



Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

(Autonomous College Affiliated to the University of Mumbai)

NAAC Accredited with "A" Grade (CGPA : 3.18)



Department of Information Technology

COURSE CODE: DJS22ITL302

DATE: 5/10/2023

COURSE NAME: Data Structure Laboratory

CLASS: I1-Batch1

NAME: Anish Sharma

Experiment No. 5

CO/LO: CO1

Aim: Implement Doubly LinkedList

Theory:

Doubly linked list is a complex type of linked list in which a node contains a pointer to the previous as well as the next node in the sequence. Therefore, in a doubly linked list, a node consists of three parts: node data, pointer to the next node in sequence (next pointer) , pointer to the previous node (previous pointer).

Program:

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

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

```
struct node{
```

```
    int data;
```

```
    struct node* next;
```

```
    struct node* prev;
```

```
};
```

```
struct node*temp,*newnode;
```

```
struct node*head=NULL;
```

```
void insertAtEnd(){
```



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```
int x;

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

printf("\nEnter a data of created node:\n");

scanf("%d",&x);

newnode->data=x;

newnode->next=NULL;

newnode->prev=NULL;

if(head==NULL){

    head=temp=newnode;

}

else{

    temp->next=newnode;

    newnode->prev=temp;

    temp=newnode;

}

}

void insertAtStart(){

    int x;

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

    printf("\nEnter a data of created node:\nqaws");

    scanf("%d",&x);
```



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```
newnode->data=x;

newnode->prev=NULL;

newnode->next=head;

head=newnode;

}

void insertAtPos(){

    int pos;

    printf("\nEnter a position:\n");

    scanf("%d",&pos);

    temp=head;

    int i;

    for(i=1;i<pos;i++){

        temp=temp->next;

    }

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

    int x;

    printf("\nEnter a data of created node:\n");

    scanf("%d",&x);

    newnode->data=x;

    newnode->prev=temp->prev->next;

    temp->prev->next=newnode;
```



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```
newnode->next=temp;
```

```
temp->prev=newnode;
```

```
}
```

```
void delAtEnd(){
```

```
    temp=head;
```

```
    while(temp->next!=NULL){
```

```
        temp=temp->next;
```

```
    }
```

```
    printf("\nDeleted data:%d\n",temp->data);
```

```
    temp->prev->next=0;
```

```
    temp=temp->prev;
```

```
}
```

```
void delAtPos(){
```

```
    int pos;
```

```
    printf("\nEnter a position:\n");
```

```
    scanf("%d",&pos);
```

```
    temp=head;
```

```
    int i;
```

```
    for(i=1;i<pos;i++){
```



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```
temp=temp->next;

}

printf("\nDelete element:%d",temp->data);

temp->prev->next=temp->next;

temp->next->prev=temp->prev;

}

void delAtStart(){

    printf("Delete first node:%d",head->data);

    head=head->next;

    head->prev=0;

}

void display(){

    temp=head;

    while(temp->next!=0){

        printf("%d ",temp->data);

        temp=temp->next;

    }

    printf("%d\n",temp->data);

}

int main()

{
```



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```
int choice;
```

```
while(1){
```

```
    printf("\nInsertion at End- 1\nInsertion at starting - 2\nDisplaying data - 3\nDelete at  
End - 4\nDelete at Start - 5\nInsert At any position -6\nDelete at any position-7\nExit -  
0\n");
```

```
    scanf("%d",&choice);
```

```
    if(choice==1){
```

```
        insertAtEnd();
```

```
    }
```

```
    else if(choice==2){
```

```
        insertAtStart();
```

```
    }
```

```
    else if(choice==3){
```

```
        display();
```

```
    }
```

```
    else if(choice==4){
```

```
        delAtEnd();
```

```
    }
```

```
    else if(choice==5){
```

```
        delAtStart();
```

```
    }
```



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```
else if(choice==6){  
    insertAtPos();  
}  
else if(choice==7){  
    delAtPos();  
}  
else if(choice==0){  
    break;  
}  
  
}  
return 0;  
}
```

Output screenshots:



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```
Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
1

Enter a data of created node:
1

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
1

Enter a data of created node:
2

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
1

Enter a data of created node:
3

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
2

Enter a data of created node:
qaws1

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
3
1 1 2 3
```




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```
Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
4

Deleted data:3

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
5
Delete first node:1
Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
3
1 2

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
1

Enter a data of created node:
56

Insertion at End- 1
Insertion at starting - 2
Displaying data - 3
Delete at End - 4
Delete at Start - 5
Insert At any position -6
Delete at any position-7
Exit -0
1

Enter a data of created node:
45
```



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Conclusion:

I have understood the concept of Doubly LinkedList with insertion, deletion and displaying element.

REFERENCES:

No references
(mam's notes)



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COURSE CODE: DJS22ITL302

DATE:

COURSE NAME: Data Structure Laboratory

CLASS: II-Batch I

NAME: Anish Sharma

SAP ID: 80003220045

ROLL NO.: I011

Experiment No. 5

CO/LO: CO1

Aim: To implement doubly linked list

Theory:

A doubly linked list is a linked data structure that consists of a set of sequentially linked records called nodes. Each node has three elements i.e. data, previous and next pointers.

Two node links allow traversal of list in either direction. While adding a remaining a node in a doubly linked list.

Operations:-

1. Insertion (beginning, between any element, Ending)
2. Deletion (beginning, between any element, Ending)
3. Display



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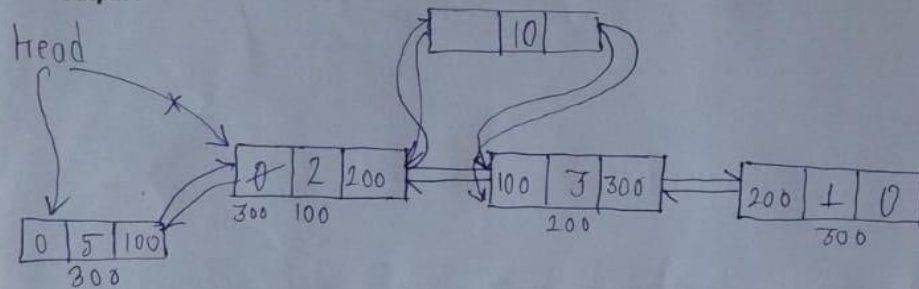
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Output :



Conclusion :

Thus implementation and concepts of doubly linked list was understood.

References :

Mam's Notes