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).