HAUSCR Summit for Young Leaders in China 2020

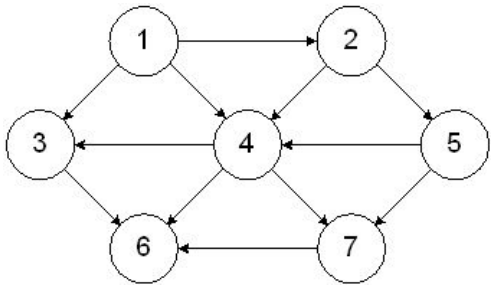
HSYLC

Introduction to Data Structures and Algorithms

Homework #2

Description: This homework assignment is a short set of problems that are intended to solidify the concepts taught in class. Feel free to collaborate with others, but please write your answers separately. I am available to help as well. Please explain your answers, and partial credit is available for significant progress on a problem.

1. **Recurrences (10%, 5% each):** Find the worst-case asymptotic bound for each of the following recurrence equations:
    a. $T(n) = 3T(n/2) + 3n^2 + \log n$
    b. $T(n) = 7T(n/2) + 10n$
2. **Graph Searching (5%):** Consider the following directed graph, and write the order in which the vertices will be visited using DFS and BFS starting at vertex 1. Assume that ties are broken by lowest-number vertex being visited first.



3. **Application of Graph Searching (5%):** Suppose I have a tree (undirected graph) and a source vertex, and I want to find the distance from the source vertex to the farthest vertex. How could I do so? A couple sentences is sufficient.

Total Weight: 25%.

Beijing