CMSC 441   Spring 2004
Homework 4

- READING ASSIGNMENT: Class handout:**"Algorithmics: Theory & Practice,"** by Giles Brassard & Paul Bratley, Prentice-Hall (1988), pages 65 - 78.

1. Handout, Problem 2.3.7, page 75

Solve the following recurrence exactly for n a power of 2:

$$T(n) = 2T(n/2) + \lg n , \quad n \geq 2$$

subject to $T(1) = 1$.
Express the solution as simply as possible using the Θ notation.

2. Handout, Problem 2.3.8, page 75

Solve the following recurrence exactly for n of the form 2^{2^k}:

$$T(n) = 2T(\sqrt{n}) + \lg n , \quad n \geq 4$$

subject to $T(2) = 1$.
Express your solution as simply as possible using the Θ notation.

3. Handout, Problem 2.3.9, page 76

Solve the following recurrence exactly:

$$t_n = t_{n-1} + t_{n-3} - t_{n-4} , \quad n \geq 4$$

subject to $t_n = n$ for $0 \leq n \leq 3$.   Express your answer as simply as possible using the Θ notation.

4. Handout, Problem 2.3.10, page 76

Solve the following recurrence exactly for n a power of 2:

$$T(n) = 5T(n/2) + (n \lg n)^2 , \quad n \geq 2$$

subject to $T(1) = 1$.   Express your answer as simply as possible using the Θ notation.

5. Handout, Problem 2.3.12, page 76

Solve the following recurrence exactly:

$$t_n = t_{n-1} + 2t_{n-2} - 2t_{n-3} , \quad n \geq 3$$

subject to $t_n = 9n^2 - 15n + 106$ for $0 \leq n \leq 2$.   Express your answer as simply as possible using the Θ notation.