines

Input file: `net.in` **100 points**
Output file: `net.out` **Time limit: 3 sec**
Source code: `net.pas/.c/.cpp` **Memory limit: 64 MB**

Consider a communication network that consists of a set of nodes and a set of two-way direct communication lines between pairs of nodes. It is known that the investigated network is connected, that is, there is a communication path between every pair of nodes. Some nodes provide service type ***A*** to all nodes (including itself), while some nodes provide service type ***B*** to all nodes (including itself). The same node may provide both types of services. Every node must have access to both types of services.

If a direct line falls out, it might happen that a service becomes unavailable to some node; a direct line with this property is called a critical network line.

Task

You are to write a program that determines the number of critical network lines (Subtask A) and the pairs of nodes they connect (Subtask B).

Input

The first line of the text file `net.in` contains four integers, N, M, K, and L. N ($1 \leq N \leq 100\,000$) is the number of nodes of the network, M ($1 \leq M \leq 1\,000\,000$) is the number of direct communication lines, K ($1 \leq K \leq N$) is the number of the nodes that provide service ***A***, and L ($1 \leq L \leq N$) is the number of the nodes that provide service ***B***. The nodes are identified by the numbers from 1 to N. The second line contains K integers, the identifiers of the nodes that provide service ***A***. The third line contains L integers, the identifiers of the nodes that provide service ***B***. Each of the following M lines contains a pair of integers, $p\ q$ ($1 \leq p, q \leq N, p \neq q$); the pair defines a direct communication line. There is at most one direct communication line between any two nodes.

Output

The first line of the text file `net.out` contains a single integer, S, the number of the critical lines of the network (Subtask A). Each of the following S lines contains a pair of integers, $p\ q$ ($1 \leq p, q \leq N$), defining a critical network line (Subtask B). You can output the critical network lines in any order, and for each line you can output the endpoints in any order.

Example

net.in	net.out
9 10 3 4	3
2 4 5	3 2
4 9 8 3	5 6
1 2	7 9
4 1	
2 3	
4 2	
1 5	
5 6	
6 7	
6 8	
7 9	
8 7	