**School of Computers and Information Engineering**

**STUDENT LEARNING ACTIVITY**

Fall Semester 2022

**Data Structures (SOC 2010)**

Phone book system

Student Learning Assignment

Submitted by

Nuriddinov Subkhiddin U2110219 (CSE 21-14)



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[Note – you can add more sections if you find any relevant to your work]

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**Problem Introduction**

This report is generated for Student Learning Activity: Using Data Structure to solve a real-life problem.

Report is created by Nuriddinov Subkhiddin.

*This Project is a Phone Book Management System which is developed in C++ using Doubly Linked Lists in order to help the people who having difficulty remembering contact information easily. More clearly , the program help them to easily view contact information when you forget it or help you enter new contact information*

*Although the human brain has the ability to remember much more than a computer, it uses only 1-2% of its brain. Also, a person has 2 types of memory, because of the programs I created, he uses short memory to remember people's contact information, i.e. They do not try to remember, and such a feature is very useful for people. Even samsung and ios device systems have apps called contact which are also made to help people.*

*So in all respects this program is useful, I may work on it in the future to create a clone version or an improved version of contact programs of famous companies.*

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**Operations included in the application**

Firstly, I thought we would create an program to record the contact information that are important to us, to store the data, and to search. My app include this operations :

1.Displaying Saved Contacts.

2. Inserting New Contact.

3.Updating Details on Exisiting Contact.

4.Deleting a Contact.

5.Searching a Contact. -- Search by Number , Search by Name and Search

by Email

Functions defined in the Code:

* void insert();
* void sort();
* void deletecontact();
* void searchbyname();
* void searchbynumber();
* void searchbyemail();
* void accept();
* void display();
* void update();

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**Choice of Data Structure**

**Main reason why I chose Double Linked List data structure over others:**

* It allows traversing in both forward and backward directions because of the next and previous [pointers](https://www.codingninjas.com/codestudio/library/pointers-in-c" \t "_blank), unlike the singly linked list, which allows traversing in only one direction.
* Deletion of nodes is easier compared to a singly linked list. This is because to delete a node; we need access to the node to be deleted and the node previous to it. So, in a singly linked list, for deletion, we require two pointers, while in a doubly-linked list, there is no need to maintain an extra pointer as each node itself carries the information of the previous node.
* Reversing a doubly linked list is also easy. We only need to swap each node’s next and previous pointers and update the head node to point to the last node to reverse a doubly-linked list.
* We can easily insert a new node before a given node.

Primitive Operations Doubly Linked Lists can Perform:

* Searching. -- O(n)
* Sorting. -- O(n\*log n)
* Deletion. -- O(n)

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**Code**

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**Code**

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**Limitations and Future Scope**

Despite the fact that the application has some time constraints and a lack of knowledge of c++, as opposed to a normal life, I have experience in using DLL and Nodes in my team projects, I think I managed to save information on the main parts of the idea at the same time we have information on its use in various works.

**Subject Importance**

The main goal of this app was to create an app like is to quickly search, change, add new data without remembering them, but we couldn’t show the app in full because we are still new in our programming science. But this is an important program for us, and we ourselves have been enslaved to the 1st program in terms of using the data structure in real life.

A better version of this program is probably used by Samsung and Apple in their contact apps.

As for the subject of Data Structure, this subject is very necessary and we will use it again in our database or algorithm lessons. In addition, students who plan to work in FAANG companies will be interviewed on these issues, algorithms and data structures.

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**References**

<https://www.geeksforgeeks.org/introduction-and-insertion-in-a-doubly-linked-list/>

<https://www.prepbytes.com/blog/linked-list/advantages-disadvantages-and-uses-of-a-doubly-linked-list/>