SSN College of Engineering, Kalavakkam
Department of Computer Science and Engineering
III Semester - CSE
UCS 1312 Data Structures Lab Laboratory

Academic Year: 2021-2022 **Batch: 2020-2024**

Date of Assignment: 27.09.2021

Exercise 3: ListADT and its Applications

[CO1, K3]

ListADT will have character item and a pointer to previous and next node. Create a ListADT which has implementations for the following operations

Insert an item in the front of the list
void insertFront(listADT L, char c)
Insert an item at the end of the list
void insertEnd(listADT L, char c)
Insert an item 'd' after the first occurrence 'c' of the list
void insertMiddle(listADT L, char c, char d)
Display the items from the list
void displayItems(listADT L)
Delete the item present in the list
void deleteItem(listADT L, char c)
Search an element in the list and return the number of occurrences
int searchItem(listADT L, char c)

1. Demonstrate the ListADT with the following testcase

   Initially L is Empty
   insertFront(L,'A') → header←→A
   insertEnd(L,'B') → header←→A←→B
   insertMiddle(L,'A','E') → header←→A←→E←→B
   insertMiddle(L,'A','E') → header←→A←→ E←→E←→B

   search(L,'E') → 2

2. Create an application using the ListADT to do the following

   a. Check whether the list is palindrome or not
   b. Create separate lists containing vowels and consonants from the list
   c. Swap kth node from the beginning with kth node from the end

Testcase for the Application

a. Check whether the list is palindrome or not

Input: Header←→A←→C←→E←→K←→P←→I←→O←→U←→J

Output: Not a palindrome
Input: Header←→A←→P←→P←→A
Output: Palindrome

b. Create lists containing vowels and consonants

Input: Header←→A←→C←→E←→K←→P←→I←→O←→U←→J
Output:
Header1←→A←→E←→I←→O←→U
Header2←→C←→K←→P←→J

c. Swap k^{th} node from the beginning with k^{th} node from the end

Input: Header←→A←→C←→E←→K←→P←→I←→O←→U←→J
K=2
Output: Header←→A←→U←→E←→K←→P←→I←→O←→C←→J