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 list, 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-$\Theta$, 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-$\Theta$, give a concrete example with explicit functions.