Ex 1: SINGLY LINKED LIST

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Program:

```
#include <stdio.h>
#include<malloc.h>
void createfnode(int ele);
void insertfront(int ele);
void insertend(int ele);
void display();
struct node
{
   int data;
   struct node* next;
};
struct node* head = NULL;
struct node *newnode;
void insertfront(int ele)
 {
 newnode=(struct node*)malloc(sizeof(struct node));
 if(newnode!=NULL)
 { newnode->data=ele;
    if(head!=NULL)
```

```
  {
    newnode->next=head;
    head=newnode;
  }
  else
  {

     newnode->next=NULL;
     head=newnode;
  }
}
}

 void insertend(int ele)
{
 newnode=(struct node*)malloc(sizeof(struct node));
 if(newnode!=NULL)
 {
    newnode->data=ele;
    newnode->next=NULL;
  if(head!=NULL)
  {
     struct node *t;
     t=head;
```

```
        while(t->next!=NULL)
        {
            t=t->next;
        }
       newnode->next=NULL;
       t->next=newnode;
    }
    else
    {
        head=newnode;
    }
}

}

int listsize()
{
    int c=0;
    struct node *t;
    t=head;
    while(t!=NULL)
    {
        c=c+1;
        t=t->next;
```

```
    }
    printf("\n The size of the list is %d:\n",c);
    return c;
}
void insertpos(int ele,int pos)
{
  int ls=0;
  ls=listsize();
  if(head == NULL && (pos <= 0 || pos > 1))
  {
     printf("\nInvalid position to insert a node\n");
     return;
  }
 if(head != NULL && (pos <= 0 || pos > ls))
  {
     printf("\nInvalid position to insert a node\n");
     return;
  }
  struct node* newnode = NULL;
newnode=(struct node*)malloc(sizeof(struct node));

 if(newnode != NULL)
  {
     newnode->data=ele;
```

```
        struct node* temp = head;
        int count = 1;
        while(count < pos-1)
        {
            temp = temp -> next;
            count += 1;
        }
        if(pos == 1)
        {
            newnode->next = head;
            head = newnode;
        }
        else
        {
            newnode->next = temp->next;
            temp->next = newnode;
        }
    }
}
void findnext(int s)
{
    struct node *temp;
    temp=head;
    if(temp==NULL&&temp->next==NULL)
```

```
    {
        printf("No next element ");
    }
    else
    {
        while(temp->data!=s)
        {
            temp=temp->next;


        }
                printf("\nNext Element of %d is %d\n",s,temp->next->data);
    }

}

void findprev(int s)
{
    struct node *temp;
    temp=head;
    if(temp==NULL)
    {
        printf("List is empty ");
    }
    else
```

```
    {
       while(temp->next->data!=s)
       {
          temp=temp->next;
        }
        printf("\n The previous ele of %d is %d\n",s,temp->data);
    }
}
void find(int s)
{
    struct node *temp;
    temp=head;
    if(head==NULL)
    {
       printf("\n List is empty");
    }
    else
    {

          while(temp->data!=s && temp->next!=NULL)
          {
             temp=temp->next;
          }
          if(temp!=NULL && temp->data==s)
```

```
            {
      printf("\n Searching ele %d is present in the addr of %p",temp->data,temp);
    }
    else
    {
       printf("\n Searching elem %d is not present",s);
    }

}
}

void isempty()
{
    if(head==NULL)
    {
       printf("\nList is empty\n");
    }
    else
    {
       printf("\nList is not empty\n");
    }
}

void deleteAtBeginning()
```

```
{
   struct node *t;
     t=head;
     head=t->next;
}

void deleteAtEnd()
{
   struct node *temp;
   temp=head;
   if(head==NULL)
   {
      printf("\n List is empty");
   }
   else
   {
         while(temp->next->next!=NULL)
         {
            temp=temp->next;
         }
        temp->next=NULL;
   }

}
```

```
 void display()
 {
    struct node *t;
    t=head;
    while(t!=NULL)
    {
       printf("%d\t",t->data);
       t=t->next;
    }
 }
 void delete(int ele)
{
   struct node *t;
   t=head;
   if(t->data==ele)
   {
      head=t->next;
   }
   else
   {
   while(t->next->data!=ele)
   {
      t=t->next;
   }
```

```
    t->next=t->next->next;


 }
}
int main()
{

    do
    {
    int ch,a,pos;
    printf("\n Choose any one operation that you would like to perform\n");
    printf("\n 1.Insert the element at the beginning");
    printf("\n 2.Insert the element at the end");
    printf("\n 3. To insert at the specified position");
    printf("\n 4. To view list");
    printf("\n 5.To view list size");
    printf("\n 6.To delete first element");
    printf("\n 7.To delete last element");
    printf("\n 8.To find next element");
    printf("\n 9. To find previous element");
    printf("\n 10. To find search for an element");
    printf("\n 11. To quit");
    printf("\n Enter your choice\n");
```

```
scanf("%d",&ch);
    switch(ch)
    {
    case 1:
    printf("\n Insert an element to be inserted at the beginning\n");
    scanf("%d",&a);
    insertfront(a);
    break;
    case 2:
     printf("\n Insert an element to be inserted at the End\n");
    scanf("%d",&a);
    insertend(a);
    break;
    case 3:
     printf("\n Insert an element and the position to insert in the list\n");
    scanf("%d%d",&a,&pos);
    insertpos(a,pos);
    break;
    case 4:
    display();
    break;
    case 5:
    listsize();
    break;
```

```
        case 6:
        printf("\n Delete an element to be in the beginning\n");
        deleteAtBeginning();
        break;
        case 7:
        printf("\n Delete an element to be at the end\n");
        deleteAtEnd();
        break;
        case  8:
        printf("\n enter the element to which you need to find next ele in the
list\n");;
        scanf("%d",&a);
        findnext(a);
        break;
        case 9:
        printf("\n enter the element to which you need to find prev ele in the
list\n");;
        scanf("%d",&a);
        findprev(a);
        break;
        case 10:
        printf("\n enter the element to find the address of it\n");;
        scanf("%d",&a);
        find(a);
        break;
```

```
        case 11:
        printf("Ended");
           exit(0);
        default:
        printf("Invalid option is chosen so the process is quit");
        }
    }while(1);
 return 0;
}
```

OUTPUT:

```
aiml2315011129@cselab:~$ gcc sll.c
aiml2315011129@cselab:~$ ./a.out

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
1

 Insert an element to be inserted at the beginning
2

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
1

 Insert an element to be inserted at the beginning
1

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
2

 Insert an element to be inserted at the End
3

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
```

```
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
2

 Insert an element to be inserted at the End
4

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
4
1       2       3       4
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
3

 Insert an element and the position to insert in the list
10 2

 The size of the list is 4:

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
```

```
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
4
1       10      2       3       4
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
5

 The size of the list is 5:

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
6

 Delete an element to be in the beginning

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
4
10      2       3       4
```

```
10      2       3       4
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
7

 Delete an element to be at the end

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
4
10      2       3
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
8

 enter the element to which you need to find next ele in the list
2

Next Element of 2 is 3

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
```

```
 enter the element to which you need to find next ele in the list
2

Next Element of 2 is 3

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
9

 enter the element to which you need to find prev ele in the list
2

 The previous ele of 2 is 10

 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
10

 enter the element to find the address of it
10

 Searching ele 10 is present in the addr of 0x55d6cef30b40
 Choose any one operation that you would like to perform

 1.Insert the element at the beginning
 2.Insert the element at the end
 3. To insert at the specified position
 4. To view list
 5.To view list size
 6.To delete first element
 7.To delete last element
 8.To find next element
 9. To find previous element
 10. To find search for an element
 11. To quit
 Enter your choice
11
Ended
aiml231501129@cselab:~$
```