ICJ

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	1024 mebibytes

The Berland company "InterCity Jets" (ICJ) operates flights between n cities. In total, there are m bidirectional airlines in the ICJ schedule. Each airline connects two cities, and it is guaranteed that it is possible to fly between any two cities using the ICJ airlines with zero or more transfers.

The airport of each city consists of m terminals. The terminals are numbered with integers from 1 to m. The departure and arrival terminals for each airline are predefined, meaning that an airline is specified by two pairs "city and the terminal id of that city's airport". Note that some terminals may not be present in the ICJ schedule, as there are other airlines in Berland.

If the arrival flight and the departure flight during a transfer are scheduled from different terminals, then to avoid repeated security checks, passengers are transported on commuter buses. In the case of a transfer at the same terminal, the transfer is made via jet bridges.

A well-known travel blogger, Oblomov, plans to travel on ICJ planes from city A to city B. Oblomov dislikes using buses, and since all his flights in the travel are sponsored by ICJ, he first wants to minimize the number of inter-terminal transfers. Only if there are multiple options with the minimum number of inter-terminal transfers, he plans to minimize the number of flights.

Given the ICJ flight schedule, as well as the starting and ending cities of the journey, determine the minimum number of times Oblomov will have to take the bus and the minimum number of flights he must make to get from the starting city to the destination. In the departure and arrival cities, Oblomov can choose any terminal as he travels by taxi.

Input

The first line of input contains four integers n, m, s, and f ($2 \le n \le 10^5$, $n-1 \le m \le 2 \cdot 10^5$, $1 \le s, f \le n$, $s \ne f$) — the number of cities and the number of airlines in the ICJ schedule, as well as Oblomov's starting and ending cities, respectively.

Each of the following m lines contains a description of one bidirectional airline and consists of four integers a_i, ta_i, b_i, tb_i ($1 \le a_i, b_i \le n$, $1 \le ta_i, tb_i \le m$, $a_i \ne b_i$) — the first airport number, terminal number of the first airport, the second airport number and terminal number of the second airport for that airline, respectively.

You may assume that it is possible to fly between any two cities using ICJ and that any two airports are directly connected by no more than one ICJ airline.

Output

Print two integers — the minimum number of bus trips Oblomov will have to take during his journey and the minimum number of flights that can be made with that number of bus trips.

Example

standard input	*standard output*
3 3 3 1 1 1 2 1 3 1 2 2 1 2 3 3	0 1