

COMP 2611 – Data Structures
Lab #1 (September 11-13, 2023)

Instructions

Download Lab1-Files.zip and unzip the archive. You will obtain three sub-folders, each of which contains a file, LinkedList.cpp. Question 1 and Question 2 require you to modify the main function in LinkedList.cpp to achieve the required functionality. Question 3 shows how to organize the code in the program as separate files in a Dev-C++ *project*.

1. Folder: LinkedList-Simple

Using only the *createNode* and *printList* functions from LinkedList.cpp, write a program to do the following:

- (a) Create a linked list with four nodes: 10, 20, 30, and 50, in that order. The variable *top* should point to the first node in the list, i.e., the node containing 10. After creating the linked list, call *printList* to ensure that the nodes have been properly connected.
- (b) Write code to delete the second node in the linked list. So, the linked list should now contain three nodes, 10, 30, and 50. Again, call *printList* to ensure that this is the case.
- (c) Write code to insert a new node with the value 40, before the last node. So, the linked list should now contain four nodes, 10, 30, 40, and 50. Call *printList* to ensure that the nodes are properly connected.
- (d) Write code to delete the first node in the linked list. So, the linked list should now contain three nodes, 30, 40, and 50. Call *printList* to ensure that the nodes are properly connected.
- (e) Write code to find the sum of the values in the linked list. The sum should be 120.

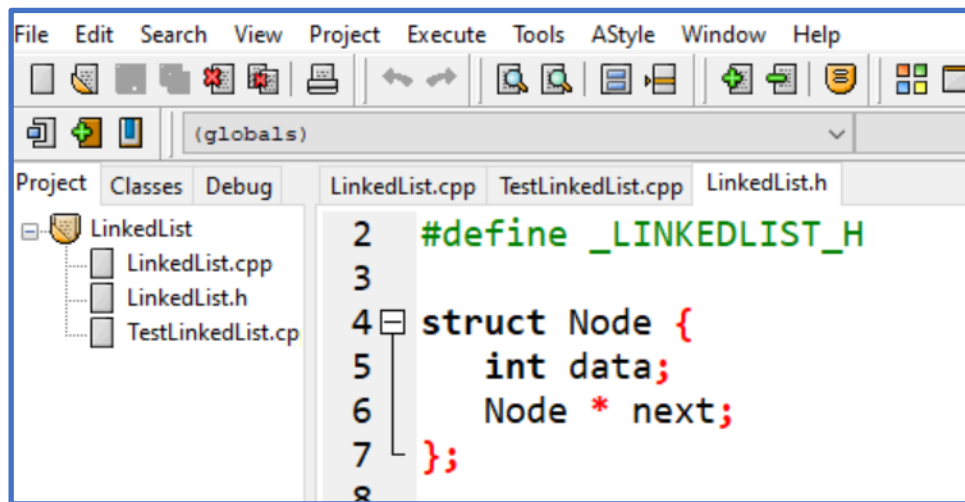
2. Folder: LinkedList-Normal

Using all the functions available in LinkedList.cpp, write a program to do the following:

- (a) Insert 17, 23, and 250 at the head of a list and print the list.
- (b) Insert 4, 10, 500, 25 at the tail of the list and print the list.
- (c) Use *getIndex()* to find out the element at position 3 and the element at position 10, if they exist (assuming that the indexes start at zero).
- (d) Find out what is the last element in the list.
- (e) Find out if the list contains the following elements: 25, 250, 18.
- (f) Find out how many elements there are in the list.

3. Folder: LinkedList-Project

- (a) Open the Dev-C++ project file, LinkedList.dev.
- (b) Examine the various components of the project in Dev-C++:



- (c) Click on the TestLinkedList.cpp tab. The code in TestLinkedList.cpp will be displayed in the editor.
- (d) Copy the code from the main function in Question 2 to the main function in TestLinkedList.cpp.
- (e) Compile the project and run the program. You should get the same results as in Question 2.
- (f) Observe that LinkedList.h only contains a set of function declarations (prototypes). To manipulate a linked list (e.g., in TestLinkedList.cpp), only these functions can be used.