Big-O for Problem 2

According to the Recurrence Tree principle, recursive functions can be described as an expanding tree with height logn for each n. Mergesort divides the array down into n/2, n/4, n/8… which is scalar*n each time, so cn.

N

n/2 n/2

n/4 n/4 n/4 n/4

…

This is the per-branch height complexity. Seeing as each branch has complexity logn, the total complexity of the sort is cn*logn, simplified to nlogn.