

Homework Assignment 4

CS 330 Discrete Structures
Fall Semester, 2009

Due: Monday, November 2, 2009

1. Solve the following problems using the operator method discussed in class and given in the notes:

- (a) Page 458, exercise 28
- (b) Page 458, exercise 30
- (c) Page 472, exercise 32

2. Solve the simultaneous recurrence relations

$$\begin{aligned}a_n &= a_{n-1}/2 + 2b_{n-1} \\ b_n &= 2a_{n-1} + b_{n-1}/2\end{aligned}$$

with initial values $a_0 = b_0 = 1$.

3. Solve the following problems using secondary recurrences together with the operator method discussed in class and given in the notes:

- (a) Page 484, exercise 34
- (b) Derive all three cases of the Master Theorem on page 479 (we did parts of this in class)
- (c) In the notes, the recurrence $T(n) = \sqrt{n} \cdot T(\sqrt{n}) + n$ is solved by a recursion tree (page 13 of the notes) and again by the “guess-and-confirm” method in section 1.6.3. Solve it by means of a secondary recurrence (section 1.5.3), together with the operator method.