Detailed Report: Phone Book Management Application

GitHub Link: https://github.com/Pavan-12062000/Full-Stack-Course/tree/feature/Phone%20Book%20Management%20System

1. Overview

The Phone Book Management Application is a comprehensive command-line tool designed for managing personal contacts. It allows users to perform a wide range of operations, including adding, viewing, searching, updating, deleting, exporting, importing, merging, and filtering contacts. The application is developed in Python and is structured to provide a robust and user-friendly experience.

2. Data Structures Used

a) Contact class: Each contact is represented by a Contact class, which stores:
- First Name (first_name)
- Last Name (last_name)
- Phone Number(s) (phone_number)
- Email Address (optional) (email)
- Address (optional) (address)
- Creation Timestamp (created_at)
- Update Timestamp (updated_at)

b) Phonebook class: The PhoneBook class serves as the main data structure where all contacts are stored as a list. It provides various methods for performing CRUD operations, sorting, grouping, and searching contacts.
Key attributes:
- contacts: A list of Contact objects.

Key methods:
- add_contact(): Adds a new contact to the phone book.
- update_contact(): Updates the details of an existing contact.
- delete_contact(): Deletes a contact based on full name or other criteria.
- merge_contacts(): Merges duplicate contacts.
- search_contacts(): Provides wildcard search and filters.
- sort_contacts(): Sorts contacts alphabetically.
- group_contacts(): Groups contacts by first letter of the last name.

3. Functionalities implemented

a. Add contact: Users can add new contacts to the phone book by providing essential information such as first name, last name, and phone number. Optional fields include email and address. The system ensures that all required fields are filled and validates the phone number format. Users can also add multiple phone numbers for a single contact and cancel the operation if necessary. If the user enters a blank input for the phone number, the prompt will continuously ask for a valid phone number until provided.

b. View contacts: This functionality allows users to view a comprehensive list of all contacts stored in the phone book. The contact details are displayed in a user-friendly format, including names, phone numbers, email addresses, and addresses. Users can review the entire list or navigate through the contacts to find specific entries.

c. Search contact: Users can search for contacts by entering a search term that matches either the first name or last name or phone number. The application performs a case-insensitive search and supports partial matches, making it easy to find contacts even if only part of their information is known. Results are displayed with relevant contact details.

d. Update contact: This feature enables users to update the details of an existing contact. After locating the contact to be updated, users can modify any of the contact's attributes, such as first name, last name, phone numbers, email addresses, or physical addresses. The update process ensures that all changes are saved and reflected in the contact list.

e. Delete contact: Users can delete a contact from the phone book with a two-step confirmation process. After searching for the contact, the system displays the contact's details and prompts the user to confirm the deletion. If confirmed, the contact is permanently removed from the phone book. If not confirmed, the user is returned to the main menu.

f. Export contacts to CSV: This functionality allows users to export all contacts to a CSV file. The CSV file format includes columns for first name, last name, phone numbers, email addresses, and physical addresses. This feature is useful for creating backups or transferring contact data to other applications.

g. Import contacts to CSV: Users can import contacts in bulk from a CSV file. The file should adhere to a specific format with columns for first name, last name, phone numbers, email addresses, and addresses. The application reads and parses the CSV file, adding each contact to the phone book. This feature facilitates the batch addition of contacts and is essential for migrating contact data from other sources.

Instructions for the CSV file for importing contacts:

1. The file should be in CSV format.
2. The first row of the file should contain the heading mentioned below:
   a. Firstname
   b. Lastname
   c. Phone Number
   d. Email
   e. Address

And then you can add any number of contacs.

h. Merge two contacts: This feature enables the merging of two contacts into a single contact record. Users can specify the full names of the two contacts to be merged. The application combines their details, including phone numbers, emails, and addresses, into one record. This is useful for consolidating duplicate entries and ensuring that all contact information is maintained in a single entry.

i. Filter contacts by date: Users can filter and view contacts based on a specified date range. This functionality allows users to display contacts that were created or updated within a certain period. The date range is defined by a start date and an end date, and the application retrieves contacts that match the criteria. This feature is useful for tracking recent additions or modifications to the contact list.

j. Batch Delete Contact: This functionality allows users to delete multiple contacts at once based on a search term. Users can enter a name or phone number to filter contacts, and the application displays all matching entries. The user can then select the contacts to delete by specifying their indices. This feature streamlines contact management, making it easy to clean up the contact list by removing old or duplicate entries efficiently. A confirmation step ensures that users can review their selections before deletion, enhancing the overall user experience.

4. Commands to execute the application

To run the application, we need to run **python main.py** command to run the application and it goes to the main menu of the application where you need to choose the options.

5. Conclusion

The Phone Book Management Application provides a comprehensive solution for contact management, featuring robust CRUD operations, advanced search capabilities, and effective data import/export. The application is well-structured, with modular code and detailed logging for enhanced usability and maintainability. Adhering to PEP 8 standards, it ensures code quality and readability. Unit tests are included to validate functionality and support future enhancements.