CSE 332: Data Structures and Parallelism

Section 7: Parallel Primitives

0. Parallel Quicksort Recurrence

(a) Fill out the table below with each respective recurrence for the best case span and runtime.

Quicksort	Sequential Sort	Parallel Sort
Sequential Partition		
Parallel Partition		

(b) Which part of the recurrence is related to the Sequential Sort and explain why it is such?

(c) Which part of the recurrence is related to the Parallel Sort and explain why it is such?

(d) Which part of the recurrence is related to the Sequential Partition and explain why it is such?

(e) Which part of the recurrence is related to the Parallel Partition and explain why it is such?

1. Solve Parallel Quicksort Recurrences

(a) Show that Quicksort with sequential partitioning, but parallel recursive sorting, is indeed $\mathcal{O}(n)$, by solving the recurrence relation shown in lecture: $\mathsf{T}(n) = n + \mathsf{T}(n/2)$.

(b) Show that a completely parallel Quicksort, with parallel partition and recursion, is $\mathcal{O}(log^2(n))$, by solving the recurrence relation shown in lecture: $\mathsf{T}(n) = \mathcal{O}(log(n)) + \mathsf{T}(n/2)$.