CSE 106

Assignment 5: Graphs

Space Stations

In a distant sector of the Star Wars galaxy, the Galactic Federation manages ***N*** space stations, linked by ***M*** bidirectional space tunnels. However, some stations remain isolated, preventing the Rebel Fleet from moving freely to resist the Empire. Your mission is to determine the minimum number of new tunnels needed, and where to build them, to ensure that every station is fully connected, allowing the fleet to access any outpost across the galaxy.

You must solve this problem **twice**: once using **BFS** and once using **DFS**, demonstrating both approaches independently. Implement the **DFS** solution with **adjacency list** and the **BFS** solution with **adjacency matrix**.

Input

The first line of input has two integers ***n*** and ***m***: the number of space stations and existing space tunnels. The space stations are numbered ***1, 2, ..., n***.

The next ***m*** lines each contain two integers ***a*** and ***b***, indicating a space tunnel between stations ***a*** and ***b***. Each tunnel connects two different stations, and there is at most one tunnel between any two stations.

Output

First, print an integer ***k***: the number of new tunnels required.

Then, print ***k*** lines, each containing two integers representing the stations to connect with a new tunnel. Any valid solution is acceptable.

Sample IO

Input	**Output**
10 10 4 8 5 9 4 9 2 7 6 7 7 10 1 5	1 1 3

6 9 8 9 2 4	
10 10 3 9 6 8 9 10 7 8 8 10 7 10 1 9 8 9 6 9 2 7	2 1 4 4 5

Submission Guidelines

- Create a directory with your 7-digit student ID as its name.
- Place all source files (.c, .h) into that directory.
- Zip the directory in the .zip format (any other format like .rar, .7z, etc. is not acceptable).
- Upload the .zip file to Moodle.