National Institute of Technology Calicut
Department of Computer Science and Engineering
Third Semester B. Tech.(CSE)
CS2092D Programming Laboratory

Evaluation - Assignment #6 (22.10.2020)

Instructions: Three questions are given below. Complete each question in the given sequence. For questions 1 and 3, write the design in the shared doc, get your design approved by the instructor before you start coding. Proceed to the next question only after showing the results of the previous program to your instructor. In case of clarifications, your instructor will help you.

Marks (Design + Implementation): Q1: 1.5+1.5 Q2: 0+2 Q3: 2+3

Time: Q1 and Q2: till 5.00 P.M Q3: till 5.30 P.M

1. Suppose for each first year batch, we maintain a list to store the $CGPA$ acquired by students in that batch. The list is kept sorted in the non decreasing order of $CGPA$. Write a function COMBINE(L_1, L_2) that given two such lists L_1 and L_2, *inserts* each element of L_2 to L_1 in its correct sorted position, such that at the end L_1 will contain all elements of both the lists together in sorted order. Declare $CGPA$ as `float` type (rounded to 2 decimal places). Assume maximum batch strength is 50. Use array to implement the list. Input will be given in sorted order. It may be noted that the COMBINE operation is to be done through a sequence of insertions (do not write any sorting/merging algorithms). You may define other required functions.

   Input format:

   - The first line of the input contains integers $n_1 \in [0,\ 50]$ and $n_2 \in [0,\ 50]$, the size of the two lists L_1 and L_2.
   - The second line lists the n_1 elements of L_1, as space-separated float type values in the range $[0.00,\ 10.00]$ in sorted order.
   - The third line lists the n_2 elements of L_2, as space-separated float type values in the range $[0.00,\ 10.00]$ in sorted order.

   Output Format:

   - The first line of the output contains the elements of L_1 (after COMBINE()) in sorted order, separated by space.

   Sample Input:

   4 3
   5.01 6.92 7.01 8.08
   6.51 8.92 9.07

   Sample Output:

   5.01 6.51 6.92 7.01 8.08 8.92 9.07

2. Modify the list in Qn No.1 so as to store for each student *name* and $CGPA$. You can use an array of structures. Rewrite the function COMBINE() to take care of array of structures. You have to use the same logic, that is repeated insertions.

   Input format:

   - The first line of the input contains integers n_1 and $n_2 \in [0, 50]$ separated by space, the size of the two lists L_1 and L_2.

- Next n_1 lines contains the students *name* and $CGPA$ (sorted order) in L_1 separated by space.
- Next n_2 lines contains the students *name* and $CGPA$ (sorted order) in L_2 separated by space.

Output Format:

- The output contains the elements of L_1 (after COMBINE()) in sorted order of $CGPA$, with each student's detail written on a separate line in the order $name, CGPA$ separated by space.

Sample Input:

```
4 3
ab1 5.01
ab2 6.92
ab3 7.01
ab4 8.08
xy1 6.51
xy2 8.92
xy3 9.07
```

Sample Output:

```
ab1 5.01
xy1 6.51
ab2 6.92
ab3 7.01
ab4 8.08
xy2 8.92
xy3 9.07
```

3. Modify the program for Qn No.2. to use Singly Linked Lists for storing student records. Rewrite the function COMBINE() for linked lists, using the same logic, that is repeated insertions.