8.1a What are the five sorting strategies discussed in class? Apart from distribution sort, identify the others as having a run-time of $\Theta(1)$, $O(n)$, or $\Theta(n)$?

8.1b Selection sort goes through a lists, finds the largest element, and then swaps it with the last location. It then proceeds to find the second largest element, and swaps it with the second-last location. This is continued until the entire list is sorted. What is the most appropriate Landau symbol with

8.1c Why is an in-place sorting algorithm more preferable to one that is not?

8.1c A perfect binary tree of height h has 2^h leaf nodes. Assuming that $\ln(n!) = \Theta(n \ln(n))$, what is the minimum height of a tree with $n!$ leaf nodes?

8.1d What are the number of inversions in the following unsorted list?

$$6, 7, 3, 9, 2, 9, 3, 4, 2, 8, 8$$

8.1e What is the number of inversions that are removed if the middle two elements are swapped? What are the number of inversions that are removed

$$95, 29, 91, 66, 48, 76, 5, 75, 61, 35, 85, 4, 17, 28, 56, 7, 81, 26, 86, 34$$

8.1f Is it preferable to have a sorting algorithm that compares and possibly swaps adjacent entries, or one that compares and possibly swaps entries that are at a greater distance apart in the unsorted list? Does it make a difference? Give some arguments as to why one might be better.

8.1g If $f(n) = o(g(n))$ what is the asymptotic growth of $g(n) + 1.96\,f(n)$ and what is the asymptotic growth of $g(n) - 1.96\,f(n)$? If you are not using big-Θ, give a concrete example with explicit functions.

8.1h If $f(n) = \Theta(g(n))$ what is the asymptotic growth of $g(n) + 1.96\,f(n)$ and what is the asymptotic growth of $g(n) - 1.96\,f(n)$? If you are not using big-Θ, give a concrete example with explicit functions.