
Submissions: This assignment is due on the 21st of September, 2017. 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 [30 pts]: We have seen in class how to write a recursive function to compute the skyline of \( n \) given points in 2-dimensions in \( O(n \log n) \) time. Write a function to compute the skyline of points given in \( d \)-dimensional space [\( d \) is a constant, meaning that it is not a part of the input - so just think it is a small number like 3 or 4]. What is the running time of your algorithm?

Problem 2 [5 + 5 pts]: (i) Problem 2.2 and, (ii) Problem 2.7 from DPV.

Problem 3 [10 pts]: Problem 2.9 from DPV.

Problem 4 [15 pts]: Problem 2.22 from DPV.

Problem 5 [10 pts]: Read the proof of the \( \Omega(n \log n) \) lower bound for comparison based sorting. Then solve Problem 2.20 from DPV.

Problem 6 [10 pts]: Problem 2.32 from DPV.

Problem 7 [15 pts]: Problem 1 of Lecture 2 from JE.

Problem 8 [Extra credit (20 pts)]: Problem 2 of Lecture 2 from JE.