Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_MCQ_Updated

Attempt : 1
Total Mark : 20
Marks Obtained : 12

Section 1 : MCQ

1. How do you delete a node from the middle of a doubly linked list?

Answer

Update the prev pointer of the next node

Status : Wrong ***Marks : 0/1***

2. Which of the following is false about a doubly linked list?

Answer

Implementing a doubly linked list is easier than singly linked list

Status : Correct ***Marks : 1/1***

3. What does the following code snippet do?

```
struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
newNode->data = value;
newNode->next = NULL;
newNode->prev = NULL;
```

Answer

Creates a new node and initializes its data to 'value'

Status : Correct ***Marks : 1/1***

4. What is a memory-efficient double-linked list?

Answer

Each node has only one pointer to traverse the list back and forth

Status : Wrong ***Marks : 0/1***

5. Which of the following statements correctly creates a new node for a doubly linked list?

Answer

struct Node newNode = (struct Node*) malloc(sizeof(struct Node));

Status : Wrong ***Marks : 0/1***

6. What will be the effect of setting the prev pointer of a node to NULL in a doubly linked list?

Answer

It will break the list

Status : Wrong ***Marks : 0/1***

7. What is the correct way to add a node at the beginning of a doubly linked list?

Answer

void addFirst(int data){   Node* newNode = new Node(data);
head = newNode;}

Status : Wrong ***Marks : 0/1***

8. Where Fwd and Bwd represent forward and backward links to the adjacent elements of the list. Which of the following segments of code deletes the node pointed to by X from the doubly linked list, if it is assumed that X points to neither the first nor the last node of the list?

A doubly linked list is declared as

```
struct Node {
    int Value;
    struct Node *Fwd;
    struct Node *Bwd;
);
```

Answer

X->Bwd.Fwd = X->Fwd ; X.Fwd->Bwd = X->Bwd;

Status : Wrong ***Marks : 0/1***

9. Which of the following information is stored in a doubly-linked list's nodes?

Answer

All of the mentioned options

Status : Correct ***Marks : 1/1***

10. Consider the following function that refers to the head of a Doubly Linked List as the parameter. Assume that a node of a doubly linked list has the previous pointer as prev and the next pointer as next.

Assume that the reference of the head of the following doubly linked list is passed to the below function 1 <--> 2 <--> 3 <--> 4 <--> 5 <-->6. What should

be the modified linked list after the function call?

```
Procedure fun(head_ref: Pointer to Pointer of node)
   temp = NULL
   current = *head_ref

   While current is not NULL
      temp = current->prev
      current->prev = current->next
      current->next = temp
      current = current->prev
   End While

   If temp is not NULL
      *head_ref = temp->prev
   End If
End Procedure
```

Answer

6 <--> 5 <--> 4 <--> 3 <--> 2 <--> 1.

Status : Correct ***Marks : 1/1***

11. Which of the following is true about the last node in a doubly linked list?

Answer

Its next pointer is NULL

Status : Correct ***Marks : 1/1***

12. What will be the output of the following program?

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

struct Node {
   int data;
```

```
    struct Node* next;
    struct Node* prev;
};

int main() {
    struct Node* head = NULL;
    struct Node* tail = NULL;
    for (int i = 0; i < 5; i++) {
        struct Node* temp = (struct Node*)malloc(sizeof(struct Node));
        temp->data = i + 1;
        temp->prev = tail;
        temp->next = NULL;
        if (tail != NULL) {
            tail->next = temp;
        } else {
            head = temp;
        }
        tail = temp;
    }
    struct Node* current = head;
    while (current != NULL) {
        printf("%d ", current->data);
        current = current->next;
    }
    return 0;
}
```

Answer

1 2 3 4 5

Status : Correct ***Marks : 1/1***

13. What is the main advantage of a two-way linked list over a one-way linked list?

Answer

Two-way linked lists allow for traversal in both directions.

Status : Correct ***Marks : 1/1***

14. How many pointers does a node in a doubly linked list have?

Answer

2

Status : Correct ***Marks : 1/1***

15. Which pointer helps in traversing a doubly linked list in reverse order?

Answer

prev

Status : Correct ***Marks : 1/1***

16. What happens if we insert a node at the beginning of a doubly linked list?

Answer

The previous pointer of the new node is NULL

Status : Correct ***Marks : 1/1***

17. What will be the output of the following code?

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

struct Node {
    int data;
    struct Node* next;
    struct Node* prev;
};

int main() {
    struct Node* head = NULL;
    struct Node* temp = (struct Node*)malloc(sizeof(struct Node));
    temp->data = 2;
```

```
    temp->next = NULL;
    temp->prev = NULL;
    head = temp;
    printf("%d\n", head->data);
    free(temp);
    return 0;
}
```

Answer

2

Status : Correct ***Marks : 1/1***

18. How do you reverse a doubly linked list?

Answer

By traversing the list in reverse order and creating a new reversed list

Status : Wrong ***Marks : 0/1***

19. Consider the provided pseudo code. How can you initialize an empty two-way linked list?

```
Define Structure Node
    data: Integer
    prev: Pointer to Node
    next: Pointer to Node
End Define

Define Structure TwoWayLinkedList
    head: Pointer to Node
    tail: Pointer to Node
End Define
```

Answer

struct TwoWayLinkedList* list = malloc(sizeof(struct TwoWayLinkedList)); list->head = NULL; list->tail = NULL;

Status : Correct ***Marks : 1/1***

20. Which code snippet correctly deletes a node with a given value from a doubly linked list?

```
void deleteNode(Node** head_ref, Node* del_node) {
    if (*head_ref == NULL || del_node == NULL) {
        return;
    }
    if (*head_ref == del_node) {
        *head_ref = del_node->next;
    }
    if (del_node->next != NULL) {
        del_node->next->prev = del_node->prev;
    }
    if (del_node->prev != NULL) {
        del_node->prev->next = del_node->next;
    }
    free(del_node);
}
```

Answer

Deletes the node at a given position in a doubly linked list.

Status : Wrong ***Marks : 0/1***

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 1

Attempt : 1
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*temp;
    struct Node*Newnode=(struct Node*)malloc(sizeof(struct Node));
    Newnode->item=item;
    Newnode->next=NULL;
    if(*head==NULL){
        Newnode->prev=*head;
        *head=temp=Newnode;
```

```
    }
    else{
        temp=*head;
        while(temp->next!=NULL){
            temp=temp->next;
        }
        Newnode->prev=temp;
        temp->next=Newnode;
        temp=Newnode;

    }
   //type your code here
}
void displayForward(struct Node* head) {
    while(head!=NULL){
        printf("%c ",head->item);
        head=head->next;

    }
    printf("\n");
    //type your code here
}

void displayBackward(struct Node* tail) {
    while(tail!=NULL){
        printf("%c ",tail->item);
        tail=tail->prev;

    }
    printf("\n");
    //type your code here
}

void freePlaylist(struct Node* head) {
    struct Node*temp;
    while(head!=NULL){
        temp=head;
        head=head->next;
        free(temp);
    }
    //type your code here
}
```

```
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***

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 2

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Moniksha, a chess coach organizing a tournament, needs a program to manage participant IDs efficiently. The program maintains a doubly linked list of IDs and offers two functions: Append to add IDs as students register, and Print Maximum ID to identify the highest ID for administrative tasks.

This tool streamlines tournament organization, allowing Moniksha to focus on coaching her students effectively.

Input Format

The first line consists of an integer n, representing the number of participant IDs to be added.

The second line consists of n space-separated integers representing the participant IDs.

Output Format

The output displays a single integer, representing the maximum participant ID.

If the list is empty, the output prints "Empty list!".

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 3
163 137 155
Output: 163

Answer

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


struct Node {
    int id;
    struct Node* prev;
    struct Node* next;
};


struct DoublyLinkedList {
    struct Node* head;
    struct Node* tail;
};


void initList(struct DoublyLinkedList* list) {
    list->head = NULL;
    list->tail = NULL;
}


void append(struct DoublyLinkedList* list, int id) {
```

```
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
    newNode->id = id;
    newNode->prev = NULL;
    newNode->next = NULL;

    if (list->tail == NULL) {

        list->head = newNode;
        list->tail = newNode;
    } else {

        list->tail->next = newNode;
        newNode->prev = list->tail;
        list->tail = newNode;
    }
}


void printMax(struct DoublyLinkedList* list) {
    if (list->head == NULL) {
        printf("Empty list!\n");
        return;
    }

    struct Node* current = list->head;
    int maxID = current->id;


    while (current != NULL) {
        if (current->id > maxID) {
            maxID = current->id;
        }
        current = current->next;
    }

    printf("%d\n", maxID);
}

int main() {
    int n;
    scanf("%d", &n);
```

```
    if (n == 0) {
        printf("Empty list!\n");
        return 0;
    }

    struct DoublyLinkedList list;
    initList(&list);


    for (int i = 0; i < n; i++) {
        int id;
        scanf("%d", &id);
        append(&list, id);
    }


    printMax(&list);

    return 0;
}
```

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

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 3

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Bob is tasked with developing a company's employee record management system. The system needs to maintain a list of employee records using a doubly linked list. Each employee is represented by a unique integer ID.

Help Bob to complete a program that adds employee records at the front, traverses the list, and prints the same for each addition of employees to the list.

Input Format

The first line of input consists of an integer N, representing the number of employees.

The second line consists of N space-separated integers, representing the employee IDs.

Output Format

For each employee ID, the program prints "Node Inserted" followed by the current state of the doubly linked list in the next line, with the data values of each node separated by spaces.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 4
101 102 103 104

Output: Node Inserted
101
Node Inserted
102 101
Node Inserted
103 102 101
Node Inserted
104 103 102 101

Answer

```
#include <iostream>
using namespace std;

struct node {
    int info;
    struct node* prev, * next;
};

struct node* start = NULL;

// You are using GCC
void traverse() {
    node*pos=start;
    printf("Node Inserted\n");
    while(pos!=NULL){
        printf("%d ",pos->info);
        pos=pos->next;
    }
    printf("\n");
```

```
}

void insertAtFront(int data) {
    //type your code here
    node* newnode=(node*)malloc(sizeof(node));
    newnode->info=data;
    newnode->next=start;
    start=newnode;

}

int main() {
    int n, data;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> data;
        insertAtFront(data);
        traverse();
    }
    return 0;
}
```

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

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 4

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Ravi is developing a student registration system for a college. To efficiently store and manage the student IDs, he decides to implement a doubly linked list where each node represents a student's ID.

In this system, each student's ID is stored sequentially, and the system needs to display all registered student IDs in the order they were entered.

Implement a program that creates a doubly linked list, inserts student IDs, and displays them in the same order.

Input Format

The first line contains an integer N the number of student IDs.

The second line contains N space-separated integers representing the student IDs.

Output Format

The output should display the single line containing N space-separated integers representing the student IDs stored in the doubly linked list.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
10 20 30 40 50
Output: 10 20 30 40 50

Answer

```
// You are using GCC
#include<stdio.h>
#include<stdlib.h>

typedef struct Node{
   int data;
   struct Node* prev;
   struct Node* next;

}Node;

Node* createNode(int data){
   Node* newNode=(Node*)malloc(sizeof(Node));
   newNode->data=data;
   newNode->prev=NULL;
   newNode->next=NULL;
   return newNode;

}

void insertEnd(Node** head,int data){
   Node *newNode=createNode(data);
   if(*head==NULL){
      *head=newNode;
```

```
        return;

    }
    Node* temp=*head;
    while(temp->next!=NULL){
        temp=temp->next;

    }
    temp->next=newNode;
    newNode->prev=temp;

}
void display(Node* head){
    Node *temp=head;
    while(temp!=NULL){
        printf("%d",temp->data);
        if(temp->next!=NULL){
            printf(" ");

        }
        temp=temp->next;

    }
}
int main(){
    int N;
    scanf("%d",&N);

    Node *head=NULL;
    for (int i=0;i<N;i++){
        int studentsID;
        scanf("%d",&studentsID);
        insertEnd(&head,studentsID);

    }
    display(head);
    return 0;
}
```

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

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 3

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Bob is tasked with developing a company's employee record management system. The system needs to maintain a list of employee records using a doubly linked list. Each employee is represented by a unique integer ID.

Help Bob to complete a program that adds employee records at the front, traverses the list, and prints the same for each addition of employees to the list.

Input Format

The first line of input consists of an integer N, representing the number of employees.

The second line consists of N space-separated integers, representing the employee IDs.

Output Format

For each employee ID, the program prints "Node Inserted" followed by the current state of the doubly linked list in the next line, with the data values of each node separated by spaces.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 4
101 102 103 104

Output: Node Inserted
101
Node Inserted
102 101
Node Inserted
103 102 101
Node Inserted
104 103 102 101

Answer

```
#include <iostream>
using namespace std;

struct node {
    int info;
    struct node* prev, * next;
};

struct node* start = NULL;

// You are using GCC
void traverse() {
    node*pos=start;
    printf("Node Inserted\n");
    while(pos!=NULL){
        printf("%d ",pos->info);
        pos=pos->next;
    }
    printf("\n");
```

```
}

void insertAtFront(int data) {
    //type your code here
    node* newnode=(node*)malloc(sizeof(node));
    newnode->info=data;
    newnode->next=start;
    start=newnode;

}

int main() {
    int n, data;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> data;
        insertAtFront(data);
        traverse();
    }
    return 0;
}
```

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

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_CY

Attempt : 1
Total Mark : 30
Marks Obtained : 0

Section 1 : Coding

1. Problem Statement

Sam is learning about two-way linked lists. He came across a problem where he had to populate a two-way linked list and print the original as well as the reverse order of the list. Assist him with a suitable program.

Input Format

The first line of input consists of an integer n, representing the number of elements in the list.

The second line consists of n space-separated integers, representing the elements.

Output Format

The first line displays the message: "List in original order:"

The second line displays the elements of the doubly linked list in the original order.

The third line displays the message: "List in reverse order:"

The fourth line displays the elements of the doubly linked list in reverse order.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 5
1 2 3 4 5
Output: List in original order:
1 2 3 4 5
List in reverse order:
5 4 3 2 1

Answer

-

Status : Skipped ***Marks : 0/10***

2. Problem Statement

Krishna needs to create a doubly linked list to store and display a sequence of integers. Your task is to help write a program to read a list of integers from input, store them in a doubly linked list, and then display the list.

Input Format

The first line of input consists of an integer n, representing the number of integers in the list.

The second line of input consists of n space-separated integers.

Output Format

The output prints a single line displaying the integers in the order they were

added to the doubly linked list, separated by spaces.

If nothing is added (i.e., the list is empty), it will display "List is empty".

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 5
1 2 3 4 5
Output: 1 2 3 4 5

Answer

-

Status : - ***Marks : 0/10***

3. Problem Statement

Ashiq is developing a ticketing system for a small amusement park. The park issues tickets to visitors in the order they arrive. However, due to a system change, the oldest ticket (first inserted) must be revoked instead of the last one.

To manage this, Ashiq decided to use a doubly linked list-based stack, where:

Pushing adds a new ticket to the top of the stack.Removing the first inserted ticket (removing from the bottom of the stack).Printing the remaining tickets from bottom to top.

Input Format

The first line consists of an integer n, representing the number of tickets issued.

The second line consists of n space-separated integers, each representing a ticket number in the order they were issued.

Output Format

The output prints space-separated integers, representing the remaining ticket

numbers in the order from bottom to top.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 7
24 96 41 85 97 91 13
Output: 96 41 85 97 91 13

Answer

-

Status : *-* ***Marks : 0/10***