CS121 Problem Set 4

Due: 23:59, December 29, 2024

1. Submit your solutions to Gradescope (www.gradescope.com).
2. In "Account Settings" in Gradescope, set FULL NAME to your Chinese name and enter your STUDENT ID.
3. If you submit handwritten solutions, write neatly and submit a clear scan.
4. When submitting your homework, be sure to match each of your solutions to the corresponding problem number.

1. Design a PRAM algorithm to compute an in-order traversal of a binary tree with n nodes in $O(\log n)$ parallel time and $O(n)$ work.

2. Design a PRAM algorithm to compute a histogram of a size n array in $O(\log n)$ parallel time and $O(n)$ work. Assume all the values in the array are integers in the range 1 to $k = O(\log n)$. The output of the algorithm should be an array of size k, where the i'th entry is the number of occurrences of value i.

3. Design a PRAM algorithm to implement Quicksort. What is the (expected) time and work complexity of your algorithm?