

COMP361 Tutorial on Greedy Algorithms

Question 1

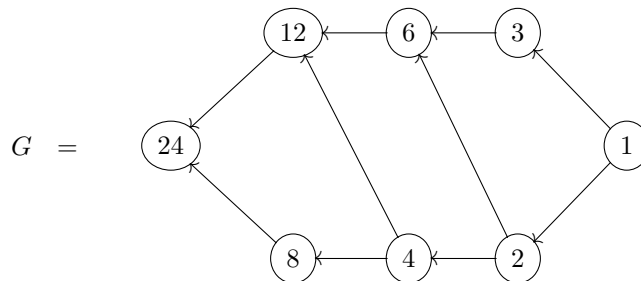
Slide 6 in Greedy Lecture 2 on Prim's Algorithm. Finish the proof of correctness and do the analysis.

Question 2

Suppose that we have a set of activities, each with a fixed start and finish time, to schedule among a large number of lecture theatres. Give an efficient greedy algorithm to schedule all the activities, using the smallest possible number of lecture theatres. Outline an argument that your algorithm is correct.

Question 3

Consider the graph:



- Give the spanning tree produced by a depth-first search starting from node 1 and visiting the neighbours of a node in numerical order.
- What is the topological order thus obtained?

Question 4

Suppose that in a 0-1 Knapsack problem, the order of items when sorted by increasing weight is the same as their order when sorted by decreasing value. Give an efficient algorithm to find an optimal solution to this variant of the knapsack problem, and argue that your answer is correct.