



Question - 1

Sorting with Firstname & Lastname

SCORE: 5 points

Suppose there is a class Person, containing the First Name and Last Name. If you want to implement a sort method to sort a list of Person according to their First Name and Last Name (First based on the first character of Last Name and then based on the first character of First Name), which sort method would be more suitable?

- ☐ Quick Sort
- ☒ Merge Sort
- ☐ Shell Sort
- ☐ Heap Sort

Question - 2

Sorting for array in reverse order

SCORE: 5 points

Which method runs faster for an array in reverse order, selection sort or insertion sort?

- ☐ Insertion sort
- ☐ Selection sort
- ☒ Same

Question - 3

Max Priority Queue Output for NORTHEASTERN

SCORE: 5 points

Suppose that the sequence NORT*H**E*A*ST**E*R*N***. (where a letter means insert and an asterisk means remove the maximum) is applied to an initially empty priority queue. Give the sequence of letters returned by the remove the maximum operations.

- ☐ TRONHSTERNEA
- ☒ TRONHTSERNEA
- ☐ ROTNHTSERNEA
- ☐ ROTNHSTERNEA

Question - 4

Binary heap

SCORE: 5 points

Please select which of the following statements are true about a binary heap:

☒

A binary heap is an efficient data structure with which to implement a priority queue.

☒

A binary heap is a type of binary tree which is implemented in an array rather than with pointers.

☐

"Heap order" requires that the two child nodes of a node are ordered: smallest on the left, largest on the right.

☐

A binary heap is a "complete" binary tree, by which we mean that all nodes have either two or zero children.

☒

A binary heap is an implicit data structure.

Question - 5

Unordered Array MIN Priority Queue

SCORE: 15 points

Minimum Priority queues are characterized by the *remove the minimum* and *insert* operations.

Unordered Array MIN Priority Queue does not maintain the elements in sorted order.

It simply appends the element in the array and searches for the minimum element on each delete call.

Implement insert and delete methods for MinPQ.
Get all Unittests to pass.