

DATA STRUCTURE PROGRAM MANUAL

BENCHMARKING PROCESS

1. Add Contacts

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'add' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): add
```

- d. Now the time and spaces used can be seen.

```
-----
Adjacency List - addContact: Total Time: 24.09 ms, Total Memory: 592545 bytes
Adjacency Matrix - addContact: Total Time: 5.60 ms, Total Memory: 1414790 bytes
HashMap - addContact: Total Time: 2.03 ms, Total Memory: 519515 bytes
=====
```

2. Search Contacts

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'search' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): search
```

- d. Now the time and spaces used can be seen.

```
-----
Adjacency List - searchContact: Total Time: 0.218 ms, Total Memory: 47112 bytes
Adjacency Matrix - searchContact: Total Time: 0.0204 ms, Total Memory: 0 bytes
HashMap - searchContact: Total Time: 0.0769 ms, Total Memory: 47112 bytes
=====
```

3. List All Contacts

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'list' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): list
```

- d. Now the time and spaces used can be seen.

```
-----
Adjacency List - listAllContacts: Total Time: 0.000487 ms, Total Memory: 84 bytes
Adjacency Matrix - listAllContacts: Total Time: 0.000567 ms, Total Memory: 84 bytes
HashMap - listAllContacts: Total Time: 0.000385 ms, Total Memory: 84 bytes
=====
```

4. Suggest Connections

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'suggest' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): suggest
```

- d. Now the time and spaces used can be seen.

```
Adjacency List - suggestContacts: Total Time: 3.21 ms, Total Memory: 304444 bytes
Adjacency Matrix - suggestContacts: Total Time: 0.666 ms, Total Memory: 290608 bytes
HashMap - suggestContacts: Total Time: 1.07 ms, Total Memory: 290608 bytes
```

5. Update Contacts

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'update' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): update
```

- d. Now the time and spaces used can be seen.

```
Adjacency List - updateContact: Total Time: 0.0158 ms, Total Memory: 3228 bytes
Adjacency Matrix - updateContact: Total Time: 0.0136 ms, Total Memory: 4037 bytes
HashMap - updateContact: Total Time: 0.00783 ms, Total Memory: 1509 bytes
```

6. Delete Contacts

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'delete' then press enter.

```
- list: Test listing all contacts
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): delete
```

- d. Now the time and spaces used can be seen.

```
Adjacency List - deleteContact: Total Time: 0.0144 ms, Total Memory: 3613 bytes
Adjacency Matrix - deleteContact: Total Time: 0.0107 ms, Total Memory: 2737 bytes
HashMap - deleteContact: Total Time: 0.00890 ms, Total Memory: 4969 bytes
```

7. Add Connections

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'addconnection' then press enter.

```
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): addconnection
```

- d. Now the time and spaces used can be seen.

```
Adjacency List - addConnection: Total Time: 0.342 ms, Total Memory: 291088 bytes
Adjacency Matrix - addConnection: Total Time: 0.0848 ms, Total Memory: 291088 bytes
HashMap - addConnection: Total Time: 0.159 ms, Total Memory: 291088 bytes
=====
```

8. Remove Connections

- a. Enter command '1' then press enter.

```
Welcome to Contacts Manager Performance Testing

Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
```

- b. Enter the number of desired contacts then press enter.

```
Select an option:
1. Run custom performance test
0. Exit

Enter your choice: 1
Enter number of contacts: 1000
```

- c. Enter command 'removeconnection' then press enter.

```
- suggest: Test suggesting contacts
- update: Test updating a contact
- delete: Test deleting a contact
- addconnection: Test adding a connection
- removeconnection: Test removing a connection
Enter operations to test (comma-separated): removeconnection
```

- d. Now the time and spaces used can be seen

```
Adjacency List - removeConnection: Total Time: 0.241 ms, Total Memory: 322100 bytes
Adjacency Matrix - removeConnection: Total Time: 0.0902 ms, Total Memory: 290416 bytes
HashMap - removeConnection: Total Time: 0.212 ms, Total Memory: 290416 bytes
```

CONTACT MANAGER FX (GUI)

- ## 1. View Selection

Choose which data structure you want to view.

A screenshot of a web application's 'Select a view' dropdown menu. The menu is open, showing five options: 'Adjacency Matrix (directed)', 'Adjacency Matrix (undirected)', 'Adjacency List (directed)', 'Adjacency List (undirected)', and 'HashMap View'. The 'Adjacency Matrix (undirected)' option is highlighted with a grey background.

- ## 2. Add Contacts

To add a contact, enter their name in the box beside the 'Add' button followed by their id and press the 'Add' button.

[illegible]

3. Update Contacts

To update a contact, enter their old name from the contact in the box beside the ‘Update’ button and continue to enter their new name and id, then press the ‘Update’ button.

[illegible]

4. Search Contacts

To search for a contact, enter their name in the search category and then press the ‘Search’ button.

Contacts Manager FX

Adjacency Matrix (directed)

| Index | From Contact | Bob | Jessica | Bill | Max | Kevin |
|-------|--------------------|-----|---------|------|-----|-------|
| 0 | Bob (ID: 101) | 0 | 0 | 0 | 0 | 0 |
| 1 | Jessica (ID: 102) | 0 | 0 | 0 | 0 | 0 |
| 2 | Bill (ID: 103) | 0 | 0 | 0 | 0 | 0 |
| 3 | Max (ID: 104) | 0 | 0 | 0 | 0 | 0 |
| 4 | Kevin (ID: 105) | 0 | 0 | 0 | 0 | 0 |
| 5 | Michelle (ID: 106) | 0 | 0 | 0 | 0 | 0 |
| 6 | null | 0 | 0 | 0 | 0 | 0 |
| 7 | null | 0 | 0 | 0 | 0 | 0 |
| 8 | null | 0 | 0 | 0 | 0 | 0 |
| 9 | null | 0 | 0 | 0 | 0 | 0 |
| 10 | null | 0 | 0 | 0 | 0 | 0 |
| 11 | null | 0 | 0 | 0 | 0 | 0 |
| 12 | null | 0 | 0 | 0 | 0 | 0 |
| 13 | null | 0 | 0 | 0 | 0 | 0 |
| 14 | null | 0 | 0 | 0 | 0 | 0 |
| 15 | null | 0 | 0 | 0 | 0 | 0 |
| 16 | null | 0 | 0 | 0 | 0 | 0 |
| 17 | null | 0 | 0 | 0 | 0 | 0 |
| 18 | null | 0 | 0 | 0 | 0 | 0 |
| 19 | null | 0 | 0 | 0 | 0 | 0 |
| 20 | null | 0 | 0 | 0 | 0 | 0 |
| 21 | null | 0 | 0 | 0 | 0 | 0 |
| 22 | null | 0 | 0 | 0 | 0 | 0 |

Found: Bill (ID: 103)

Search: [Search]

Full name: [-Add]

Student ID:

Full name: [Delete]

Old name: [Update]

New name:

New student ID:

Full name: [Add connection]

Full name: [Remove connection]

Full name: [Suggest friends]

[Start breadth first traversal]

[Start depth first traversal]

5. Delete Contacts

To delete a contact, enter their name in the box beside the 'Delete' button and then press the button.

Contacts Manager FX

Adjacency List (directed)

| Contact | Known People |
|-------------------|----------------|
| Billie (ID: 102) | John, Jude |
| Ricky (ID: 103) | |
| Mark (ID: 201) | |
| John (ID: 101) | Billie |
| Alice (ID: 106) | Jeffrey, Iqbal |
| Iqbal (ID: 105) | Mark |
| Jude (ID: 108) | Billie |
| Jeffrey (ID: 104) | Ricky |

Search:

Full name:

Student ID:

Full name:

Old name:

New name:

New student ID:

Full name:

Full name:

Full name:

6. Suggest Connections

To suggest a contact, enter their name in the box beside the 'Suggest friends' button and then press the button.

Contacts Manager FX

Adjacency List (undirected)

```
[Contact { name=' Ricky ', studentId= 103 }, Contact { name=' Mark ', studentId= 201 }]
```

| Contact | Known People |
|-------------------|----------------|
| Billie (ID: 102) | Jude, John |
| Ricky (ID: 103) | Jeffrey |
| Mark (ID: 201) | Iqbal |
| John (ID: 101) | Billie |
| Alice (ID: 106) | Jeffrey, Iqbal |
| Iqbal (ID: 105) | Alice, Mark |
| Jude (ID: 108) | Billie |
| Jeffrey (ID: 104) | Alice, Ricky |

Search:

Full name:

Student ID:

Full name:

Old name:

New name:

New student ID:

Full name:

Full name:

Full name:

7. Add Connections

To add a connection, enter the name in the box beside the 'Add connections' button and add another name below it to add connection between those two names then press the button.

