//C Program to Implement a Singly Linked List and develop functions to perform insertion, deletion and linear search operations.

#include<stdio.h>

#include<stdlib.h>

struct node

{

int data;

struct node \*next;

};

struct node \*head;

void beginsert ();

void lastinsert ();

void randominsert();

void begin\_delete();

void last\_delete();

void random\_delete();

void display();

void search();

void main ()

{

int choice =0;

while(choice != 9)

{

printf("\n\n\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*\n");

printf("\nChoose one option from the following list ...\n");

printf("\n===============================================\n");

printf("\n1.Insert in begining\n2.Insert at last\n3.Insert at any random location\n4.Delete from Beginning\n5.Delete from last\n6.Delete node after specified location\n7.Search for an element\n8.Show\n9.Exit\n");

printf("\nEnter your choice?\n");

scanf("\n%d",&choice);

switch(choice)

{

case 1:

beginsert();

break;

case 2:

lastinsert();

break;

case 3:

randominsert();

break;

case 4:

begin\_delete();

break;

case 5:

last\_delete();

break;

case 6:

random\_delete();

break;

case 7:

search();

break;

case 8:

display();

break;

case 9:

exit(0);

break;

default:

printf("Please enter valid choice..");

}

}

}

void beginsert()

{

struct node \*ptr;

int item;

ptr = (struct node \*) malloc(sizeof(struct node \*));

if(ptr == NULL)

{

printf("\nOVERFLOW");

}

else

{

printf("\nEnter value\n");

scanf("%d",&item);

ptr->data = item;

ptr->next = head;

head = ptr;

printf("\nNode inserted");

}

}

void lastinsert()

{

struct node \*ptr,\*temp;

int item;

ptr = (struct node\*)malloc(sizeof(struct node));

if(ptr == NULL)

{

printf("\nOVERFLOW");

}

else

{

printf("\nEnter value?\n");

scanf("%d",&item);

ptr->data = item;

if(head == NULL)

{

ptr -> next = NULL;

head = ptr;

printf("\nNode inserted");

}

else

{

temp = head;

while (temp -> next != NULL)

{

temp = temp -> next;

}

temp->next = ptr;

ptr->next = NULL;

printf("\nNode inserted");

}

}

}

void randominsert()

{

int i,loc,item;

struct node \*ptr, \*temp;

ptr = (struct node \*) malloc (sizeof(struct node));

if(ptr == NULL)

{

printf("\nOVERFLOW");

}

else

{

printf("\nEnter element value");

scanf("%d",&item);

ptr->data = item;

printf("\nEnter the location after which you want to insert ");

scanf("\n%d",&loc);

temp=head;

for(i=0;i<loc;i++)

{

temp = temp->next;

if(temp == NULL)

{

printf("\ncan't insert\n");

return;

}

}

ptr ->next = temp ->next;

temp ->next = ptr;

printf("\nNode inserted");

}

}

void begin\_delete()

{

struct node \*ptr;

if(head == NULL)

{

printf("\nList is empty\n");

}

else

{

ptr = head;

head = ptr->next;

free(ptr);

printf("\nNode deleted from the begining ...\n");

}

}

void last\_delete()

{

struct node \*ptr,\*ptr1;

if(head == NULL)

{

printf("\nlist is empty");

}

else if(head -> next == NULL)

{

head = NULL;

free(head);

printf("\nOnly node of the list deleted ...\n");

}

else

{

ptr = head;

while(ptr->next != NULL)

{

ptr1 = ptr;

ptr = ptr ->next;

}

ptr1->next = NULL;

free(ptr);

printf("\nDeleted Node from the last ...\n");

}

}

void random\_delete()

{

struct node \*ptr,\*ptr1;

int loc,i;

printf("\n Enter the location of the node after which you want to perform deletion \n");

scanf("%d",&loc);

ptr=head;

for(i=0;i<loc;i++)

{

ptr1 = ptr;

ptr = ptr->next;

if(ptr == NULL)

{

printf("\nCan't delete");

return;

}

}

ptr1 ->next = ptr ->next;

free(ptr);

printf("\nDeleted node %d ",loc+1);

}

void search()

{

struct node \*ptr;

int item,i=0,flag;

ptr = head;

if(ptr == NULL)

{

printf("\nEmpty List\n");

}

else

{

printf("\nEnter item which you want to search?\n");

scanf("%d",&item);

while (ptr!=NULL)

{

if(ptr->data == item)

{

printf("item found at location %d ",i+1);

flag=0;

}

else

{

flag=1;

}

i++;

ptr = ptr -> next;

}

if(flag==1)

{

printf("Item not found\n");

}

}

}

void display()

{

struct node \*ptr;

ptr = head;

if(ptr == NULL)

{

printf("Nothing to print");

}

else

{

printf("\nprinting values . . . . .\n");

while (ptr!=NULL)

{

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

ptr = ptr -> next;

}

}

}