

Algorithm Design and Application

Homework #1 (Units 1 & 2)

1. Based on the string (array of characters): “NTUSTBEST”, illustrate the operations of (a) INSERTION-SORT, (b) MERGE-SORT, (c) HEAPSORT, and (d) QUICKSORT (sort the characters from A to Z). Please mark the two S ’s as S_1 , and S_2 , and the three T ’s as T_1 , T_2 , and T_3 according to their order in the input, please show their positions during the processing.
2. Rank the following functions by order of growth; that is, find an arrangement g_1, g_2, \dots of the functions satisfying $g_1 = \Omega(g_2), g_2 = \Omega(g_3), \dots$. For example, for the three functions $n, 1, n^2$, we have $n^2 > n > 1$.

$$\begin{array}{ccccccc}
 (\sqrt{3})^{\lg n} & n^2 & (1.2)^n & n! & (\lg n)^{\lg n} & \lg^2 n & \\
 1000000 & n \cdot 2^n & n^{\lg \lg n} & n & 2^n & n \lg n &
 \end{array}$$

3. Exercise 4.4-9
4. Exercise 4.5-4
5. Exercise 4.5-1
6. Exercise 8.3-1
7. Exercise 8.4-1
8. Exercise 2.2-2
9. Exercise 9.3-8
10. Exercise 3.1-2