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## Launching into Computer Science

### Assignment 1 – Part 2

#### **Readme of *My Phone Book***

In order to be brief and clear (Great Learning Team, 2021), this readme file contains short paragraphs under the following headings:

- **Introduction**
- **Set-up and maintenance**
- **User manual**

#### **Introduction**

***My Phone Book*** is project developing a user-friendly application on Python for facilitating users to locate the contact numbers. Three data are stored for each record, namely: name, telephone number and mobile number. There are five services provided which are: insert, delete, modify, search and sort.

#### **Set-up and maintenance**

The application is written using Python, therefore installation of Python is required in order to run ***My Phone Book***.

Simple is beauty. Simple operations of Python is sufficient to develop this application and thus no library is used because developer-written codes may be more efficient

(Jarvis, 2016) in developing simple application as they are usually less complex. Therefore other than Python, no other installation and configuration is required.

The current version of ***My Phone Book*** provides five services. It is, however, written in a way that allows extension. The coding of this application is broke down into a number of segments, each of them contains a service/feature and coded as a user-defined function (Chris, 2021). These functions are able to operate separately and therefore future maintenance or upgrade of individual service is easy.

### **User manual**

***My Phone Book*** is designed to be a simple but user friendly phone book. The user interface simulating dialog with users to arouse user interest. There are always questions as to next step so that user could easy following the services.

#### ***General:***

1. Users are greeted by a welcoming banner which signify the start of the application.
2. After a service is completed, the application will continue to enquire if a new service is required until the user select end service.
3. In case user accidentally enters characters other than the options available, there will be a reminder message and re-enter is usually allowed.

### **Choosing services:**

1. User has to select desirable service: Insert, delete, modify, search, sort by entering the option number.

```
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? d
```

2. A summary of services provided is as below:

Service choice		
<i>a = insert</i>		
<i>b = delete</i>	1 = Delete by name	
	2 = Delete by telephone number	
	3 = Delete by mobile number	
<i>c = modify</i>	1 = Modify name	
	2 = Modify telephone number	
	3 = Modify mobile number	
<i>d = search</i>	1 = Search by name	
	2 = Search by telephone number	
	3 = Search by mobile number	
<i>e = sort</i>	1 = Sort by name	A = ascending order D = descending order
	2 = Sort by telephone number	A = ascending order D = descending order
	3 = Sort by mobile number	A = ascending order D = descending order

### **Insert service (option a):**

1. After entering the insert service, user is guided to enter the name, telephone number and mobile number

```
Please input the name: Hans1
Please input the telephone number: 666
Please input the mobile number: 6666
```

2. Once the required data are entered, the phone will automatically update. The name of the record just inserted will be listed out for user reference,

```
*****
Hans1 has been inserted!
*****
```

3. The current version, being a **Testing Version** of the application, will automatically print a list of all entry on the phone book for easy reference.

```
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hansi Telephone number: 666 Mobile number: 6666
##### check point #####
```

#### **Delete service (option b):**

1. Delete service is available in case the user wants to delete a record.
2. **Warning:** Please be note that the deletion will apply to the whole record, i.e. name, telephone number and mobile number of the same record will be deleted at the same time.
3. User could choice to locate the record to be deleted by name, telephone number or mobile number.
4. For example, (1) stands for delete by name. User is required to enter the name of the record to be deleted. If the name entered is not in the phone book, reminder message and allow re-enter. Same routine applies when user choose (2) delete by telephone number or (3) delete by mobile number.
5. After the name of the record to be deleted is entered, the user is asked to confirm if you want to execute the deleting.

6. **Warning:** Once confirmed, the whole record (i.e. the name, telephone number and mobile number of the same record) will be deleted. There is no way to recover a deleted entry. Therefore user is reminded to be careful when making the confirmation.

7. There is a feedback message informing the user which record is deleted.

```
Please input the name to be deleted: Hans1  
Confirm delete: Hans1? Please enter Yes or No ? Yes  
*****  
The name Hans1 and its related telephone number and mobile number have been deleted.  
*****
```

8. Same as “Inert” service, a list of all entry will be printed automatically to facilitate checking in the current **Testing Veion**.

#### **Modify service (option c):**

1. Modify service is available in case the user would like to amend any data in a record.

2. User must first know the name in the record for which modification to be made.

3. After entering the name in the record which contain data to be modified, options will be available as to which data to modify (i.e. modify name, telephone number or mobile number). Please note that only one data can be amended every time. If user wants to modify multiple data, new service is required for next modification.

4. After selecting type of data, the user is required to enter the new data. Thereafter, user is required to confirm the modification.

5. **Warning:** Once confirmed, the existing data will be replaced by the new data. There is no way to recover a modified entry. Therefore user is reminded to be careful when making the confirmation.

6. There is a feedback message informing the user how the data is modified:

```
Please input the name of record to be modified: Elsa
For record Elsa, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: Elsa1
Confirm modifying: Elsa? Please enter Yes or No ? Yes
*****
The name Elsa was replaced by Elsa1.
*****
```

7. Same as above, the current **Testing Version** will automatically print a list of all entries to facilitate checking.

```
##### check point #####
1. Name: Elsa1 Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
##### check point #####
```

### **Search service (option d):**

1. User could perform searches either by name, telephone number or mobile number.

User is asked to enter the desire option.

```
Please input name to search: Elsa1
*****
Name:Elsa1, Telephone number: 101, Mobile number: 1001
*****
```

### **Sort service (option e):**

1. User could sort the entries in the phone book by name, telephone number or mobile number, in either ascending or descending order.

```
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Do you like to sort name in (A) Ascenting order (D) Descending order? Enter A or D? a
*****
1. Name: Anna Telephone number: 101 Mobile number: 1001
2. Name: Elsa1 Telephone number: 222 Mobile number: 2222
3. Name: Hans5 Telephone number: 333 Mobile number: 3333
4. Name: Hnas4 Telephone number: 444 Mobile number: 4444
5. Name: Kristoff Telephone number: 555 Mobile number: 5555
6. Name: Marshmallow Telephone number: 999 Mobile number: 9999
7. Name: Olaf Telephone number: 000 Mobile number: 0000
*****
```

**My Phone Book** is a user-friendly application. Try **My Phone Book** today and enjoy its simplicity.

### Reference:

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<https://www.mygreatlearning.com/blog/readme-file/#:~:text=readme%20file%20is,-,What%20is%20a%20README%20File%3F,about%20the%20patches%20or%20updates>. [Accessed on: 20 Aug 2022]

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## Launching into Computer Science

### Unit 06 Assignment 1: Part 2

#### Testing Strategy and Testing Result

The application provides five basic services, which are: insert, delete, modify, search and sort. During the development of the coding, the whole application is broke down to different modules. Each module contains one or more user-defined functions. The modular approach will make the coding easier to understood and maintain. Debugging is easier too (Programiz, 2021).

The current version upload is a ***Testing version*** which means the following two parts are added to facilitate testing and monitoring of testing results. These parts will be deleted during ***Production version***.

#### 1. Embedded test data

In order to test the “delete”, “modify”, “search” and “sort” services, there must be some data readily available. As such, five records (for testing purposes only) are added to the *name\_list*, *number\_list* and *mobile\_list* as below. The presence of these data, however, will not affect the proper functioning of application.

Name List	Number List	Mobile List
1. Elsa	1. Elsa's phone no. 111	1. Elsa's mobile no. 1111
2. Anna	2. Anna's phone no. 222	2. Anna's mobile no. 2222
3. Kristoff	3. Kristoff's phone no. 333	3. Kristoff's mobile no. 3333
4. Olaf	4. Olaf's phone no. 444	4. Olaf's mobile no. 4444
5. Marshmallow	5. Marshmallow's phone no. 555	5. Marshmallow's mobile no. 5555

The production version will not contain these test data.

## 2. Check point in *Testing version*

In addition to the test data, the ***Testing version*** also contains coding for “check point” which are written for the purpose of checking the “insert”, “delete” and “modify” services. The check point is a printout of the whole phone book after running each of the “insert”, “delete” and “modify” modules so that developer/user can check if the record is properly inserted, deleted or modified.

This Check Point is being coded in a user-defined function (named: Checkpoint() ). This Check Point coding will be hidden in the production version.

The application has been tested and the testing results are set out in the tables below.

## ***Test result***

The following set out all testing results.

### **Service selection module:**

Major testing areas:

1. Service choice: Case sensitivity of responds (out of a, b, c, d or e)
2. Service choice: will error message appear when key in character other than those in question?

After running a selected service, user will be asked if he/she wants to start a new service

3. New service choice: Case sensitivity of responds (out of s or e)
4. New service choice: will error message appear when key in character other than those in question?

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
1A. Service selection	Service choice (a = insert)	Check case sensitivity of "a"	a	Go to "insert" Function	Satisfaction
			A	Go to "insert" Function	Satisfaction
1A Service selection - insert loop	1.2 Start new service? (s = start, e = end)	Check case sensitivity of "s"	s	go to beginning of selection choice	Satisfaction
			S	go to beginning of selection choice	Satisfaction
		Check case sensitivity of "e"	e	print closing greeting and exit program	Satisfaction
			E	print closing greeting and exit program	Satisfaction
1A. Service selection - insert loop	1.3 Start new service?	Key other character to restart choice	Character other than s or e	Error message "Sorry, please enter s or e, and go back ask to restart service choice again	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
1B. Service selection	2.1 Service choice (b = delete)	Check case sensitivity of "b"	b	Go to "delete" Function	Satisfaction
			B	Go to "delete" Function	Satisfaction
1B. Service selection - insert loop	2.2 Start new service? (s = start, e = end)	Check case sensitivity of "s"	s	go to beginning of selection choice	Satisfaction
		Check case sensitivity of "e"	S	go to beginning of selection choice	Satisfaction
			e	print closing greeting and exit program	Satisfaction
			E	print closing greeting and exit program	Satisfaction
1B. Service selection - delete loop	2.3 Start new service?	Key other character to restart choice	Character other than s or e	Error message "Sorry, please enter s or e, and go back ask to restart service choice again	Satisfaction
1C. Service selection	3.1 Service choice (c = modify)	Check case sensitivity of "c"	c	Go to "modify" Function	Satisfaction
			C	Go to "modify" Function	Satisfaction
1C. Service selection - modify loop	3.2 Start new service? (s = start, e = end)	Check case sensitivity of "s"	s	go to beginning of selection choice	Satisfaction
		Check case sensitivity of "e"	S	go to beginning of selection choice	Satisfaction
			e	print closing greeting and exit program	Satisfaction
			E	print closing greeting and exit program	Satisfaction
1C. Service selection - modify loop	3.3 Start new service?	Key other character to restart choice	Character other than s or e	Error message "Sorry, please enter s or e, and go back ask to restart service choice again	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
1D. Service selection	4.1 Service choice (d = search)	Check case sensitivity of "d"	d	Go to "search" Function	Satisfaction
			D	Go to "search" Function	Satisfaction
1D. Service selection - search loop	4.2 Start new service? (s = start, e = end)	Check case sensitivity of "s"	s	go to beginning of selection choice	Satisfaction
		Check case sensitivity of "e"	S	go to beginning of selection choice	Satisfaction
			e	print closing greeting and exit program	Satisfaction
			E	print closing greeting and exit program	Satisfaction
1D. Service selection - search loop	4.3 Start new service?	Key other character to restart choice	Character other than s or e	Error message "Sorry, please enter s or e, and go back ask to restart service choice again	Satisfaction
1E. Service selection	5.1 Service choice (e = sort)	Check case sensitivity of "e"	e	Go to "sort" Function	Satisfaction
			E	Go to "sort" Function	Satisfaction
1E. Service selection - sort loop	5.2 Start new service? (s = start, e = end)	Check case sensitivity of "s"	s	go to beginning of selection choice	Satisfaction
		Check case sensitivity of "e"	S	go to beginning of selection choice	Satisfaction
			e	print closing greeting and exit program	Satisfaction
			E	print closing greeting and exit program	Satisfaction
1E. Service selection - sort	4.3 Start new service?	Key other character to restart choice	Character other than s	Error message "Sorry, please enter s or e, and go back ask to	Satisfaction

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
loop			or e	restart service choice again	
1F. Service selection	6.1 Service choice	Key other character to service choice	Characters other than a, b, c, d, e	Error message "Sorry, please enter a, b, c, d, or e." and go back to service choice again	Satisfaction

**Insert module:**

Major testing areas: 1. Enter data: Enter normal data, see Check Point afterward to see if data properly inserted  
 2 Enter data: will error message appear when key in duplicated name

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
2. Insert	1.1 Enter data	Enter the test data	Hans1, 666, 6666 Hans2, 777, 7777 Hans3, 888, 8888 Hans4, 999, 9999 Hans5, 000,0000	print "Irene1 has been inserted!"	Satisfaction
				Check point: List of phone book show entry properly inserted	Satisfaction
				print "Thank you for using the insertion function!"	Satisfaction
	1.2 Duplicated name	Enter a duplicated name	Elsa	print "Elsa already exist, No entry was inserted."	Satisfaction
				print "Thank you for using the insertion function!"	Satisfaction

```
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Terminal .settings README.md Assignment01... Terminal infolaptop-galil... Terminal
*****
WELCOME TO MY PHONE BOOK *****
*****
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? a
Please input the name: Hans1
Please input the telephone number: 666
Please input the mobile number: 6666
*****
Hans1 has been inserted!
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans1 Telephone number: 666 Mobile number: 6666
#####
##### check point #####
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? A
Please input the name: Hans2
Please input the telephone number: 777
Please input the mobile number: 7777
*****
Hans2 has been inserted!
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
```

```

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5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans1 Telephone number: 666 Mobile number: 6666
7. Name: Hans2 Telephone number: 777 Mobile number: 7777
##### check point #####
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? S
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? a
Please input the name: Hans3
Please input the telephone number: 888
Please input the mobile number: 8888
*****
ans3 has been inserted!
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans1 Telephone number: 666 Mobile number: 6666
7. Name: Hans2 Telephone number: 777 Mobile number: 7777
8. Name: ans3 Telephone number: 888 Mobile number: 8888
##### check point #####
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? A
Please input the name: Hnas4

```

```
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#####
# check point #####
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? A
Please input the name: Hnas4
Please input the telephone number: 999
Please input the mobile number: 9999
*****
Hnas4 has been inserted!
*****
#####
# check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans1 Telephone number: 666 Mobile number: 6666
7. Name: Hans2 Telephone number: 777 Mobile number: 7777
8. Name: ans3 Telephone number: 888 Mobile number: 8888
9. Name: Hnas4 Telephone number: 999 Mobile number: 9999
#####
# check point #####
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? a
Please input the name: Hans5
Please input the telephone number: 000
Please input the mobile number: 0000
```

```
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Terminal .settings README.md Assignment01_... Terminal infolaptop-galil... Terminal
Thank you for using the insertion function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? a
Please input the name: Hans5
Please input the telephone number: 000
Please input the mobile number: 0000
*****
Hans5 has been inserted!
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans1 Telephone number: 666 Mobile number: 6666
7. Name: Hans2 Telephone number: 777 Mobile number: 7777
8. Name: ans3 Telephone number: 888 Mobile number: 8888
9. Name: Hnas4 Telephone number: 999 Mobile number: 9999
10. Name: Hans5 Telephone number: 000 Mobile number: 0000
#####
Thank you for using the insertion function!
```

### Delete module:

Major testing areas:

1. Delete choice: Go to proper sub-function (out of 1= delete by name, 2 = delete by number, 3 = delete by mobile)
2. Delete choice: will error message appear when key in character other than those in question?
3. Delete by name/number/mobile: Enter data to delete, see Check Point afterward to see if data properly deleted
4. Delete by name/number/mobile: Error message appear when enter non-exit name/number/mobile and allow re-enter?
5. Confirm delete: Case sensitivity of responds (out of yes or no)
6. Confirm delete: will error message appear when key in character other than those in question?

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
3A. Delete by name (yes)	1.1 Delete choice	Choosing delete choice	1 = delete by name	go to "delete by name" Sub-Function	Satisfaction
	1.2 Delete by name Sub-function	Enter a name to delete	Elsa1	Print "confirm delete? Yes or No?"	Satisfaction
	1.3 Delete by name Sub-function	Confirm delete, check case sensitive of "yes"	yes, YES, Yes	print "The name [ ] and its related telephone number and mobile number have been deleted"	Satisfaction
				<b>Check point: List of phone book show entry properly deleted</b>	Satisfaction
				print "Thank you for using the deleting function!"	Satisfaction
3A.Delete by name (no)	1.4 Delete by name Sub-function	Confirm delete, check case sensitive of "no"	No, NO, no	end delete by name function and print "Thank you for using the deleting function"	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
3A. Delete by name (other character)	1.5 Delete by name Sub-function	Confirm delete - other character	4	print "sorry, please enter "yes" or "no" and go back to confirm choice	Satisfaction
3A. Delete by name (name not found)	1.6 Delete by name Sub-function	Confirm delete - non-exit name	Peter	(1) record not found and print "Sorry, no matched name was found, no record was deleted." (2) go back to beginning of the "delete by name" function	Satisfaction
3B. Delete by number (yes)	2.1 Delete choice	Choosing delete choice	2 = delete by number	go to "delete by number" Sub-Function	Satisfaction
	2.2 Delete by number Sub-function	Enter a telephone number to delete	777	Print "confirm delete? Yes or No?"	Satisfaction
	2.3 Delete by number Sub-function	Confirm delete, check case sensitive of "yes"	yes, YES, Yes	print "The telephone number [ ] and its related name and mobile number have been deleted"	Satisfaction
				<b>Check point: List of phone book show entry properly deleted</b>	Satisfaction
				print "Thank you for using the deleting function!"	Satisfaction
3B. Delete by number (no)	2.4 Delete by number Sub-function	Confirm delete, check case sensitive of "no"	No, NO, no	end delete by number function and print "Thank you for using the deleting function"	Satisfaction
3B. Delete by number (other character)	2.5 Delete by number Sub-function	Confirm delete - non-exit number	122	print "sorry, please enter "yes" or "no" and go back to confirm choice	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
3B. Delete by number (number not found)	2.6 Delete by number Sub-function	Confirm delete - other character	4	(1) record not found and print "Sorry, no matched number was found, no record was deleted." (2) go back to beginning of the "delete by number" function	Satisfaction
3C. Delete by mobile (yes)	3.1 Delete choice	Choosing delete choice	3 = delete by mobile	go to "delete by mobile" Sub-Function	Satisfaction
	3.2 Delete by mobile Sub-function	Enter a telephone mobile to delete	8888	Print "confirm delete? Yes or No?"	Satisfaction
	3.3 Delete by mobile Sub-function	Confirm delete, check case sensitive of "yes"	yes, YES, Yes	print "The mobile [ ] and its related name and telephone number have been deleted"	Satisfaction
				<b>Check point: List of phone book show entry properly deleted</b>	Satisfaction
				print "Thank you for using the deleting function!"	Satisfaction
3C. Delete by mobile (no)	3.5 Delete by mobile Sub-function	Confirm delete, check case sensitive of "no"	No, NO, no	end delete by mobile function and print "Thank you for using the deleting function"	Satisfaction
3C. Delete by mobile (other character)	3.6 Delete by mobile Sub-function	Confirm delete - non-exit mobile	1122	print "sorry, please enter "yes" or "no" and go back to confirm choice	Satisfaction
3C. Delete by mobile (mobile not found)	3.7 Delete by mobile Sub-function	Confirm delete - other character	4	(1) record not found and print "Sorry, no matched mobile was found, no record was deleted." (2) go back to beginning of the "delete by mobile" function	Satisfaction

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
3D. Delete function (delete choice enter other character)	3.8 Delete choice	Choose delete choice (other character)	others	(1) print "Sorry, please enter 1, 2 or 3. (2) go back to beginning of delete function and re-choose delete choice (2) print "Please input the name to be deleted"	Satisfaction

```

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Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Please input the name to be deleted: Hans1
Confirm delete: Hans1? Please enter Yes or No ? Yes
*****
The name Hans1 and its related telephone number and mobile number have been deleted.
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hans2 Telephone number: 777 Mobile number: 7777
7. Name: ans3 Telephone number: 888 Mobile number: 8888
8. Name: Hnas4 Telephone number: 999 Mobile number: 9999
9. Name: Hans5 Telephone number: 000 Mobile number: 0000
#####
Thank you for using the deleting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? B
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Please input the telephone number to be deleted: 777
Confirm delete: 777? Please enter Yes or No ? YES
*****
The telephone number 777 and its related name and mobile number have been deleted.
*****
```

```
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Confirm delete: 777? Please enter Yes or No ? YES
*****
The telephone number 777 and its related name and mobile number have been deleted.
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: ans3 Telephone number: 888 Mobile number: 8888
7. Name: Hnas4 Telephone number: 999 Mobile number: 9999
8. Name: Hans5 Telephone number: 000 Mobile number: 0000
#####
check point #####
Thank you for using the deleting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 3
Please input the mobile number to be deleted: 8888
Confirm delete: 8888? Please enter Yes or No ? yes
*****
The mobile number 8888 and its related name and telephone number have been deleted.
*****
##### check point #####
1. Name: Elsa Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
```

```
Terminal .settings README.md Assignment01_... Terminal x infolaptop-galil... Terminal
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
##### check point #####
#####
#
```

Thank you for using the deleting function!

```
Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Please input the name to be deleted: Peter
Sorry, no matched name was found, no record was deleted.
Please input the name to be deleted: Hans4
Sorry, no matched name was found, no record was deleted.
Please input the name to be deleted: Hans5
Confirm delete: Hans5? Please enter Yes or No ? no
```

Thank you for using the deleting function!

```
Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Please input the telephone number to be deleted: 112
Sorry, no matched telephone number was found, no record was deleted.
Please input the telephone number to be deleted: 999
Confirm delete: 999? Please enter Yes or No ? NO
```

Thank you for using the deleting function!

```
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Thank you for using the deleting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 3
Please input the mobile number to be deleted: 1122
Sorry, no matched mobile number was found, no record was deleted.
Please input the mobile number to be deleted: 0000
Confirm delete: 0000? Please enter Yes or No ? no

Thank you for using the deleting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 4
Sorry, please enter 1, 2 or 3.
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 3
Please input the mobile number to be deleted: 0000
Confirm delete: 0000? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm delete: 0000? Please enter Yes or No ? no

Thank you for using the deleting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? b
Do you like to delete (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Please input the telephone number to be deleted: 000
Confirm delete: 000? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm delete: 000? Please enter Yes or No ? no
```

```
Terminal .settings README.md Assignment01.... Terminal x infolaptop-galil... Terminal
Please input the name to be deleted: Hans5
Confirm delete: Hans5? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm delete: Hans5? Please enter Yes or No ? no

Thank you for using the deleting function!
```

## Modify module:

Major testing areas:

1. Name of entry to modify: Error message appear when enter non-exit name and allow re-enter?

After entering the name of record to be modify, there are choices between modify the name, number or mobile

2. Modify choice: Go to proper sub-function (out of 1= modify name, 2 = modify number, 3 = modify mobile of the record)
3. Modify choice: will error message appear when key in character other than those in question?
4. Modifying the name/number/mobile: Enter new data, see Check Point afterward to see if data properly modified
5. Confirm modify: Case sensitivity of responds (out of yes or no)
6. Confirm modify: will error message appear when key in character other than those in question?

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
4A Enter name of record to modify	1.1 Modify name	Enter non-exist name	Harry	print "Sorry, no matched record was found, no record was modified." then allow re-enter	Satisfaction
4B.. Modify name (yes)	2.1 Name of record to be modified	Enter name of record to be modified	Elsa	go to modify choice	Satisfaction
	2.2 Modify choice	Modify name, telephone no or mobile no?	1 = modify name	go to modify by name loop, print "please enter the new name"	Satisfaction
	2.3 Modify name	Enter new name	Elsa1	Print "confirm delete? Yes or No?"	Satisfaction
	2.4 Modify name	Confirm modify, check case sensitive of "yes"	yes, YES, Yes	print "The name [original name] was replaced by [new name]."	Satisfaction

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
				Check point: List of phone book show entry properly modified	Satisfaction
				print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4B Modify name (no)	2.5 Modify name	Confirm modify, check case sensitive of "no"	No, no, NO	print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4B Modify name (modify choice = other character)	2.6 Modify name	Confirm modify, enter other character	others	print "Sorry, please enter 1, 2, or 3?"	Satisfaction
4B Modify name (confirm choice = other character)	2.7 Modify name	Confirm modify, check character other than "yes" or "no"	others	print "Sorry, please enter yes or no?"	Satisfaction
4C.. Modify number (yes)	3.1 Name of record to be modified	Enter name of record to be modified	Elsa	go to modify choice	Satisfaction
	3.2 Modify choice	Modify number, telephone no or mobile no?	2 = modify number	go to modify by number loop, print "please enter the new number"	Satisfaction
	3.3 Modify number	Enter new number	101	Print "confirm delete? Yes or No?"	Satisfaction
	3.4 Modify number	Confirm modify, check case sensitive of "yes"	yes, YES, Yes	print "The number [original number] was replaced by [new number]."	Satisfaction
				Check point: List of phone book show entry properly modified	Satisfaction

Module	Step to be tested	Testing procedure	Input	Expected result	Conclusion
				print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4C Modify number (no)	3.5 Modify number	Confirm modify, check case sensitive of "no"	No, no, NO	print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4C Modify number (modify choice = other character)	3.6 Modify number	Confirm modify, enter other character	others	print "Sorry, please enter 1, 2, or 3?"	Satisfaction
4C Modify number (confirm choice = other character)	3.7 Modify number	Confirm modify, check character other than "yes" or "no"	others	print "Sorry, please enter yes or no?"	Satisfaction
4D.. Modify mobile (yes)	4.1 Name of record to be modified	Enter name of record to be modified	Elsa	go to modify choice	Satisfaction
	4.2 Modify choice	Modify mobile, telephone no or mobile no?	3 = modify mobile	go to modify by mobile loop, print "please enter the new mobile"	Satisfaction
	43 Modify mobile	Enter new mobile	1001	Print "confirm delete? Yes or No?"	Satisfaction
	4.4 Modify mobile	Confirm modify, check case sensitive of "yes"	yes, YES, Yes	print "The mobile [original mobile] was replaced by [new mobile]."	Satisfaction
				Check point: List of phone book show entry properly modified	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
				print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4D Modify mobile (no)	4.5 Modify mobile	Confirm modify, check case sensitive of "no"	No, no, NO	print "Thank you for using the modification function!" and end "modify" function, to back to service selection	Satisfaction
4D Modify mobile (modify choice = other character)	4.6 Modify mobile	Confirm modify, enter other character	others	print "Sorry, please enter 1, 2, or 3?"	Satisfaction
4D Modify mobile (confirm choice = other character)	4.7 Modify mobile	Confirm modify, check character other than "yes" or "no"	others	print "Sorry, please enter yes or no?"	Satisfaction

```
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Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Harry
Sorry, no matched name was found, no record was modified.
Please input the name of record to be modified: Elsa
For record Elsa, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: Elsa1
Confirm modifying: Elsa? Please enter Yes or No ? Yes
*****
The name Elsa was replaced by Elsa1.
*****
##### check point #####
1. Name: Elsa1 Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
##### check point #####
Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: 101
Confirm modifying: Elsa1? Please enter Yes or No ? YES
*****
```

```
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For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: 101
Confirm modifying: Elsa1? Please enter Yes or No ? YES
*****
The name Elsa1 was replaced by 101.
*****
##### check point #####
1. Name: 101 Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 2222 Mobile number: 2222
3. Name: Kristoff Telephone number: 3333 Mobile number: 3333
4. Name: Olaf Telephone number: 4444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 5555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 9999 Mobile number: 9999
7. Name: Hans5 Telephone number: 0000 Mobile number: 0000
#####
##### check point #####
Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
Sorry, no matched name was found, no record was modified.
Please input the name of record to be modified: 101
For record 101, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: Elsa1
Confirm modifying: 101? Please enter Yes or No ? yes
*****
The name 101 was replaced by Elsa1.
*****
##### check point #####
1. Name: Elsa1 Telephone number: 111 Mobile number: 1111
```

```

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*****
The name 101 was replaced by Elsa1.
#####
##### check point #####
1. Name: Elsa1 Telephone number: 111 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
#####
##### check point #####
Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 2
Please input the new telephone number for Elsa1 :101
Confirm modifying the telephone number of Elsa1? Please enter Yes or No ? yes
*****
The telephone number of Elsa1 was replaced by 101.
#####
##### check point #####
1. Name: Elsa1 Telephone number: 101 Mobile number: 1111
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999

```

```
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6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
##### check point #####
Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 3
Please input the new mobile number for Elsa1 :1001
Confirm modifying the mobile number of Elsa1? Please enter Yes or No ? YES
*****
The mobile number of Elsa1 was replaced by 1001.
*****
##### check point #####
1. Name: Elsa1 Telephone number: 101 Mobile number: 1001
2. Name: Anna Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Olaf Telephone number: 444 Mobile number: 4444
5. Name: Marshmallow Telephone number: 555 Mobile number: 5555
6. Name: Hnas4 Telephone number: 999 Mobile number: 9999
7. Name: Hans5 Telephone number: 000 Mobile number: 0000
##### check point #####
Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa
Sorry, no matched name was found, no record was modified.
```

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Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa
Sorry, no matched name was found, no record was modified.
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 4
Sorry, please enter 1, 2 or 3.
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 1
Please input the new name: Elsa
Confirm modiyng: Elsa1? Please enter Yes or No ? 0
Sorry, please enter Yes or No.
Confirm modiyng: Elsa1? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm modiyng: Elsa1? Please enter Yes or No ? no

Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 2
Please input the new telephone number for Elsa1 :111
Confirm modiyng the telephone number of Elsa1? Please enter Yes or No ? NO

Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
```

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Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 2
Please input the new telephone number for Elsa1 :111
Confirm modiying the telephone number of Elsa1? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm modiying the telephone number of Elsa1? Please enter Yes or No ? no

Thank you for using the modification function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? c
Please input the name of record to be modified: Elsa1
For record Elsa1, please select item to modify: (1) Name, (2) Telephone number, (3) Mobile number? Enter 1, 2 or 3? 3
Please input the new mobile number for Elsa1 :1111
Confirm modiying the mobile number of Elsa1? Please enter Yes or No ? 4
Sorry, please enter Yes or No.
Confirm modiying the mobile number of Elsa1? Please enter Yes or No ? no

Thank you for using the modification function!
```

## Search module:

Major testing areas:

1. Search choice: Go to proper sub-function (out of 1= by name, 2 = by number, 3 = by mobile)
2. Search choice: will error message appear when key in character other than those in question?
3. Search by name/number/mobile: Enter existing data, see search result to check if search functions properly
4. Search by name/number/mobile: Enter non-existing data, will error message appear and allow re-enter?

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
5A. Search	1.1 Search choice	Key other character	enter character other than 1, 2, 3	Error message, goes back to modify choice	Satisfaction
5B. search by name	2.1 Search choice	Search by name, telephone no or mobile no?	1 = search by name	print "Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? "	Satisfaction
	2.2 Search by name sub-function	Enter search name	Elsa1	print search result and print "Thank you for using searching function"	Satisfaction
5B search by name (non-exist name)	2.3 Search by name sub-function	Enter search name (non-exist name)	John	print error message "Sorry, there is no matched record!" and allow re-enter	Satisfaction

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
5C. search by number	3.1 Search choice	Search by number, telephone no or mobile no	2 = search by number	print "Do you like to search (1) by number (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? "	Satisfaction
	3.2 Search NY number sub-function	Enter search number	222	print search result and print "Thank you for using searching function"	Satisfaction
5C search by number (non-exist number)	3.3 Search NY number sub-function	Enter search number (non-exist number)	221	print error message "Sorry, there is no matched record!" and allow re-enter	Satisfaction
5D. search by mobile	4.1 Search choice	Search by mobile, telephone no or mobile no	3 = search by mobile	print "Do you like to search (1) by mobile (2) by telephone mobile (3) by mobile mobile? Enter 1, 2 or 3? "	Satisfaction
	4.2 Search by mobile sub-function	Enter search mobile	2222	print search result and print "Thank you for using searching function"	Satisfaction
5D search by mobile (non-exist mobile)	4.3 Search by mobile sub-function	Enter search mobile (non-exist mobile)	8888	print error message "Sorry, there is no matched record!" and allow re-enter	Satisfaction

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Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? d
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Please input name to search: Elsa1
*****
Name:Elsa1, Telephone number: 101, Mobile number: 1001
*****

Thank you for using the name search function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? D
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Please input name to search: John
Sorry, there is no matched name!Please input name to search: Elsa
Sorry, there is no matched name!Please input name to search: Elsa1
*****
Name:Elsa1, Telephone number: 101, Mobile number: 1001
*****

Thank you for using the name search function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? d
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Please input telephone number to search: 222
*****
Name:Anna, Telephone number: 222, Mobile number: 2222
*****
```

```
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*****
Name:Anna, Telephone number: 222, Mobile number: 2222
*****
Thank you for using the telephone number search function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? D
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Please input telephone number to search: 112
Sorry, there is no matched telephone number!Please input telephone number to search: 222
*****
Name:Anna, Telephone number: 222, Mobile number: 2222
*****
Thank you for using the telephone number search function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? D
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 3
Please input mobile number to search: 8888
Sorry, no matched mobile number found. Please input mobile number to search: 2222
*****
Name:Anna, Telephone number: 222, Mobile number: 2222
*****
Thank you for using the mobile number search function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? d
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 4
```

```
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Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? d
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 4
Sorry, please enter 1, 2 or 3.
Do you like to search (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Please input name to search: Anna
*****
Name:Anna, Telephone number: 222, Mobile number: 2222
*****
Thank you for using the name search function!
```

## Sort module:

Major testing areas:

1. Search choice: Go to proper sub-function (out of 1= by name, 2 = by number, 3 = by mobile)
2. Search choice: will error message appear when key in character other than those in question?
3. Search by name/number/mobile: Enter existing data, see search result to check if search functions properly
4. Search by name/number/mobile: Enter non-existing data, will error message appear and allow re-enter?

<b>Module</b>	<b>Step to be tested</b>	<b>Testing procedure</b>	<b>Input</b>	<b>Expected result</b>	<b>Conclusion</b>
6A. Sort	1.1 Sort choice	Key other character	others	print error message "Sorry, please enter 1, 2 or 3." and allow re-enter sort choice	Satisfaction
6B sort by name	2.1 sort by name + sorting order choice	Case sensitive of "a"/"d"	a, A, d, D	print sorted list	Satisfaction
	2.2 sort by name + sorting order choice	Other character	others	print "Thank you for using the sorting function!" and back to service selection  Error message , print "Sorry, please enter A or D?"	Satisfaction
6C sort by number	3.1 sort by number + Sorting order choice	Case sensitive of "a"/"d"	a, A, d, D	print sorted list	Satisfaction

				print "Thank you for using the sorting function!" and back to service selection	Satisfaction
	3.2 sort by number + Sorting order choice	Other character	others	Error message , print "Sorry, please enter A or D?"	Satisfaction
6D. sort by mobile	4.1 sort by mobile + Sorting order choice	Case sensitive of "a"/"d"	a, A, d, D	print sorted list	Satisfaction
				print "Thank you for using the sorting function!" and end "sorting" function, to back to service selection	Satisfaction
	4.2 sort by mobile + Sorting order choice	Other character	others	Error message , print "Sorry, please enter A or D?"	Satisfaction

```
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Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Do you like to sort name in (A) Ascenting order (D) Decending order? Enter A or D? a
*****
1. Name: Anna Telephone number: 101 Mobile number: 1001
2. Name: Elsa1 Telephone number: 222 Mobile number: 2222
3. Name: Hans5 Telephone number: 333 Mobile number: 3333
4. Name: Hnas4 Telephone number: 444 Mobile number: 4444
5. Name: Kristoff Telephone number: 555 Mobile number: 5555
6. Name: Marshmallow Telephone number: 999 Mobile number: 9999
7. Name: Olaf Telephone number: 000 Mobile number: 0000
*****
Thank you for using the sorting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 1
Do you like to sort name in (A) Ascenting order (D) Decending order? Enter A or D? d
*****
1. Name: Olaf Telephone number: 101 Mobile number: 1001
2. Name: Marshmallow Telephone number: 222 Mobile number: 2222
3. Name: Kristoff Telephone number: 333 Mobile number: 3333
4. Name: Hnas4 Telephone number: 444 Mobile number: 4444
5. Name: Hans5 Telephone number: 555 Mobile number: 5555
6. Name: Elsa1 Telephone number: 999 Mobile number: 9999
7. Name: Anna Telephone number: 000 Mobile number: 0000
*****
```

```
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6. Name: Elsa1 Telephone number: 999 Mobile number: 9999
7. Name: Anna Telephone number: 000 Mobile number: 0000
*****
Thank you for using the sorting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Do you like to sort telephone number in (A) Ascending order (D) Descending order? Enter A or D? a
*****
Name: Olaf Telephone number: 000 Mobile number: 1001
Name: Marshmallow Telephone number: 101 Mobile number: 2222
Name: Kristoff Telephone number: 222 Mobile number: 3333
Name: Hnas4 Telephone number: 333 Mobile number: 4444
Name: Hans5 Telephone number: 444 Mobile number: 5555
Name: Elsa1 Telephone number: 555 Mobile number: 9999
Name: Anna Telephone number: 999 Mobile number: 0000
*****
Thank you for using the sorting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Do you like to sort telephone number in (A) Ascending order (D) Descending order? Enter A or D? d
*****
Name: Olaf Telephone number: 999 Mobile number: 1001
Name: Marshmallow Telephone number: 555 Mobile number: 2222
Name: Kristoff Telephone number: 444 Mobile number: 3333
Name: Hnas4 Telephone number: 333 Mobile number: 4444
```

```
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Name: Hans5 Telephone number: 444 Mobile number: 5555
Name: Elsa1 Telephone number: 555 Mobile number: 9999
Name: Anna Telephone number: 999 Mobile number: 0000
*****
Thank you for using the sorting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? s
Please select a service: (a) insert (b) delete (c) modify (d) search or (e) sort? Please enter a, b, c, d or e? e
Do you like to sort (1) by name (2) by telephone number (3) by mobile number? Enter 1, 2 or 3? 2
Do you like to sort telephone number in (A) Ascenting order (D) Descending order? Enter A or D? d
*****
Name: Olaf Telephone number: 999 Mobile number: 1001
Name: Marshmallow Telephone number: 555 Mobile number: 2222
Name: Kristoff Telephone number: 444 Mobile number: 3333
Name: Hnas4 Telephone number: 333 Mobile number: 4444
Name: Hans5 Telephone number: 222 Mobile number: 5555
Name: Elsa1 Telephone number: 101 Mobile number: 9999
Name: Anna Telephone number: 000 Mobile number: 0000
*****
Thank you for using the sorting function!

Would you like to (S) Start new service or (E) End service? Please enter S or E? 2
Sorry, please enter S or E.
Would you like to (S) Start new service or (E) End service? Please enter S or E? e
*****
***** THANK YOU FOR VISITING MY PHONE BOOK *****
***** GOOD DAY AND SEE YOU NEXT TIME *****
*****
```

Reference:

Programiz. (ND) Python user-defined Functions.

Available: <https://www.programiz.com/python-programming/user-defined-function#:~:text=Advantages%20of%20user%2Ddefined%20functions,needed%20by%20calling%20that%20function.>

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