CSCI 3104: Algorithms
Spring 2022
Recitation #15 - Complexity II

Problem 1

need to be able to get from any edge vert to any other edge vert in $d-1$ steps exactly... create either 1 or 2

For each of the following problems, argue whether it is a) in P or b) NP-complete.

a. Bipartite Determination. Given a graph $G = (V, E)$, is G bipartite (that is, can we partition $V = V_1 \cup V_2$ such that V_1, V_2 are disjoint and for all $u, v \in V_i$, $(u, v \notin E?)$)

b. Heavy Cycle Detection. Given a (nonnegatively) weighted graph $G = (V, E, w)$ and number $k \geq 0$, is there a simple cycle of weight at least k?

c. Unit-Weight Knapsack. Given a capacity $C \in \mathbb{R}$ and set S of objects, each of which has weight 1 and value v_i, can we choose a subset of items with total weight at most C and total value $\geq k$?