Birla Institute of Technology and Science-Pilani, Hyderabad Campus
First Semester 2020-2021
Lab Sheet-3
CS G526: Advanced Algorithms and Complexity
Date: 11/11/20

General Instructions: Argue logically. Write it in a manner that explains your logic very clearly. Do not miss steps in between.

Problem-1:[20 pts] You are given a binary matrix filled with 0 and 1 only. We say two cells (i_1, j_1) and (i_2, j_2) are adjacent iff $|i_1 - i_2| \leq 1$ and $|j_1 - j_2| \leq 1$. A collection of adjacent cells with value 1 forms a block. Your goal is to count the number of blocks in the matrix.

Problem-2:[30] Given a graph in the form of an edge list, can you check if the graph is bipartite or not? Your implementation should be able to read the edge list from a file and it will Output "yes" if the graph is bipartite and "no" if it is not bipartite. Can you do that in $O(m + n)$ where m is the number of edges and n is the number of vertices.