Assignment 3

5 – Points

Assigned: 18th March 2024

Deadline: 25th March 2024

CS 2124: DATA STRUCTURES

Spring 2024

Assignment 3

(Assignment has two parts i.e. Priority Queue & Huffman Encoding)

- Students should submit a zip file containing all .c and .h with the PDF file (1 PDF file containing output of all parts of the assignment) on the Canvas.
- Kindly do not include .exe files of the work as it is tagged as a virus by Canvas
- Assignments must be uploaded on Canvas by the due date to receive credit.
- Kindly **do not email** the assignment; graders can only access your assignment on Canvas.
- Late work will be penalized with a points deduction (As mentioned in the outline). The only exception will be documented, extenuating circumstances, which must be communicated prior to the due date or submission of the work.
- **Note:** Canvas uses 11:59:00 p.m. as the cutoff time, not 11:59:59 p.m.
- **Recommendation:** Don't submit work so close to the deadline that you have to worry about bandwidth issues, Canvas issues, or discrepancies in your system clock and the Canvas clock. These will not be considered extenuating circumstances

Part –I : Priority Queue (Points: 2.5)

1. Students are to implement a priority queue using C language
2. Ask user for number of elements for the Priority Queue
3. User input elements and their Priority
4. Display elements with their Priority
5. Ask use for Dequeue.
6. If user input dequeue, the element with highest priority should be removed from the existing list and then display the new list.
7. 5 is the highest priority, 1 is the lowest priority for a process
8. Students can use any data structure to implement the Priority Queue

```
<Student Name>, abc123 (Spring 2024)
--- P-Queue: 5 = Highest, 1 = Lowest ---
Enter P-Queue Length = 3
Enter element 1: 2
Enter priority of element 1: 0
Enter element 2: 2
Enter priority of element 2: 4
Enter element 3: 15
Enter priority of element 3: 2
----Priority Queue Full------
Priority Queue Before Dequeue :
(Element: 2, Priority: 0)
(Element: 2, Priority: 4)
(Element: 15, Priority: 2)
-----------------------------------
Dequeue (1 for yes, 0 for exit): 1
Priority Queue After Dequeue :
(Element: 2, Priority: 0)
(Element: 15, Priority: 2)
-----------------------------------
Dequeue (1 for yes, 0 for exit): 0
```

Part –II : Huffman Encoding (Points 2.5)

- In this assignment you have to create a Huffman Encoding Table and Tree for your first or last name.
- ***Note:*** *This is not a coding assignment.*

CS 2124: DATA STRUCTURES
Spring 2024
Name: XYZ (abc123)

1. Huffman Code/bit representation Table of your name.
   a) Fix bit representation (points: 1)
   b) Variable bit representation (points: 1)
2. Huffman Tree of your name. (You must use a software to draw the tree i.e. MS word, Visio etc. Do not hand draw the tree)
   a) Fix bit representation (points: 0.2)
   b) Variable bit representation (points: 0.3)
   c) Highlight which Huffman bit representation require less bits for encoding i.e. Fix bit representation or variable bit representation, just like in lecture slides

Note: Fix bit representation depends on your name characters

a) 3 bits can represent 8 characters, 4 bit can represent 16 characters
b) If you have more then 8 characters use 4 bit representation. You do not need to use all the bits i.e. you can use 4 bits to represent 9 characters.