

**School of Computer Science and Electrical Engineering
University of Ottawa**

**GNG - 5300 | Fall 2024
Full Stack Software Development**

***Assignment 1
Phone Book Management Application***

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Introduction

The main goal for this assignment is to design a user-friendly command-line interface to model an advanced phonebook system using the Python programming language. The application that was implemented supports the following functionalities:

- Creating & adding contacts to your phonebook.
- Deleting contacts from your phonebook.
- Updating individual contacts.
- Displaying all contacts.
- Batch addition of contacts from an input CSV file.
- Batch deletion of contacts from an input CSV file.
- Sorting contacts alphabetically.
- Grouping contacts by last name.
- Audit logging for all operations performed on the phonebook.

Software Design

Data Structures

1. **Contact class (`contact.py`):** This class models each contact as an object. It contains attributes like `first_name`, `last_name`, `phone_number`, `email`, and `address`. Additional attributes include:
 - `time_created` and `time_updated` to track when the contact was created and last modified.
 - `update_history`, a list that stores the history of updates made to the contact, ensuring that changes are tracked.
2. **List (`contacts_list`):** In `phonebook.py`, a list is used to store all contact objects. This list serves as the central collection of contacts, allowing for easy iteration, searching, and manipulation.
3. **Dictionary (`old_values` and `new_values`):** When updating a contact, dictionaries are used to store the old and new values of the contact's attributes, facilitating easy comparison and logging of changes.

Functionalities Integrated

1. CRUD Operations:

- **Add Contact:** Adds a new contact to the `contacts_list` and logs the operation.
- **Delete Contact:** Removes a contact from the list based on the full name and logs the operation.
- **Update Contact:** Modifies a contact's details, validates phone numbers and emails, and tracks the change in the `update_history`.
- **Display Contacts:** Displays all contacts in the system with their details.

2. Batch Processing:

- **Batch Add/Delete Contacts:** Allows importing or removing contacts in bulk using CSV files stored in the `data` folder, facilitating large-scale contact management.

3. Search and Sort:

- **Search Contacts:** Performs wildcard searching through names and phone numbers, with support for filtering by creation dates.
- **Sort Contacts:** Provides options to sort contacts alphabetically by last name or group them by the first letter of the last name.

4. Audit Logging:

Tracks operations like adding, deleting, updating, and searching contacts temporarily in an `audit_log.txt` file. The audit log is cleared whenever the user exits the application.

These data structures and functionalities make the system robust, allowing for flexible contact management with clear auditing capabilities.

Testing

In this section, we provide screenshots of some of the different features being tested using the command-line interface. The command used to run the CLI application: `python main.py`

1. Application main menu

```
(base) PS C:\Users\amoka\OneDrive\Desktop\Fall 2024\GNG5300 - FS Cloud Development\Coding\Assignment1> python main.py

--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 
```

2. Adding a single contact with validation for input fields.

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 1
Enter first name: Ahmad
Enter last name: El Mokahal
Enter phone number (format: (###) ###-####): (123) 456-789
Error: Invalid phone number format. It must be (###) ###-####.
Enter phone number (format: (###) ###-####): (123) 456-7888
Enter email (optional): am@mail.com
Enter address (optional):
Contact added successfully!
```

3. Batch addition of contacts from a CSV file placed in the data folder. (file: testing.csv)

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 6
Place your CSV file in the 'data' folder and enter the name of the file (e.g: testing.csv): testing.csv
Contacts added successfully from CSV.
```

4. Displaying the 5 batch contacts added + 1 individual contact.

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 2

Phonebook Contacts:
=====
1. Ahmad El Mokahal | Phone: (123) 456-7888 | Email: am@mail.com | Address: N/A
2. John Doe | Phone: (123) 456-7890 | Email: john.doe@example.com | Address: 123 Elm Street
3. Jane Smith | Phone: (987) 654-3210 | Email: jane.smith@example.com | Address: 456 Oak Avenue
4. Alice Johnson | Phone: (555) 123-4567 | Email: N/A | Address: 789 Pine Road
5. Bob Brown | Phone: (444) 987-6543 | Email: bob.brown@example.com | Address: N/A
6. Charlie Davis | Phone: (333) 678-1234 | Email: N/A | Address: 101 Maple Lane
=====
Total contacts: 6
```

5. Sorting contacts alphabetically by last name.

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 8
Contacts sorted alphabetically by last name.

Phonebook Contacts:
=====
1. Bob Brown | Phone: (444) 987-6543 | Email: bob.brown@example.com | Address: N/A
2. Charlie Davis | Phone: (333) 678-1234 | Email: N/A | Address: 101 Maple Lane
3. John Doe | Phone: (123) 456-7890 | Email: john.doe@example.com | Address: 123 Elm Street
4. Ahmad El Mokahal | Phone: (123) 456-7888 | Email: am@mail.com | Address: N/A
5. Alice Johnson | Phone: (555) 123-4567 | Email: N/A | Address: 789 Pine Road
6. Jane Smith | Phone: (987) 654-3210 | Email: jane.smith@example.com | Address: 456 Oak Avenue
=====
Total contacts: 6
```

6. Wildcard searches the phonebook using the following query: 'Jane'

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 3
Enter name or phone number to search: Jane

-----
Contact Name : Jane Smith
Phone Number : (987) 654-3210
Address      : 456 Oak Avenue
Email       : jane.smith@example.com
Added on    : 2024-09-16 15:31:35
-----
```

7. Updating the contact information for Jane Smith

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 4
Enter the full name of the contact to update: Jane Smith

-----
Contact Name : Jane Smith
Phone Number : (987) 654-3210
Address      : 456 Oak Avenue
Email       : jane.smith@example.com
Added on    : 2024-09-16 15:31:35
-----

--- Select Contact to Update ---
1. Jane Smith | (987) 654-3210

Enter the number of the contact to update: 1

--- Enter New Details (Leave blank to keep current values) ---
Enter new first name (current: Jane): Kelly
Enter new last name (current: Smith): Smith
Enter new phone number (current: (987) 654-3210): (123) 535-1838
Enter new email (current: jane.smith@example.com): kelly.smith@example.com
Enter new address (current: 456 Oak Avenue):
Contact updated successfully!
```

```
Choose an option: 3
Enter name or phone number to search: Kelly

-----
Contact Name : Kelly Smith
Phone Number : (123) 535-1838
Address      : 456 Oak Avenue
Email       : kelly.smith@example.com
Added on    : 2024-09-16 15:31:35
-----
```

8. Batch deletion of contacts from a CSV file placed in the data folder. (file: testing.csv)

```
--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 7
Place your CSV file in the 'data' folder and enter the name of the file (e.g: testing.csv): testing.csv
Error: Contact Jane Smith does not exist.
Contacts added successfully batch removed from CSV.
```

```

Choose an option: 2

Phonebook Contacts:
=====
1. Ahmad El Mokahal | Phone: (123) 456-7888 | Email: am@mail.com | Address: N/A
2. Kelly Smith | Phone: (123) 535-1838 | Email: kelly.smith@example.com | Address: 456 Oak Avenue
=====
Total contacts: 2

```

9. View the audit log of all operations.

```

--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 10

--- Audit Log ---
2024-09-16 15:30:10.477035 - Added contact: Ahmad El Mokahal
2024-09-16 15:31:35.044140 - Batch added contacts from file: testing.csv
2024-09-16 15:33:11.091376 - Sorted contacts alphabetically by last name.
2024-09-16 15:34:58.210753 - Searched for contacts with query: jane, found 1 matches
2024-09-16 15:35:49.074138 - Searched for contacts with query: jane smith, found 1 matches
2024-09-16 15:36:39.953360 - Updated contact: {'first_name': 'Jane', 'last_name': 'Smith', 'phone_number': '(987) 654-3210', 'email': 'jane.smith@example.com', 'address': '456 Oak Avenue'} to {'first_name': 'Kelly', 'last_name': 'Smith', 'phone_number': '(123) 535-1838', 'email': 'kelly.smith@example.com', 'address': '456 Oak Avenue', 'time_created': datetime.datetime(2024, 9, 16, 15, 31, 35), 'time_updated': datetime.datetime(2024, 9, 16, 15, 31, 35), 'update_history': []}
2024-09-16 15:37:53.208363 - Searched for contacts with query: kelly, found 1 matches
2024-09-16 15:40:18.072810 - Batch deleted contacts from file: testing.csv

```

10. Exit the application & clear the audit log

```

--- Phonebook Main Menu ---
1. Add Contact
2. View All Contacts
3. Search Contacts
4. Update Contact
5. Delete Contact
6. Batch Add Contacts (from CSV)
7. Batch Delete Contacts (from CSV)
8. Sort Contacts Alphabetically
9. Group Contacts by Last Name Initial
10. View Audit Log
11. Exit

Choose an option: 11
Audit log has been cleared.
Exiting the phonebook system. Goodbye!

```