
Due: Wednesday, April 25, 2012

Name(Print) _____ CSE Login _____

Name 2(Print) _____ CSE Login _____

Problem	Page	Notes	Points	Score
Problem A		See Below	9	
Problem B		See next page	9	
Problem C		See next page	8	
8.1.8	511		6	
8.1.28	512		6	
8.2.4 (a,b,c,d)	524		8	
8.2.12	525		4	
(Bonus) 8.3.14	535	Also give a big-O estimate for your recurrence	6	
8.3.22	535		4	
Typesetting (bonus)			5	
Total			54	

Problem A Given the recurrence relation $T(n) = 3T(n/2) + 3$, and the initial condition $T(1) = 5$, draw the recurrence tree, clearly stating:

1. (1 Point) The root of the tree.
2. (1 Point) The first three levels of the tree.
3. (1 Point) The last level of the tree.
4. (1 Point) The height of the tree.
5. (1 Point) The size of each (sub)problem at each of the above levels.
6. (2 Points) The non-recursive cost at each of the above levels.
7. (2 Points) Give the asymptotic characterization of $T(n)$ (Using Master Theorem).

Problem B Given the recurrence relation $T(n) = 2T(n/15) + 3n + 2$, and the initial condition $T(1) = 1$, draw the recurrence tree, clearly stating:

1. (1 Point) The root of the tree.
2. (1 Point) The first three levels of the tree.
3. (1 Point) The last level of the tree.
4. (1 Point) The height of the tree.
5. (1 Point) The size of each (sub)problem at each of the above levels.
6. (2 Points) The non-recursive cost at each of the above levels.
7. (2 Points) Give the asymptotic characterization of $T(n)$ (Using Master Theorem).

Problem C For the following recurrences, provide an asymptotic characterization (you need not solve them)

- a) $T(n) = T(n/3) + 1$
- b) $T(n) = 2T(n/3) + 3$
- c) $T(n) = T(n/5) + 3n^2$
- d) $T(n) = 2T(n/3) + 4$
- e) $T(n) = 2T(n/2) + 7n$

Instructions Follow instructions *carefully*, failure to do so may result in points being deducted.

- The homework can be submitted on paper or via handin. Homework *neatly* formatted in L^AT_EX will receive a 10 point bonus. You will not receive the 10 bonus points if you work with a partner (see below).
- Clearly label each problem and submit answers *in order*.
- Staple this cover page to the front of your assignment for easier grading.
- Late submissions *will not be accepted*
- When you are asked to prove something, you must give a formal, rigorous, and complete a proof as possible. Each step in your proof must contain explanation that would allow us to understand what theorem/logic you have applied to arrive at that step.
- You are to work individually, and all work should be your own. Check partner policy below.
- The CSE academic dishonesty policy is in effect (see http://cse.unl.edu/ugrad/resources/academic_integrity.php).

Partner Policy You may work in pairs, but you must follow these guidelines:

1. You must work *all* problems *together*. You may not simply partition the work between you.
2. You must use L^AT_EX and you may divide the typing duties however you wish.
3. You may not discuss the problems with other groups or individuals.
4. Hand in only one hard copy with both author's names.