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Lab 4

Question 1:

In my tests and run times I am finding that merge sort is faster than quicksort. quicksort has a worst case runtime of O(n^2) and average time of O(nlogn) whereas mergesort has a worst case and average case of O(nlogn). After doing some external research (Wikipedia) I have learned that worst case mergesort does about 39% fewer comparisons than average case quicksort. Where mergesort falls short of quicksort is in terms of space. quicksort does not require any additional space whereas mergesort does. quicksort will work best with a small fixed size array when it will perform at its best and mergesort does well and performs consistently with any size data.

Question2:

Part A:

A close up of text on a white background

Description automatically generated

Part B: quicksort uses divide and conquer and makes two arrays to hold the elements in. What decides which elements go in each array is the pivot point. Once it puts the elements in the array based off the pivot point it then recursively compares the subarrays. After sorting it puts them back into the original array. It continues to do this until the list is sorted.