Problem Set #2 (Algorithms)

Department: _____

Student ID: _____

Student Name: _____

For the following problems, consider the merge sort for an input sequence of n distinct numbers.

1. For each of the following cases, find the running time in Θ-notation. Justify your answers mathematically.
(a) The best case
(b) The worst case
(c) The average case

2. To draw the graphs in Problems 3 and 4, write a program which includes the comments.

3. For each of the following cases, show and explain the step-by-step results of the merge sort.
(a) One sorted input
(b) One reverse-sorted input
(c) One random input

4. For each of the following cases, draw and explain the graph of the actual running time in your PC with varying n. Compare the graph with that of the insertion sort.
(a) Sorted inputs
(b) Reverse-sorted inputs
(c) Average case using random inputs