Midterm 2 S20

P20.)

1.)

The recurrence relation for the runtime of Quicksort.

$$T(n) = \begin{cases} \Theta(1) & : n \leq 3 \\ T(\frac{n}{3}) + T(\frac{2n}{3}) + \Theta(n) & : n > 3 \end{cases}$$

This is my recurrence relation for this problem because $\Theta(1)$ represents the runtime of $T(n)$, when we reach the base case.

$T(\frac{n}{3}) + T(\frac{2n}{3}) + \Theta(n)$ represents the partition subroutine choosing the $(\frac{2}{3})n^{th}$ largest element of the list, this subroutine will always take $\Theta(n)$ time on lists of length n.