

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

Imagine Anu is tasked with finding the middle element of a doubly linked list. Given a doubly linked list where each node contains an integer value and is inserted at the end, implement a program to find the middle element of the list. If the number of nodes is even, return the middle element pair.

Input Format

The first line of input consists of an integer N, representing the number of nodes in the doubly linked list.

The second line consists of N space-separated integers, representing the values of the nodes in the doubly linked list.

Output Format

The first line of output prints the space-separated elements of the doubly linked list.

The second line prints the middle element(s) of the doubly linked list, depending on whether the number of nodes is odd or even.

Refer to the sample outputs for the formatting specifications.

Sample Test Case

Input: 5

10 20 30 40 50

Output: 10 20 30 40 50
30

Answer

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

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

```
typedef struct node{  
    struct node* prev;  
    int ele;  
    struct node* next;  
}node;
```

```
node*list=NULL;node*tail=NULL;  
int count=0;
```

```
void insertbeg(int e){  
    node*newnode=(node*)malloc(sizeof(node));  
    newnode->ele=e;  
    newnode->prev=NULL;  
    if(list==NULL){  
        newnode->next=NULL;  
        list=tail=newnode;  
        return;  
    }  
    else{  
        newnode->next=list;  
        list->prev=newnode;  
        list=newnode;  
    }  
}
```

```

        count++;
    }

    int mid(){
        node*position=list;
        for(int i=0;i<count/2;i++)
            position=position->next;
        if(count%2!=0)
            printf("%d ",position->next->ele);
        return position->ele;
    }

    void display(){
        node*position=tail;
        while(position!=NULL){
            printf("%d ",position->ele);
            position=position->prev;
        }
        printf("\n");
    }

    int main(){

        int n;
        scanf("%d",&n);
        for(int i=0;i<n;i++){
            int a;
            scanf("%d",&a);
            insertbeg(a);
        }
        display();
        printf("%d",mid());
    }

```

Status : Correct

Marks : 10/10

2. Problem Statement

Aarav is working on a program to analyze his test scores, which are stored in a doubly linked list. He needs a solution to input scores into the list and determine the highest score.

Help him by providing code that lets users enter test scores into the doubly linked list and find the maximum score efficiently.

Input Format

The first line consists of an integer N, representing the number of elements to be initially inserted into the doubly linked list.

The second line consists of N space-separated integers, denoting the score to be inserted.

Output Format

The output prints an integer, representing the highest score present in the list.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 4
89 71 2 70
Output: 89

Answer

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

typedef struct node{
    struct node*prev;
    int ele;
    struct node*next;
}node;

node*list=NULL;
int max=0;

void insertBegAndCalcMax(int e){
    node*newnode=(node*)malloc(sizeof(node));
    newnode->prev=NULL;
    newnode->ele=e;
```

```

    if(list==NULL){
        newnode->next=NULL;
        list=newnode;
    }
    else{
        newnode->next=list;
        list->prev=newnode;
        list=newnode;
    }
    if(e>max)
        max=e;
}

int main(){
    int n;
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        int e;
        scanf("%d",&e);
        insertBegAndCalcMax(e);
    }
    printf("%d",max);
}

```

Status : Correct

Marks : 10/10

3. Problem Statement

Vanessa is learning about the doubly linked list data structure and is eager to play around with it. She decides to find out how the elements are inserted at the beginning and end of the list.

Help her implement a program for the same.

Input Format

The first line of input contains an integer N, representing the size of the doubly linked list.

The next line contains N space-separated integers, each representing the values to be inserted into the doubly linked list.

Output Format

The first line of output prints the integers, after inserting them at the beginning, separated by space.

The second line prints the integers, after inserting at the end, separated by space.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5

1 2 3 4 5

Output: 5 4 3 2 1

1 2 3 4 5

Answer

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

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

```
typedef struct node{  
    struct node*prev;  
    int e;  
    struct node*next;  
}node;
```

```
node*list=NULL;node*tail=NULL;
```

```
void insertbeg(int e){  
    node*newnode=(node*)malloc(sizeof(node));  
    newnode->e=e;  
    newnode->prev=NULL;  
    if(list==NULL){  
        newnode->next=NULL;  
        list=tail=newnode;  
    }  
    else{  
        newnode->next=list;  
        list->prev=newnode;
```

```

        list=newnode;
    }
}

void traverse2way(){
    node*position=list;
    while(position!=NULL){
        printf("%d ",position->e);
        position=position->next;
    }
    printf("\n");
    position=tail;
    while(position!=NULL){
        printf("%d ",position->e);
        position=position->prev;
    }
    printf("\n");
}

```

```

int main(){
    int n;
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        int a;
        scanf("%d",&a);
        insertbeg(a);
    }
    traverse2way();
}

```

Status : Correct

Marks : 10/10