Rajalakshmi Engineering College

Name: subhashri bala
Email: 240801337@rajalakshmi.edu.in
Roll no: 2116240801337
Phone: 7418182298
Branch: REC
Department: I ECE AF
Batch: 2028
Degree: B.E - ECE

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 1

Attempt : 2
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Your task is to create a program to manage a playlist of items. Each item is represented as a character, and you need to implement the following operations on the playlist.

Here are the main functionalities of the program:

Insert Item: The program should allow users to add items to the front and end of the playlist. Items are represented as characters.Display Playlist: The program should display the playlist containing the items that were added.

To implement this program, a doubly linked list data structure should be used, where each node contains an item character.

Input Format

The input consists of a sequence of space-separated characters, representing the items to be inserted into the doubly linked list.

The input is terminated by entering - (hyphen).

Output Format

The first line of output prints "Forward Playlist: " followed by the linked list after inserting the items at the end.

The second line prints "Backward Playlist: " followed by the linked list after inserting the items at the front.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: a b c -

Output: Forward Playlist: a b c
Backward Playlist: c b a

Answer

```
#include <stdio.h>
#include <stdlib.h>

struct Node {
    char item;
    struct Node* next;
    struct Node* prev;
};

// You are using GCC
void insertAtEnd(struct Node** head, char item) {
   struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
   if(newNode == NULL){
      printf("Memory allocation failed!\n");
      return;
   }
   newNode->item = item;
   newNode->next = NULL;
   if(*head == NULL){
```

```
        newNode->prev = NULL;
        *head = newNode;
    }
    else{
        struct Node* current = *head;
        while(current->next != NULL){
            current = current->next;
        }
        newNode->prev = current;
        current->next = newNode;
    }
}
void displayForward(struct Node* head) {
    struct Node* current = head;
    while(current!=NULL){
        printf("%c ",current->item);
        current = current->next;
    }
    printf("\n");
}
void displayBackward(struct Node* tail) {
    if(tail == NULL){
        printf("\n");
        return;
    }
    struct Node* current = tail;
    while(current !=NULL){
        printf("%c ",current->item);
        current = current->prev;
    }
    printf("\n");
}
void freePlaylist(struct Node* head) {
    struct Node* current = head;
    struct Node* next;
    while(current != NULL){
        next = current->next;
        free(current);
        current = next;
    }
}
int main() {
```

```
    struct Node* playlist = NULL;
    char item;

    while (1) {
        scanf(" %c", &item);
        if (item == '-') {
            break;
        }
        insertAtEnd(&playlist, item);
    }

    struct Node* tail = playlist;
    while (tail->next != NULL) {
        tail = tail->next;
    }

    printf("Forward Playlist: ");
    displayForward(playlist);

    printf("Backward Playlist: ");
    displayBackward(tail);

    freePlaylist(playlist);

    return 0;
}
```

Status : Correct ***Marks : 10/10***