CSC373   Fall'19
Tutorial 6
Mon. Nov. 18, 2019

Q1 APPROXIMATION: Independent Set

Give an algorithm that attempts to find an approximation to the maximum independent set in a graph $G = (V, E)$ where the maximum degree of any vertex is d. Think of a simple greedy solution with a good heuristic.
Show that the algorithm runs in polynomial time.
Justify the correctness of the algorithm.
What is the bound on the approximation ratio of your algorithm?
Can you construct a graph instance that would show your approximation analysis to be tight.

Q2 APPROXIMATION: TSP

The input to the traveling salesman problem (TSP) is an undirected graph with edge weights, and the optimal output is a cycle that visits every vertex exactly once (a tour) with minimum total weight. This problem is known to be NP-complete.
Can you use the MinimumSpanningTree algorithm to produce a constant k-approximation algorithm for the TSP.
What is the constant k?
What assumptions if any does your algorithm make of the edge weights?