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EX 2: Implementation of Dolby
linked list

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#include <stdio.h>
#include <stdlib.h>
struct node
{
    struct node *Prev;
    int Element;
    struct node *Next;
};
typedef struct node Node;
int IsEmpty(Node *List);
int IsLast(Node *Position);
Node *Find(Node *List, int x);
void InsertBeg(Node *List, int e);
void InsertLast(Node *List, int e);
void InsertMid(Node *List, int p, int e);
void DeleteBeg(Node *List);
void DeleteEnd(Node *List);
void DeleteMid(Node *List, int e);
void Traverse(Node *List);
int main()
{
    Node *List = malloc(sizeof(Node));
    List->Prev = NULL;
    List->Next = NULL;
    Node *Position;
    int ch, e, p;
    printf("1.Insert Beg \n2.Insert Middle \n3.Insert End");
    printf("\n4.Delete Beg \n5.Delete Middle \n6.Delete End");
    printf("\n7.Find \n8.Traverse \n9.Exit\n");
    do
    {
        printf("Enter your choice : ");
        scanf("%d", &ch);
        switch(ch)
        {
            case 1:
                printf("Enter the element : ");
```

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scanf("%d", &e);
InsertBeg(List, e);
break;
case 2:
printf("Enter the position element : ");
scanf("%d", &p);
printf("Enter the element : ");
scanf("%d", &e);
InsertMid(List, p, e);
break;
case 3:
printf("Enter the element : ");
scanf("%d", &e);
InsertLast(List, e);
break;
case 4:
DeleteBeg(List);
break;
case 5:
printf("Enter the element : ");
scanf("%d", &e);
DeleteMid(List, e);
break;
case 6:
DeleteEnd(List);
break;
case 7:
printf("Enter the element : ");
scanf("%d", &e);
Position = Find(List, e);
if(Position != NULL)
printf("Element found...\n");
else
printf("Element not found...\n");
break;
case 8:
Traverse(List);
break;
}
} while(ch <= 8);
return 0;
}
int IsEmpty(Node *List)
{

```

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if(List->Next == NULL)
    return 1;
else
    return 0;
}
int IsLast(Node *Position)
{
    if(Position->Next == NULL)
        return 1;
    else
        return 0;
}
Node *Find(Node *List, int x)
{
    Node *Position;
    Position = List->Next;
    while(Position != NULL && Position->Element != x)
        Position = Position->Next;
    return Position;
}
void InsertBeg(Node *List, int e)
{
    Node *NewNode = malloc(sizeof(Node));
    NewNode->Element = e;
    if(IsEmpty(List))
        NewNode->Next = NULL;
    else
    {
        NewNode->Next = List->Next;
        NewNode->Next->Prev = NewNode;
    }
    NewNode->Prev = List;
    List->Next = NewNode;
}
void InsertLast(Node *List, int e)
{
    Node *NewNode = malloc(sizeof(Node));
    Node *Position;
    NewNode->Element = e;
    NewNode->Next = NULL;
    if(IsEmpty(List))
    {
        NewNode->Prev = List;
        List->Next = NewNode;
    }
}

```

```

}
else
{
    Position = List;
    while(Position->Next != NULL)
        Position = Position->Next;
    Position->Next = NewNode;
    NewNode->Prev = Position;
}
}

void InsertMid(Node *List, int p, int e)
{
    Node *NewNode = malloc(sizeof(Node));
    Node *Position;
    Position = Find(List, p);
    NewNode->Element = e;
    NewNode->Next = Position->Next;
    Position->Next->Prev = NewNode;
    Position->Next = NewNode;
    NewNode->Prev = Position;
}

void DeleteBeg(Node *List)
{
    if(!IsEmpty(List))
    {
        Node *TempNode;
        TempNode = List->Next;
        List->Next = TempNode->Next;
        if(List->Next != NULL)
            TempNode->Next->Prev = List;
        printf("The deleted item is %d\n", TempNode->Element);
        free(TempNode);
    }
    else
        printf("List is empty...\n");
}

void DeleteEnd(Node *List)
{
    if(!IsEmpty(List))
    {
        Node *Position;
        Node *TempNode;
        Position = List;
        while(Position->Next != NULL)

```

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Position = Position->Next;
TempNode = Position;
Position->Prev->Next = NULL;
printf("The deleted item is %d\n", TempNode->Element);
free(TempNode);
}
else
    printf("List is empty...\n");
}
void DeleteMid(Node *List, int e)
{
    if(!IsEmpty(List))
    {
        Node *Position;
        Node *TempNode;
        Position = Find(List, e);
        if(!IsLast(Position))
        {
            TempNode = Position;
            Position->Prev->Next = Position->Next;
            Position->Next->Prev = Position->Prev;
            printf("The deleted item is %d\n", TempNode->Element);
            free(TempNode);
        }
    }
    else
        printf("List is empty...\n");
}
void Traverse(Node *List)
{
    if(!IsEmpty(List))
    {
        Node *Position;
        Position = List;
        while(Position->Next != NULL)
        {
            Position = Position->Next;
            printf("%d\t", Position->Element);
        }
        printf("\n");
    }
    else
        printf("List is empty...\n");
}

```

OUTPUT

```
1.Insert Beg
2.Insert Middle
3.Insert End
4.Delete Beg
5.Delete Middle
6.Delete End
7.Find
8.Traverse
9.Exit
Enter your choice : 1
Enter the element : 40
Enter your choice : 1
Enter the element : 30
Enter your choice : 1
Enter the element : 20
Enter your choice : 1
Enter the element : 10
Enter your choice : 8
10 20 30 40
Enter your choice : 7
Enter the element : 30
Element found...!
Enter your choice : 1
Enter the element : 5
Enter your choice : 8
5 10 20 30 40
Enter your choice : 3
Enter the element : 45
Enter your choice : 8
5 10 20 30 40 45
Enter your choice : 2
Enter the position element : 20
Enter the element : 25
Enter your choice : 8
5 10 20 25 30 40 45
Enter your choice : 4
```

The deleted item is 5

Enter your choice : 8

10 20 25 30 40 45

Enter your choice : 6

The deleted item is 45

Enter your choice : 8

10 20 25 30 40

Enter your choice : 5

Enter the element : 30

The deleted item is 30

Enter your choice : 8

10 20 25 40

Enter your choice : 9