CS2002301 & EC2002302 Data Structures

Homework #3

Due Date: 12/16/2020 11:20

Announcements

1. This assignment is weighed 10 points.

2. Submit your code to the OJ system (http://nlp.csie.ntust.edu.tw:2020/).

3. Also, submit a report in **PDF** format to the Moodle system
   (please attach your source code in the report)

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1. (5pt) **String Quick Sort**

   Suppose a string sequence S, perform the following operations:
   1. Using **quick sort** to sort the sequence.
   2. Print the sorted sequence.

   For example, suppose that S = ["apply", "app", "april", "apple"]
   (1) Choose the first element "apply" as the pivot
       After that, the sequence would be ["apple", "app", "apply", "april"]
   (2) Then choose the first element "apple" as the pivot
       the sequence would be ["app", "apple", "apply", "april"]

   The output sequence should be ["app", "apple", "apply", "april"]

   * Sample I/O and input constraints are showed on OJ system.
   * In this problem, there are no hidden cases.
   * You MUST use quick sort to sort the sequence, otherwise you won't receive
     any points.
   * You MUST implement quick sort by yourself, otherwise you won't receive
     any points.

2. (5pt) **Priority Queue using Binary Heap**

Priority queue is an abstract data type in which each element additionally has a "priority" associated with it.

Given a sequence with priority, perform the following operations:
(1) Build a **binary min heap** from the given sequence by the order of priority.
(2) Output the sorted sequence by the min heap.

For example, suppose the sequence is as below:

element	E	A	P	P	L
order	40	2	5	4	8

Min Heap would be like:
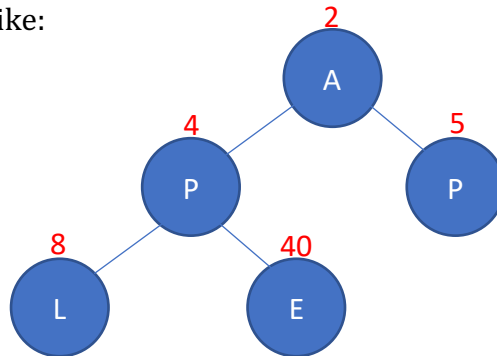
The output sequence: "APPLE"

* Sample I/O and input constraints are showed on OJ system.
* In this problem, there are no hidden cases.
* You MUST implement heap to solve this problem, otherwise you won't receive any points.
* You MUST implement heap by yourself, otherwise you won't receive any points.
* In the report, briefly explain the way you solve the problem.