Assignment 1: CS472/572 Design and Analysis of Algorithms

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Due Date: Thursday September 7th, 2006

1. (Chapter 1, pp. 49) Question 1: (5 points) (use calculator).
2. (Chapter 1, pp. 49) Question 2: (a, b, c) (20 points)
3. (Chapter 1, pp 51) Question 8: (a, g, l) (15 points) Explain why?
4. (Chapter 1, pp 52) Question 9: (a, b) (10 points) Explain why?

Additional Problems

5. (10 points) Find the Sum of the series $S = \sum_{i=1}^{n} ia^i$
6. (10 points) Is $2^{n+1} O(2^n)$? Is $2^{2n} O(2^n)$.
7. (20 points) Show that Sum of the series $S = \sum_{i=1}^{n} 2^n - i^2$ is $O(2^n)$. State your assumptions, if any.
8. (10 points) Let $f(n)$ and $g(n)$ be asymptotically nonnegative functions. Using the basic definition of $\theta$-notation, prove that $\max(f(n), g(n)) = \theta(f(n) + g(n))$.