* **Due** Sunday by 11:59pm

**Exercises - Sorting (Part 2)**

Answer the following questions by implementing the code samples and/or answering the questions in a word document. Upload all project files and word documents zipped to the exercise dropbox.

1. Show the result of running shell sort on the input 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 using the increments {1, 3, 7}.

2. Show how Heapsort processes the input 142, 543, 123, 65, 453, 879, 572, ~~434, 111, 242, 811, 102~~.

*Note: Your answers should show the buildHeap() operation, 7 deleteMin() operations and lastly should ensure that the array result is in ascending order (as described in class).*

3. What is the running time of heap sort for presorted input? Justify your answer.

4. Sort [3, 1, 4, 1, 5, 9, 2, 6] using merge sort. Show the state of the sequence at each step of the algorithm.

5. Determine the running time of mergesort for:

a) sorted input  
b) reverse-ordered input  
c) random input

Justify your answers.

6. Sort 3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5 using quicksort with the following pivots. Show the state of the sequence at each step of the algorithm.

a) the largest of the first two distinct elements  
b) median-of-three partitioning