

Name _____

CSE Login _____

Problem	Page	Points	Score
5.1.4 (Use Product Rule)	344	4	
5.1.6 (Use Product Rule)	344	4	
5.2.16 (Use Pigeonhole principle)	353	4	
A		12	
B		12	
C		4	
D		12	
Total		52	
Typesetting in L ^A T _E X (Bonus)		5	

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

1. The root of the tree.
2. The first three levels of the tree.
3. The last level of the tree
4. The height of the tree.
5. The size of each (sub)problem at each of the above levels.
6. The non recursive cost at each of the above levels.
7. The solution of the recurrence relation.

B Use the backward substitution method to solve the following recurrence relation:

$$T(n) = T(n - 2) + n \tag{1}$$

Where $T(1) = 5$

C Use the Master theorem to find the complexity of the following:

$$f(n) = 4f(n/2) + 100n^2 \tag{2}$$

D Use the Principle of Inclusion Exclusion to solve the following:

1. How many integers between 1 and 1000 (inclusive) are divisible by at least one of 5,7,11?
2. How many integers between 1 and 1000 (inclusive) are divisible by 5 and by 7 but *not* by 11?

3. How many integers between 1 and 1000 (inclusive) are divisible by 5 but by neither 7 or 11?

General 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 points bonus if you work with a partner (see below).
- Clearly label each problem and submit the answers in order.
- Staple this cover page to the front of your assignment for easier grading.
- Late submissions will not be accepted.
- Show sufficient work to justify your answer(s). *Sloppy, hard to read papers will not be graded.*
- When you are asked to prove something, you must give as formal, rigorous, and complete a proof as possible.
- 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://www.cse.unl.edu/undergrads/academic_integrity.php.

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

1. You must work on 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 problems with other groups or individuals.
4. Hand in only one hard copy under the first author's name.