Tutorial 07
Advanced Sort – Merge Sort

1. Explain using an example of sorting algorithm, the divide and conquer strategy used in algorithm design.

2. Using Merge Sort binary tree, trace the execution of merge sort with the following list of numbers:
   a. 4, 7, 1, 8, 3, 2, 6, 5 (in ascending order)
   b. 5, 2, 7, 8, 1, 4, 6, 3 (in descending order)

3. In computer science, an in-place algorithm can be described as:

   > "an algorithm that does not need an extra space and produces an output in the same memory that contains the data by transforming the input 'in-place'. However, a small constant extra space used for variables is allowed"

   Are the sorting algorithms we have discussed so far, i.e. bubble sort, selection sort, insertion sort and merge sort, in-place algorithm?

4. Given a sequence S of n values, each equal to 0 or 1 e.g. [1, 0, 0, 1, 1, 1, 0]. Describe an in-place method for sorting S.

   [**NOTE**: Do not use the standard sorting algorithms e.g. bubble sort, selection sort, insertion sort etc. to answer this question.]

-- End of Tutorial --