4314 Mining Station on the Sea

The ocean is a treasure house of resources and the development of human society comes to depend more and more on it. In order to develop and utilize marine resources, it is necessary to build mining stations on the sea. However, due to seabed mineral resources, the radio signal in the sea is often so weak that not all the mining stations can carry out direct communication. However communication is indispensable, every two mining stations must be able to communicate with each other (either directly or through other one or more mining stations). To meet the need of transporting the exploited resources up to the land to get put into use, there build n ports correspondently along the coast and every port can communicate with one or more mining stations directly.

Due to the fact that some mining stations can not communicate with each other directly, for the safety of the navigation for ships, ships are only allowed to sail between mining stations which can communicate with each other directly.

The mining is arduous and people do this job need proper rest (that is, to allow the ship to return to the port). But what a coincidence! This time, n vessels for mining take their turns to take a rest at the same time. They are scattered in different stations and now they have to go back to the port, in addition, a port can only accommodate one vessel. Now all the vessels will start to return, how to choose their navigation routes to make the total sum of their sailing routes minimal.

Notice that once the ship entered the port, it will not come out!

Input

There are several test cases. Every test case begins with four integers in one line, n ($1 \leq n \leq 100$), m ($n \leq m \leq 200$), k and p. n indicates n vessels and n ports, m indicates m mining stations, k indicates k edges, each edge corresponding to the link between a mining station and another one, p indicates p edges, each edge indicating the link between a port and a mining station. The following line is n integers, each one indicating one station that one vessel belongs to. Then there follows k lines, each line including 3 integers a, b and c, indicating the fact that there exists direct communication between mining stations a and b and the distance between them is c.

Finally, there follows another p lines, each line including 3 integers d, e and f, indicating the fact that there exists direct communication between port d and mining station e and the distance between them is f. In addition, mining stations are represented by numbers from 1 to m, and ports 1 to n.

Input is terminated by end of file.

Output

Each test case outputs the minimal total sum of their sailing routes.

Sample Input

```
3 5 5 6
1 2 4
1 3 3
1 4 4
1 5 5
2 5 3
2 4 3
```

```
1 1 5
1 5 3
2 5 3
2 4 6
3 1 4
3 2 2
```

Sample Output

```
13
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