**Data Structures Lab (CSC204)** **Session: Monsoon 2023-24**
**III BTech (CSE)** **Date: 28.08.2023**

## Assignment-4 (Linked List-III & Stack)

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1. A music player application utilizes a doubly linked list to store the songs in a specific order to form a playlist. A doubly linked list enables seamless navigation to both the next and previous songs, allowing for a smooth bidirectional movement that enhances the user experience. You are required to write the program for the given application so that the user will be able to perform the below tasks.

   a) Create a function ***Playlist***( ) to create the playlist and populate the playlist with $N(N >= 5)$ songs. The songs in the playlist can be represented in the form of distinct alphabets.

   **Sample Input:**
   Enter the number of songs (N): 6
   Enter the songs: $V\ B\ N\ M\ H\ P$

   **Sample Output:**
   The playlist is: $V \leftrightarrow B \leftrightarrow N \leftrightarrow M \leftrightarrow H \leftrightarrow P$

   b) Create a function ***Insert_song***( ) to add a new song at the end of the current playlist and print the updated playlist from end to start. This function takes the *head* pointer of the linked list as an argument.

   **Sample Input:**
   Enter the name of new song: $A$

   **Sample Output:**
   The updated playlist is: $A \leftrightarrow P \leftrightarrow H \leftrightarrow M \leftrightarrow N \leftrightarrow B \leftrightarrow V$

   c) Create a function ***Delete_song***( ) to delete a song from the current playlist and print the updated playlist. This function takes the head pointer of the linked list as an argument.

   **Sample Input:**
   Enter the song to be deleted: $M$

   **Sample Output:**
   The updated playlist is: $V \leftrightarrow B \leftrightarrow N \leftrightarrow H \leftrightarrow P \leftrightarrow A$

2. A palindrome is a string that is same when read from front or back, e.g., strings such as

"abba", "radar", "malayalam" are palindromes. Stacks may be used to detect a palindrome. Write a function $\boldsymbol{Checke\_Palindrome(str)}$ that takes a string $\boldsymbol{str}$ as input and returns $\boldsymbol{TRUE}$ if the string is a palindrome and $\boldsymbol{FALSE}$ otherwise. Note that you are $NOT$ allowed to use any operation other than $\boldsymbol{PUSH}$( ) and $\boldsymbol{POP}$( ) operations.

**Sample Input-1: civic**

**Sample Output-1: The string is a palindrome**

**Sample Input-2: limit**

**Sample Output-2: The string is not a palindrome**

3. Write a function $\boldsymbol{Postfix\_Evaluation(E)}$ to evaluate a given postfix expression in the form of a string $\boldsymbol{E}$ ends with a stop flag '#'. Also note that the tokens present in the given postfix express are separated by comma symbol (',').

**Sample Input:**
Enter the postfix expression: 2,3,*,4,+,#

**Sample Output:** 10