University of Nevada, Las Vegas Computer Science 477/677 Spring 2022

Assignment 3: Due Monday February 28, 2022, Midnight

Name:_____

You are permitted to work in groups, get help from others, read books, and use the internet. Please follow Mr. Nicholas Heerdt's instructions on how to submit your completed assignment.

Read the handouts sorting.pdf,

1. Fill in the blanks. One word per blank.

   (a) The worst case number of comparisons during an execution of a comparison based sorting algorithm with an input of size n is _____. Use Ω notation.

   (b) The items stored in a priority queue represent _____ _____.

   A linked list has a *head* and a *rear*. Which of those will be the top, if linked list implements a stack? _____

2. Execute treesort by hand to sort the file MTHOYBKL.

   (a) Create a binary search tree, inserting each item in the order given.

   (b) Write the items in inorder.

3. Execute mergesort by hand with input file MTHOYBKL.

4. Execute heapsort with input file MTHOYBKL. Use array below. Add additional rows if needed.

M	T	H	O	Y	B	K	L

5. Consider the array implementation of a stack of letters.

   (a) Show the structure after the following items have been pushed in this order: B, R, Y, E, M.

   (b) Show the structure after **pop** has been executed twice.

6. In class we discussed three strategies for handling the false overflow problem for a queue implemented as an array. What were these strategies? (No more than three words to name each strategy. No need to give full explanations.)

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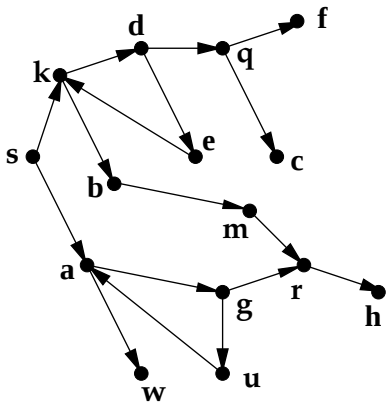
7. 

   Write the depth first search traversal of the vertices of the directed graph G shown here, then write the breadth first search traversal. In both cases use the alphabetic rule to break ties, so that everyone who works the problem correctly will have the same answer.

8. In the tiny Republic of Triland (pop 257) each citizen has a unique postal code consisting of three digits. Sort the following list of Trilandian postal codes using radix sort. Show the buckets at each phase.

   `569 045 337 192 893 450 677 190 320 537 232 554 256 512 189 121 961 300`