
Algorithms Lab

Exercise 2 – Important Bridges

Scatteredalot is a small, connected country. It consists of many islands that are connected with bridges, no two bridges connecting the same islands. Of course it happens from time to time that one of these bridges has to be repaired and the Scatterlotian people can not use it during this time. Usually this is not a problem because there are so many bridges that most of the times they can use another path leading to the same destination they are heading to. Unfortunately this is not always the case.

Scatteredalot's prime minister, who would like to stay prime minister, asks you to find all critical bridges.

Can you help him?

Input The first line of the input file will contain an integer giving the number of test cases following.

Each test case starts with a line containing n , the number of islands and m , the number of bridges. ($n \leq 1000$, $m \leq n^2$.) After that you'll find m lines, the i -th line being $e_{i_1} e_{i_2}$, the numbers of the islands the i -th bridge connects. You'll never find two bridges connecting the same islands.

Output For each test case write first k , the amount of critical bridges, in a single line, followed by k lines containing the island numbers $e_{i_1} e_{i_2}$ this critical bridge connects.

Please make sure that the list of bridges is ordered in such a way that e_{i_1} is always smaller than e_{i_2} , and that for all i, j with $i < j$ holds that $e_{i_1} \leq e_{j_1}$ and if $e_{i_1} = e_{j_1}$ then also $e_{i_2} < e_{j_2}$. (Which means that the output should be ordered *lexicographically*.) In this way it will be easier for the prime minister to check the list you've created.

Sample Input

```
2
3 3
1 2
2 3
3 1
3 2
1 2
3 1
```

Sample Output

```
0
2
1 2
1 3
```

Hint: BGL contains no algorithm to solve the problem directly, look at algorithms for connected components.