

Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_CY

Attempt : 1
Total Mark : 30
Marks Obtained : 30

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

```
// You are using GCC
```

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

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

```
typedef struct node{
```

```
    int data;struct node *next,*prev;
```

```
}node;
```

```
node *head=0;
```

```
node *create(int val){
```

```
    node *newnode=(node*)malloc(sizeof(node));
```

```
    newnode->data=val;
```

```
    newnode->prev=0;
```

```
    newnode->next=0;
```

```
    return newnode;
```

```
}
```

```
void insert(int val){
```

```
    node *newnode=create(val);
```

```
    if(head==0){
```

```
        head=newnode;
```

```
    }
```

```
    else{
```

```
        node *t=head;
```

```

        while(t->next!=0){
            t=t->next;
        }
        t->next=newnode;
        newnode->prev=t;
        t=newnode;
    }
}
void display(){
    node *t=head;
    printf("List in original order:");
    while(t!=0){
        printf("%d ",t->data);
        t=t->next;
    }
}
void reverse(){
    node *t=head;
    printf("List in reverse order:");
    while(t->next!=0){
        t=t->next;
    }
    while(t!=0){
        printf("%d ",t->data);
        t=t->prev;
    }
}
int main(){
    int n,val;
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        scanf("%d",&val);
        insert(val);
    }
    display();printf("\n");
    reverse();
}

```

Status : Correct

Marks : 10/10

2. Problem Statement

Imagine you're managing a store's inventory list, and some products were accidentally entered multiple times. You need to remove the duplicate products from the list to ensure each product appears only once.

You have an unsorted doubly linked list of product IDs. Some of these product IDs may appear more than once, and your goal is to remove any duplicates.

Input Format

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

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

Output Format

The output prints the final after removing duplicate nodes, separated by a space.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 10

12 12 10 4 8 4 6 4 4 8

Output: 8 4 6 10 12

Answer

```
// You are using GCC
#include<stdlib.h>
#include<stdio.h>
typedef struct node{
    int data;struct node*prev;struct node *next;
}node;
void append(node **head,int val){
    node *newnode=(node*)malloc(sizeof(node));
    newnode->data=val;
```

```

newnode->prev=NULL;
newnode->next=NULL;
if(*head==NULL){
    *head=newnode;
    return;
}
node *t=*head;
while(t->next!=NULL){
    t=t->next;
}
t->next=newnode;
newnode->prev=t;
}
void removed(node **head){
    int seen[101]={0};
    node *t=*head;
    while(t&& t->next!=NULL) t=t->next;

```

```

while(t!=NULL){
    node *prev=t->prev;
    if(seen[t->data]){
        if(t->prev){
            t->prev->next=t->next;
        }
        if(t->next){
            t->next->prev=t->prev;
        }
        if(t==*head){
            *head=t->next;
        }
        free(t);
    }
    else{
        seen[t->data]=1;
    }
    t=prev;
}
}

```

```

void reverse(node *head){
    if(head==NULL){
        return;
    }
}

```

```

node *t=head;
while(t->next!=NULL){
    t=t->next;
}
while(t!=NULL){
    printf("%d",t->data);
    if(t->prev!=NULL){
        printf(" ");
    }
    t=t->prev;
}
printf("\n");
}
void freelist(node *head){
    node *t;
    while(head!=NULL){
        t=head;head=head->next;
        free(t);
    }
}

int main(){
    int n;scanf("%d",&n);
    node *head=NULL;
    for(int i=0;i<n;i++){
        int val;scanf("%d",&val);
        append(&head,val);
    }
    removed(&head);
    reverse(head);
    freelist(head);return 0;
}

```

Status : Correct

Marks : 10/10

3. 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

```
// You are using GCC
#include<stdlib.h>
#include<stdio.h>
typedef struct node{
    int data;struct node *next,*prev;
}node;
node *head=0;
node *create(int val){
    node *newnode=(node*)malloc(sizeof(node));
    newnode->data=val;newnode->prev=0;
    newnode->next=0;
    return newnode;
}
void insert(int val){
    node *newnode=create(val);
    if(head==0){
        head=newnode;
```

```

    }
    else{
        node *t=head;
        while(t->next!=0){
            t=t->next;

        }
        t->next=newnode;
        newnode->prev=t;
        t=newnode;
    }
}
void display(){
    if (head==0){
        printf("List is empty");
    }
    node *t=head;
    while(t!=0){
        printf("%d" ,t->data);
        t=t->next;
    }
}
int main(){
    int n,val;
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        scanf("%d",&val);
        insert(val);
    }
    display();
}

```

Status : Correct

Marks : 10/10