DATA STRUCTURE – 1

LAB-4

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Initialize and declaration in Double link list:

Program:

main.c

```c
//S.PRAVEEN KUMAR
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//Lab-4

//creation of double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len;
    struct node* head;
    struct node* temp;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Creation of double linked list\n Enter the size in linked list: \n");
    scanf("%d",&num);
    temp->prev=NULL;
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            temp->next->prev=temp;
            temp=temp->next;
        }
    }
    temp->next=NULL;
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Creation of double linked list
 Enter the size in linked list:
4
element 0: 1
element 1: 2
element 2: 3
element 3: 4
1->2->3->4->NULL
```

Insertion at beginning:

Program:

```c
//S.PRAVEEN KUMAR
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//Lab-4

//inserton in beginning of double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len,newnum;
    struct node* head;
    struct node* temp;
    struct node* newnode;
    struct node* Firstnode;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Enter the size in linked list: \n");
    scanf("%d",&num);
    temp->prev=NULL;
    newnode=malloc(sizeof(struct node));
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            newnode=temp;
            temp=temp->next;
            temp->prev=newnode;
        }
    }
    temp->next=NULL;
    printf("Enter the element to begin: ");
    scanf("%d",&newnum);
    Firstnode=malloc(sizeof(struct node));
    Firstnode->data=newnum;
    Firstnode->prev=NULL;
    head->prev=Firstnode;
    Firstnode->next=head;
    head=Firstnode;
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    printf("NULL\n");
    return 0;
}
```

Output:

```
input
Enter the size in linked list:
5
element 0: 1
element 1: 2
element 2: 3
element 3: 4
element 4: 5
Enter the element to begin: 0
0->1->2->3->4->5->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```

Insertion at end:

Program:

main.c

```c
//S.PRAVEEN KUMAR
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//Lab-4

//insertion in end of double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len,newnum;
    struct node* head;
    struct node* temp;
    struct node* newnode;
    struct node* Lastnode;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Enter the size in linked list: \n");
    scanf("%d",&num);
    temp->prev=NULL;
    newnode=malloc(sizeof(struct node));
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            newnode=temp;
            temp=temp->next;
            temp->prev=newnode;
        }
    }
    printf("Enter the element to end: ");
    scanf("%d",&newnum);
    Lastnode=malloc(sizeof(struct node));
    Lastnode->data=newnum;
    Lastnode->next=NULL;
    Lastnode->prev=temp;
    temp->next=Lastnode;
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Enter the size in linked list:
4
element 0: 1
element 1: 2
element 2: 3
element 3: 4
Enter the element to end: 5
1->2->3->4->5->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```

Inserting at specific position:

Program:

main.c

```c
//S.PRAVEEN KUMAR
//ch.en.u4aie22048 AIE
//Lab-4

//inserton in specific position of double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len,newnum,newpos;
    struct node* head;
    struct node* temp;
    struct node* newnode;
    struct node* Middlenode;
    struct node* temp2;
    head=(struct node*)malloc(sizeof(struct node));
    Middlenode=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp2=(struct node*)malloc(sizeof(struct node));
    temp=head;
    printf("Inserting in specfic postion\n");
    printf("Enter the size in Double linked list: ");
    scanf("%d",&num);
    temp->prev=NULL;
    newnode=malloc(sizeof(struct node));
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            newnode=temp;
            temp=temp->next;
            temp->prev=newnode;
        }
    }
    temp->next=NULL;
    printf("Enter the element to Number to insert in specfic postion: ");
    scanf("%d",&newnum);
    printf("Enter the Postion : ");
    scanf("%d",&newpos);
    temp=head;
    Middlenode->data=newnum;

    for(i=0;i<newpos-1;i++)
    {
        temp=temp->next;
    }
    temp2=temp;
    temp=temp->next;
    temp->prev=Middlenode;
    Middlenode->next=temp;
    Middlenode->prev=temp2;
    temp2->next=Middlenode;
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Inserting in specfic postion
Enter the size in Double linked list: 4
element 0: 1
element 1: 2
element 2: 4
element 3: 5
Enter the element to Number to insert in specfic postion: 3
Enter the Postion : 2
1->2->3->4->5->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```

Deleting at Beginning:

Program:

main.c

```c
//S.PRAVEEN KUMAR
//ch.en.u4aie22048 AIE
//Lab-4

//deleting in beginning in double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len;
    struct node* head;
    struct node* temp;
    struct node* newnode;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Enter the size in linked list: \n");
    scanf("%d",&num);
    temp->prev=NULL;
    newnode=malloc(sizeof(struct node));
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            newnode=temp;
            temp=temp->next;
            temp->prev=newnode;
        }
    }
    temp->next=NULL;
    temp=head;
    temp=temp->next;
    temp->prev=NULL;
    head=temp;
    printf("After deleting  at beginning : \n");
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Enter the size in linked list:
5
element 0: 1
element 1: 2
element 2: 3
element 3: 4
element 4: 5
After deleting  at beginning :
2->3->4->5->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```

Deleting at end:

Program:

main.c

```c
//S.PRAVEEN KUMAR
//ch.en.u4aie22048 AIE
//Lab-4

//deleting in end in double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len;
    struct node* head;
    struct node* temp;
    struct node* temp2;
    struct node* newnode;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Enter the size in linked list: \n");
    scanf("%d",&num);
    temp->prev=NULL;
    newnode=malloc(sizeof(struct node));
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            newnode=temp;
            temp=temp->next;
            temp->prev=newnode;
        }
    }
    temp->next=NULL;
    temp=temp->prev;
    temp->next=NULL;
    temp2=temp->prev;
    temp->prev=temp2;
    printf("After deleting  at end : \n");
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Enter the size in linked list:
5
element 0: 1
element 1: 2
element 2: 3
element 3: 4
element 4: 5
After deleting  at end :
1->2->3->4->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```

Deletion at specific position:

Program:

main.c

```c
//S.PRAVEEN KUMAR
//ch.en.u4aie22048 AIE
//Lab-4

//deleting in specific position in double linked list
#include<stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
    struct node* prev;
};
int main()
{
    int num,i,number,len,newnum,newpos;
    struct node* head,*temp;
    head=(struct node*)malloc(sizeof(struct node));
    temp=malloc(sizeof(struct node));
    temp=head;
    printf("Deleting at specific postion\n");
    printf("Enter the size in Double linked list: ");
    scanf("%d",&num);
    temp->prev=NULL;
    for(i=0;i<num;i++)
    {
        printf("element %d: ",i);
        scanf("%d",&number);
        temp->data=number;
        if(i!=num-1)
        {
            temp->next=malloc(sizeof(struct node));
            temp->next->prev=temp;
            temp=temp->next;
        }
    }
    temp->next=NULL;
    printf("Enter the Postion to delete: ");
    scanf("%d",&newpos);
    temp=head;

    for(i=0;i<newpos-1;i++)
    {
        temp=temp->next;
    }
     temp->next=temp->next->next;
     temp->next->prev=temp;
    while(head!=NULL)
    {
        printf("%d->",head->data);
        head=head->next;
    }
    printf("NULL\n");
    return 0;
}
```

Output:

input

```
Deleting at specific postion
Enter the size in Double linked list: 5
element 0: 1
element 1: 2
element 2: 3
element 3: 3
element 4: 4
Enter the Postion to delete: 3
1->2->3->4->NULL


...Program finished with exit code 0
Press ENTER to exit console.
```