

## Lab 7 Lists

### Q1 Linked List Implementation

Practise implementing the insert member function, the remove member function and the copy constructor of `LinkedList.h`. Use the given code to test your implementation.

```
#include <iostream>
#include <string>
#include "LinkedList.h" // ADT list operations

using namespace std;

void displayList(const LinkedList<string> &aList)
{
    cout << "The list contains " << endl;
    for (int pos = 1; pos <= aList.getLength(); pos++)
    {
        cout << aList.getEntry( pos ) << " ";
    }
    cout << endl << endl;
}

int main()
{
    LinkedList<string> list;
    list.insert( 1, "dd" );
    list.insert( 2, "ee" );
    list.insert( 1, "aa" );
    list.insert( 2, "bb" );
    list.insert( 3, "cc" );
    displayList( list );

    list.remove(1);
    displayList( list );
    list.remove(3);
    displayList( list );

    LinkedList<string> bList( list );
    bList.insert( 3, "00" );
    displayList( list );
    displayList( bList );

    return 0;
}

/* Output

The list contains
aa bb cc dd ee

The list contains
bb cc dd ee

The list contains
bb cc ee

The list contains
bb cc ee

The list contains
bb cc 00 ee

*/
```

### Q2 Linked List Application

Using linked list code from the textbook, implement functions 1 to 9 and Q shown in the program below. These functions are for a linked list which stores a character in each node.

```
...
int main()
{
    ...
    char choice;
    bool done = false;
    ...
    do
    {
        system("cls");
        cout << endl << endl << endl;
        cout << "          1. Add Record To Back" << endl;
        cout << "          2. Insert a Record" << endl;
        cout << "          3. Erase a Record by Record Number" << endl;
        cout << "          4. Remove A Record by Content" << endl;
        cout << "          5. Clear ALL Records" << endl;
        cout << "          6. Display A Record" << endl;
        cout << "          7. Display ALL Records" << endl;
        cout << "          8. Save Records to File" << endl;
        cout << "          9. Load Records from File" << endl;
        cout << "          Q. Quit" << endl;
        cout << endl;
        cout << "          => ";
        cin >> choice;

        ...
        choice = toupper(choice);
        char ch, yesorno;
        string filename;
        int recno;

        switch( choice )
        {
            case '1' :

            case '2' :

            case '3' :

            ...
            ...

            default : cout << "Invalid choice" << endl;
        }
        system("pause");
    } while ( !done );
    cout << "Good Bye !!" << endl;
}
```

### Q3. Linked List Modification

Implement a new member function for `LinkedList.h`

```
bool sortInsert(const ItemType& newEntry)
```

`sortInsert()` will always insert a new entry in the right position to maintain a sorted linked list.

- a) Implement it by using existing member functions of `LinkedList.h`
- b) Implement it without using existing member functions of `LinkedList.h`

Write your own code to test your implementation.