#include<iostream>

using namespace std;

/\* Linked list structure \*/

struct list {

struct list \*prev;

int data;

struct list \*next;

} \*node = NULL, \*first = NULL, \*last = NULL, \*node1 = NULL, \*node2 = NULL;

class linkedlist {

public:

/\* Function for create/insert node at the beginning of Linked list \*/

void insert\_beginning() {

list \*addBeg = new list;

cout << "Enter value for the node:" << endl;

cin >> addBeg->data;

if(first == NULL) {

addBeg->prev = NULL;

addBeg->next = NULL;

first = addBeg;

last = addBeg;``

cout << "Linked list Created!" << endl;

}

else {

addBeg->prev = NULL;

first->prev = addBeg;

addBeg->next = first;

first = addBeg;

cout << "Data Inserted at the beginning of the Linked list!" << endl;

}

}

/\* Function for create/insert node at the end of Linked list \*/

void insert\_end() {

list \*addEnd = new list;

cout << "Enter value for the node:" << endl;

cin >> addEnd->data;

if(first == NULL) {

addEnd->prev = NULL;

addEnd->next = NULL;

first = addEnd;

last = addEnd;

cout << "Linked list Created!" << endl;

}

else {

addEnd->next = NULL;

last->next = addEnd;

addEnd->prev = last;

last = addEnd;

cout << "Data Inserted at the end of the Linked list!" << endl;

}

}

/\* Function for Display Linked list \*/

void display() {

node = first;

cout << "List of data in Linked list in Ascending order!" << endl;

while(node != NULL) {

cout << node->data << endl;

node = node->next;

}

node = last;

cout << "List of data in Linked list in Descending order!" << endl;

while(node != NULL) {

cout << node->data << endl;

node = node->prev;

}

}

/\* Function for delete node from Linked list \*/

void del() {

int count = 0, number, i;

node = node1 = node2 = first;

for(node = first; node != NULL; node = node->next)

cout << "Enter value for the node:" << endl;

count++;

display();

cout << count << " nodes available here!" << endl;

cout << "Enter the node number which you want to delete:" << endl;

cin >> number;

if(number != 1) {

if(number < count && number > 0) {

for(i = 2; i <= number; i++)

node = node->next;

for(i = 2; i <= number-1; i++)

node1 = node1->next;

for(i = 2; i <= number+1; i++)

node2 = node2->next;

node2->prev = node1;

node1->next = node2;

node->prev = NULL;

node->next = NULL;

node = NULL;

}

else if(number == count) {

node = last;

last = node->prev;

last->next = NULL;

node = NULL;

}

else

cout << "Invalid node number!" << endl;

}

else {

node = first;

first = node->next;

first->prev = NULL;

node = NULL;

}

cout << "Node has been deleted successfully!" << endl;

}

};

int main() {

int op = 0;

linkedlist llist = linkedlist();

while(op != 4) {

cout << "1. Insert at the beginning\n2. Insert at the end\n3. Delete\n4. Display\n5. Exit" << endl;

cout << "Enter your choice:" << endl;

cin >> op;

switch(op) {

case 1:

llist.insert\_beginning();

break;

case 2:

llist.insert\_end();

break;

case 3:

llist.del();

break;

case 4:

llist.display();

break;

case 5:

cout << "Bye Bye!" << endl;

return 0;

break;

default:

cout << "Invalid choice!" << endl;

}

}

return 0;

}

/\*\*\*\*\*\* Output \*\*\*\*\*\*/

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

1

Enter value for the node:

5

Linked list Created!

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

1

Enter value for the node:

6

Data Inserted at the beginning of the Linked list!

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

2

Enter value for the node:

7

Data Inserted at the end of the Linked list!

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

4

List of data in Linked list inAscending order!

6

5

7

List of data in Linked list in Descending order!

7

5

6

List of data in Linked list

5

6

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

3

List of data in Linked list inAscending order!

6

5

7

List of data in Linked list in Descending order!

7

5

6

3 nodes available here!

Enter the node number which you want to delete:

2

Node has been deleted successfully!

1. Insert at the beginning

2. Insert at the end

3. Delete

4. Display

5. Exit

Enter your choice:

5

Bye Bye!