#include<iostream>

#include<cstdio>

#include<cstdlib>

using namespace std;

struct node

{

int info;

struct node \*next;

}\*last;

class circular\_llist

{

public:

void create\_node(int value);

void add\_begin(int value);

void add\_after(int value, int position);

void delete\_element(int value);

void search\_element(int value);

void display\_list();

circular\_llist()

{

last = NULL;

}

};

int main()

{

int choice, element, position;

circular\_llist cl;

while (1)

{

cout<<endl<<"Circular singly linked list"<<endl;

cout<<"1.Create Node"<<endl;

cout<<"2.Add at beginning"<<endl;

cout<<"3.Add after"<<endl;

cout<<"4.Delete"<<endl;

cout<<"5.Search"<<endl;

cout<<"6.Display"<<endl;

cout<<"7.Quit"<<endl;

cout<<"Enter your choice : ";

cin>>choice;

switch(choice)

{

case 1:

cout<<"Enter the element: ";

cin>>element;

cl.create\_node(element);

cout<<endl;

break;

case 2:

cout<<"Enter the element: ";

cin>>element;

cl.add\_begin(element);

cout<<endl;

break;

case 3:

cout<<"Enter the element: ";

cin>>element;

cout<<"Insert element after position: ";

cin>>position;

cl.add\_after(element, position);

cout<<endl;

break;

case 4:

if (last == NULL)

{

cout<<"List is empty, nothing to delete"<<endl;

break;

}

cout<<"Enter the element for deletion: ";

cin>>element;

cl.delete\_element(element);

cout<<endl;

break;

case 5:

if (last == NULL)

{

cout<<"List Empty!! Can't search"<<endl;

break;

}

cout<<"Enter the element to be searched: ";

cin>>element;

cl.search\_element(element);

cout<<endl;

break;

case 6:

cl.display\_list();

break;

case 7:

exit(1);

break;

default:

cout<<"Wrong choice"<<endl;

}

}

return 0;

}

void circular\_llist::create\_node(int value)

{

struct node \*temp;

temp = new(struct node);

temp->info = value;

if (last == NULL)

{

last = temp;

temp->next = last;

}

else

{

temp->next = last->next;

last->next = temp;

last = temp;

}

}

void circular\_llist::add\_begin(int value)

{

if (last == NULL)

{

cout<<"First Create the list."<<endl;

return;

}

struct node \*temp;

temp = new(struct node);

temp->info = value;

temp->next = last->next;

last->next = temp;

}

void circular\_llist::add\_after(int value, int pos)

{

if (last == NULL)

{

cout<<"First Create the list."<<endl;

return;

}

struct node \*temp, \*s;

s = last->next;

for (int i = 0;i < pos-1;i++)

{

s = s->next;

if (s == last->next)

{

cout<<"There are less than ";

cout<<pos<<" in the list"<<endl;

return;

}

}

temp = new(struct node);

temp->next = s->next;

temp->info = value;

s->next = temp;

/\*Element inserted at the end\*/

if (s == last)

{

last=temp;

}

}

void circular\_llist::delete\_element(int value)

{

struct node \*temp, \*s;

s = last->next;

/\* If List has only one element\*/

if (last->next == last && last->info == value)

{

temp = last;

last = NULL;

free(temp);

return;

}

if (s->info == value) /\*First Element Deletion\*/

{

temp = s;

last->next = s->next;

free(temp);

return;

}

while (s->next != last)

{

/\*Deletion of Element in between\*/

if (s->next->info == value)

{

temp = s->next;

s->next = temp->next;

free(temp);

cout<<"Element "<<value;

cout<<" deleted from the list"<<endl;

return;

}

s = s->next;

}

/\*Deletion of last element\*/

if (s->next->info == value)

{

temp = s->next;

s->next = last->next;

free(temp);

last = s;

return;

}

cout<<"Element "<<value<<" not found in the list"<<endl;

}

void circular\_llist::search\_element(int value)

{

struct node \*s;

int counter = 0;

s = last->next;

while (s != last)

{

counter++;

if (s->info == value)

{

cout<<"Element "<<value;

cout<<" found at position "<<counter<<endl;

return;

}

s = s->next;

}

if (s->info == value)

{

counter++;

cout<<"Element "<<value;

cout<<" found at position "<<counter<<endl;

return;

}

cout<<"Element "<<value<<" not found in the list"<<endl;

}

void circular\_llist::display\_list()

{

struct node \*s;

if (last == NULL)

{

cout<<"List is empty, nothing to display"<<endl;

return;

}

s = last->next;

cout<<"Circular Link List: "<<endl;

while (s != last)

{

cout<<s->info<<"->";

s = s->next;

}

cout<<s->info<<endl;

}