

## Homework 3

Due: March 20, 2008

Algorithm  $X$  for the failure models with processor asynchrony (or crashes and restarts) uses a *binary progress tree* and has work complexity of  $W = O(N^{\log_2 3})$  for  $P = N$  processors.

1. Design an algorithm, call it algorithm  $X^3$ , for the same failure models and the number of processors, but using a *ternary progress tree*. Give the pseudocode for the algorithm.
2. Argue the correctness of your solution.
3. Analyze the *work* complexity of your algorithm (worst case).
4. What is the worst case *time* of your algorithm?
5. Compare your algorithm  $X^3$  to algorithms  $X$  and  $G$  as presented in class (see Class Notes Set 3.b for the details of algorithm  $G$  and the citation).