
Submissions: This assignment is due on the 18th of October, 2018. Please note:

1. Each student must submit his or her own assignment.
2. Solutions should preferably be typed in Latex, MSWord or other such word processing software, or printed clearly. In either case, submit a hard copy of your solution.
3. You must write your name and UUID clearly on your submitted assignment.
4. Staple the pages together. Write your name and UUID on top of each page.
5. It is preferable that you submit solutions to me in class, but it is ok if you can’t do that - just make sure to submit solutions by end of day (i.e., 11:59 PM) by sliding it under my office door (DH 307).

Academic Integrity: You are encouraged to work in groups, but everyone must write out their own solutions. Absolutely no word to word copying is allowed. If you have worked with other students on the assignment or referred to external sources, please mention all names and sources on your assignment.

Partial solutions: Document your efforts at solving a problem even if you cannot solve it. Write why your approach failed.

DPV ≡ Dasgupta-Papadimitriou-Vazirani book. JE ≡ Jeff Erickson’s notes.

Problem 1 [5 pts]: Recall the algorithm for DeleteMin in a Binary heap. We said we would remove the last element in the array, put it at the root and do a sift down. Why can’t we simply remove an element that is not the last element, put it at the root and do a sift-down? What could go wrong? Support your answer with an example.

Problem 2 [25 pts]: Give a polynomial time algorithm to find a cycle of negative total weight reachable from s if such a cycle exists, given a directed weighted graph \( G = (V, E) \) with edge weights \( l(u,v) \) and where \( s \in V \).

Problem 3 [20 pts]: Problem 4.3 from DPV.

Problem 4 [10 pts]: Problem 4.7 from DPV.

Problem 5 [20 pts]: Problem 4.12 from DPV.

Problem 6 [20 pts]: Problem 4.18 from DPV.