INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CS21003 Algorithms I: Second Class Test 2021 Spring

Date of Examination: 10th April 2021
Duration: 35 minutes + 5 minutes (for scanning, concatenating, and uploading)
Full Marks: 10
Subject: CS21003 Algorithms I

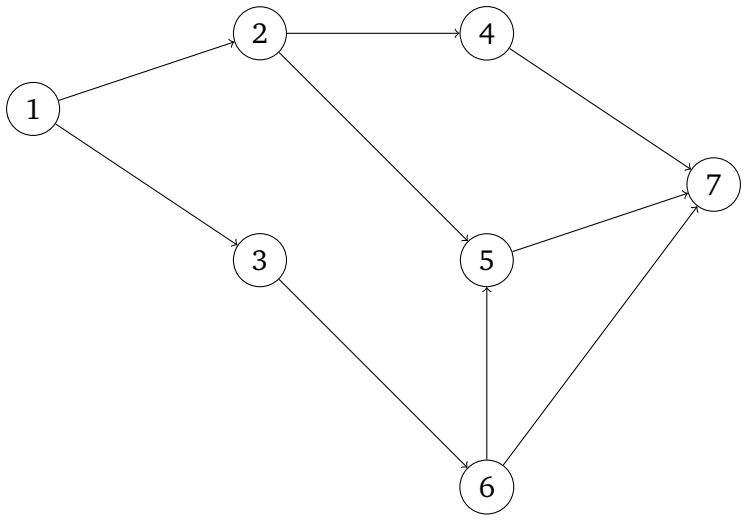
Part II

Let $\mathcal{G} = (\mathcal{V}, \mathcal{E})$ be a connected unweighted directed acyclic graph with a single root node s and a single sink node g. The following are defined below:

1. Depth of a node n, $D(n)$, is the longest length path from s to n $(D(s) = 0)$;
2. Height of a node n, $H(n)$ is the shortest length path from n to g. $(H(g) = 0)$.

Write down answers to the following:

1. Present an efficient algorithm to find the D and H values of every node in G.
2. Analyze the time and space complexity of your algorithm.
3. Show its working on the example given below where node 1 is s and node 7 is g:



[6+2+2 Marks]

All the best