**CSCI 301 Moustafa Elsayed**

**Computer Science 2**

**Project#3: Ordering and Managing two lists using linked lists**

**Introduction**

Pointers are used to build linked lists. The program uses the integers in two input files to create two lists. Then the program mergers them and prints them in terminal and output file.

**Data Structures**

This program used 6 data structures:-

* Two lists to hold the integers of the two input files
* An integer variable to hold the value of the integer in an input file and the second one to
* Two size\_t variables, one to count the number of integers in a list, and the second one to hold the integers in the two lists in order to merge them into one list
* A string variable, to hold the name of the file
* Two ifstream variables, to hold the two input files
* Node, that points to other Nodes

**Functions**

This program uses 11 functions:-

* Insert(const Item&): This function adds an item to a list
* Insert():This function prints the items of the list in an ouput file
* Merge(List&,List&):Merges the items of two lists into one list
* Length(): counts and returns the number of integers within a list
* Found(size\_t):This function searches a list to find if the input variable exists within a list
* Make\_empty(): removes the items within a list to make the list empty
* Ostream& operator <<(std::ostream& , const List&): Function that overloads the “<<” operator in order to print the items of a list
* Get\_node(const Item&, Node\*): Function that adds a new node within a list and adds an item to it
* Open\_input(ifstream& , string): Function that opens an input file
* Read1(ifstream&):function that read the items in the input file and adds them to the first list
* Read2(ifstream&): function that reads the items in the input file and adds them to the second list

**The main program**

The program creates two lists, reads the items in the first input file and adds them to the first list, and reads the items in the second input file and adds them to the second list. The program then merges the two lists by adding the items of the second list to the first list without repeating any integer. Then the program prints the number and items of the first and second list along with the number and items of the output list. Also the program prints the items of the output list in an output file.