RACHNA COLLEGE OF ENGINEERING &TECHNOLOGY GUJRANWALA
(A Constituent College of UET, Lahore)

CONTACT BOOK MANAGEMENT SYSTEM

Data Structures & Algorithms

(Final Project Proposal)

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Proposal: *Contact Book Management System*

Introduction

This proposal outlines the design and functionality of a Contact Book Management System developed in C++ that allows users to manage and organize contact information efficiently. The system provides a simple yet effective way to store, search, sort, update, and delete contact details, making it an ideal tool for individuals and small businesses.

System Overview

The Contact Book Management System is implemented using a linked list to store contact records, with each node representing a contact. Each contact contains two primary pieces of information:

- **Name:** The name of the contact person.
- **Phone Number:** The contact person's phone number

The system offers a user-friendly command-line interface that allows users to interact with the contact book. Operations such as adding, deleting, searching, sorting, and editing contacts are supported. The system also provides file handling features to save and retrieve contact data from an external file.

Key Features

1. Add New Contacts:

- The system allows users to add new contacts, each consisting of a name and a phone number. It automatically updates the linked list structure with the new information.

2. Display Contacts:

- All saved contacts are displayed in a sorted manner by name. The system sorts contacts using a bubble sort algorithm, ensuring that the display is always in alphabetical order.

3. Search Contacts:

- Users can search for a contact by either name or phone number. The system provides detailed information about the contact once found.

4. Edit Contacts:

- The system allows users to edit existing contacts. Users can search for a contact by name or phone number, then update the contact’s details.

5. Delete Contacts:

- Individual contacts can be deleted by searching for them using their name or phone number. The system removes the corresponding node from the linked list.

6. Delete All Contacts:

- Users have the option to delete all stored contacts at once, clearing the entire contact book.

7. File Operations:

- Save Contacts: The system can save the current list of contacts to a file , allowing users to preserve their data for future use.
- Load Contacts: When the system starts, it loads any previously saved contacts from the file, ensuring data persistence.

8. Sorting Contacts:

- The system uses a bubble sort algorithm to maintain contacts in alphabetical order by name. Sorting is performed automatically when displaying contacts.

Technical Implementation

Data Structure:

The Contact Book uses a linked list as its underlying data structure, where each contact is represented as a node. Each node contains:

- name (string)
- phone_number (long long int)
- next (pointer to the next node)
- prev (pointer to the previous node)

Functional Modules:

1. CreateNode(): Adds a new contact to the list.
2. Display(): Displays all contacts, sorted by name.
3. Search(): Searches for a contact by name or phone number.
4. EditContacts(): Edits an existing contact.
5. DeleteContactBySearch(): Deletes a specific contact by name or phone number.
6. DeleteAllContacts(): Deletes all contacts in the contact book.
7. BubbleSort(): Sorts the contacts in alphabetical order by name.
8. OfflineSave(): Saves all contacts to an external file (`contactbook.txt`).
9. ReopenCB(): Reopens and loads contacts from the file when the system starts.
10. Backup(): It will keep backup of data.

System Benefits

- **Efficiency:** The use of a linked list ensures that the system can handle insertion, deletion, and traversal efficiently.
- **Data Persistence:** With the ability to save and load contact data from a file, users can ensure their contact information is always backed up.
- **User-Friendly:** The command-line interface is simple and intuitive, allowing users to perform operations with ease.
- **Scalability:** The system can scale with a growing list of contacts while maintaining smooth performance.
- Flexibility: It supports both search by name and phone number, providing users with multiple ways to interact with the data.

Conclusion

The Contact Book Management System provides a robust and efficient platform for managing personal or business contacts. With its simple interface, structured data storage, and reliable file handling, the system addresses all essential contact management needs. It is an excellent solution for users who need to organize and maintain contact information efficiently while ensuring data persistence.