

Homework 01

Instructions

1. Please review the grading policy outlined in the course information page.
2. You must also write down with whom you worked on the assignment. If this changes from problem to problem, then you should write down this information separately with each problem.
3. Problem numbers (like Exercise 3.1-1) are corresponding to CLRS 3rd edition. While the 2nd edition has similar problems with similar numbers, the actual exercises and their solutions are different, so make sure you are using the 3rd edition.

Problems

1. (20p) Two linked lists (simple link, not double link) heads are given: *headA*, and *headB*; it is also given that the two lists intersect, thus after the intersection they have the same elements to the end. Find the first common element (without modifying the lists elements or using additional datastructures) as required below:
 - a) Write the pseudocode for checking all elements of the first list against all elements of the second list (brute force); explain running time.
 - b) Write a linear algorithm (pseudocode) as discussed in class : count the lists first, then use the count difference in the longer list.
2. (10p) Exercise 3.1-1
3. (5p) Exercise 3.1-4
4. (15p) Rank the following functions in terms of asymptotic growth. In other words, find an arrangement of the functions f_1, f_2, \dots such that for all i , $f_i = \Omega(f_{i+1})$.
 $\sqrt{n} \ln n$ $\ln \ln n^2$ $2^{\ln^2 n}$ $n!$ $n^{0.001}$ $2^{2 \ln n}$ $(\ln n)!$
5. (40p) Problem 4-1 (page 107)
6. (30p) Problem 4-3 from (a) to (f) (page 108)