# Assignment No. 11
# Address Book

In this assignment you are required to write an address book application. An address book is used for storing contact information sorted in alphabetical order of people's names.
This assignment consists of three parts. In the first part you will implement the core address book functionality (adding / removing contacts, save / load an address book, etc.). The second part will provide a console based interface for the address book you implemented in part 1. Part 3 will improve on part 2 by providing a Graphical User Interface (GUI) for the address book.
The three parts follow the model-view separation paradigm. This paradigm dictates that the model of an application (logic and functionality) should be separated from the visual representation (the user-interface). The rationale behind this approach is that visual representation tends to change while the model remains fairly constant. Model-view separation ensures us that changing the view does not require changing the underlying model and it enables us to maintain one model for several different views (in our case, textual and graphical user-interfaces).

## Part 1 – The Model

In this part you will implement the core address book functionality.

You are required to define and implement the classes **Contact, AddressBook** and **AddressBookUtils.** This, however, is the basic requirement. You may define and implement as many other classes and interfaces as you see fit to aid you in your task.

The class Contact represents"human contact" information. It holds the following data:

- **name**: a string representing last and first name separated by a comma, e.g. "Smith, John". (mandatory).
- **email**: the contact's email address stored as a string (optional).
- **phone**: the contact's telephone number, stored as a string (optional).
- **address**: consists of street, city, zip code and country, all stored as strings (optional).

The class AddressBook is a collection of contacts easily accessible by a contact's name, and sorted in alphabetical order of contacts names. The class supports the following operations:

- **void add(Contact c)** – add a new contact.
- **void remove(String name)** – remove a contact from the address book
- **Contact get(String name)** – retrieve an existing contact
- **boolean exists(String name)** – check if a contact already exists
- **void update(Contact c)** – update an existing contact
- **Iterator<Contact> iterator()** – return an iterator over the contacts in the address book, sorted by the name fields in alphabetical, case insensitive order.

- **`int size()`** – return the number of contacts currently stored in the address book
- **`List<Contact> search(String prefix)`** – return a list of contacts in the address book for which the name field starts with the given prefix. The order is by names, alphabetical, case insensitive order.

The class `AddressBook`Utils provides utility functions for saving and loading the content of the entire address book. It should implement the functions:

- **`void save(AddressBook ab, String filename)`** – save the whole address book to the given file (using serialization).
- **`AddressBook load(String filename)`** – load an address book from the given file name (using serialization)

Remarks:

- Names equality is **case insensitive**. For example, "Doe, John" is equal to "doe, john". However, you should retain the names in their original form as provided by the user.
- The required methods are under specified, e.g. what should happen if you call update() for a contact that doesn't exists? You should decide how to handle such cases and specify the method contract accordingly.
- Add throws clauses where appropriate.
- Use the standard collections framework (sets, maps, list etc.) for the underlying structure of the class.
- You should define constructor(s), getters / setters and other methods as you see fit.
- Mandatory information must be available throughout an object life cycle, whereas optional fields may be empty at some times.

## Part 2 – Textual View

In this part you will implement a simple textual user interface for the address book. You will implement the class `TextualAddressBookView` and the application `TextualAddressBookViewer` which uses your view class.

The `TextualAddressBookViewer` application will run in two modes: a) an interactive mode and b) a batch mode. In interactive mode the application reads commands from the user, whereas in batch mode it reads them from a file. If a command file name is provided as a command line parameter the application will run in batch mode reading commands from the specified file. If the user does not provide a file name the application will run in interactive mode.

The application will support the following commands:

- **n** – create a new address book
- **l <filename>** - load an address book from the specified file
- **a <name>;<email>;<telephone>;<street>;<city>;<zip>;<country>** - add a new contact to the address book. Note that all fields must be provided on the command line. While the name field is mandatory other fields are optional fields may have the empty string as their value.
- **p <name prefix>** - print to the standard output all contacts for which the name field starts with the given prefix (case insensitive)
- **x** – print all the contacts in the address book
- **d <name>** - delete the specified contact
- **u <name>;<email>;<telephone>;<street>;<city>;<zip>;<country>** - update an existing contact with the new information.
- **s [filename]** - save the address book to a file. If a file name is not supplied the file should be saved to the same file it was loaded from.
- **e** – exit application

Here is an example for an input file for the textual user-interface application:

```
n
a Smith, John;smith@gmail.com;03-6404324;23 Laskov St.;Tel-
Aviv;56743;Israel
a Stein, Rita;rita@gmail.com;03-5524324;;;;
a Altman, Rebecca;rebecca@gmail.com;03-9414324;;Tel-
Aviv;42732;Israel
a Altman, David;david@gmail.com;;;;;
p Altman
p Altman, Rebecca
x
d Stein, Rita
m Altman, David; david@gmail.com; 03-9414324;;;;
s addresses.data
e
```

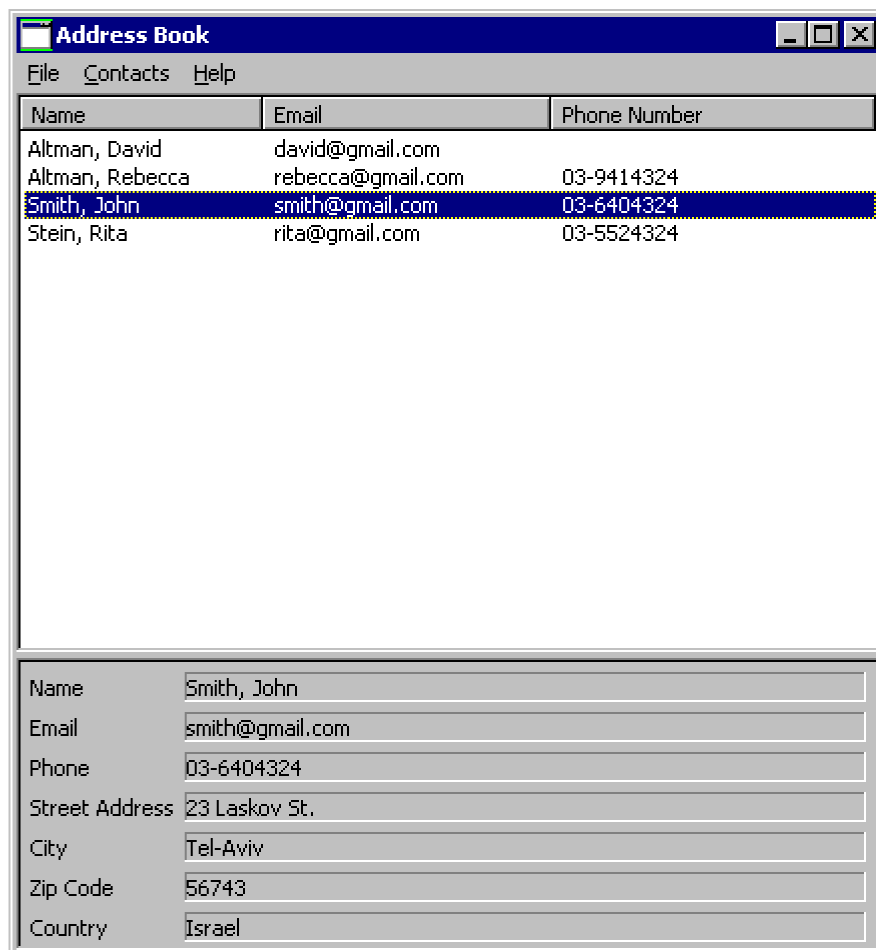
Note that the first line should be "`n`" or "`l <filename>`".
Before performing a new/load/exit command you should check that there are no unsaved changes to the current working address book. If this is not the case, ask the user for a confirmation.

## Part 3 – Graphical User Interface

In this part of the assignment you will use the Standard Widget Toolkit (SWT) to implement a graphical user interface (GUI) for your address book. You should be able to use the classes from part 1 without modifications, only replacing the textual interface for a GUI one.

The GUI will be implemented in one class named `GUIAddressBookViewer`. A template for this class can be found on the course website. If you run the application (instructions for installing and running an SWT-based application are below), you can see that the GUI is a window consisting of three parts (see the figure below for a snapshot):

- a menu bar
- a table showing all the contacts (should be ordered by name, alphabetically)
- a form showing the full details of the currently selected (in the table) contact




Your assignment is to support all the options of the menu bar, that is:

- File→New Address Book: Create a new, blank, address book
- File→Open: Load an address book from a file, using the standard file open dialog
- File→Save: Save an address book. If it was opened from a file, save it to the same file. Otherwise, request a filename in a standard file save dialog

- File→Exit: Exit the application
- Contacts→New: Open a dialog asking for the details of the new contact; create a new contact accordingly.
- Contacts→Edit: Edit the details of the currently selected (in the table) contact; use the same dialog box as the one for creating a new contact.
- Contacts→Delete: Delete the currently selected contact from the address book.

Notes:

- Before performing a File→New/Open/Exit operation, you should check that there are no unsaved changes to the current working address book, and if this is not the case, show a message box asking the user to confirm or allowing him to save the current address book before exiting.
- The table should always be consistent with the address book's contents.
- Decide which exceptions should be handled and how (e.g. showing a message box telling the user about the problem). Any reasonable decision will be accepted. Application crashes are not reasonable.
- Fill in the table with the contacts of the address book, in alphabetic name order (as in Part I), including keeping it synchronized with the address book.
- On highlight (selection) of a table row, fill in the full details in the form below it. On double click (default selection) perform the Contact->Edit functionality.
- The `setHeaderVisible` method of the `Table` class is buggy under Linux. As a result, on Linux the column names of the table might be invisible (see https://bugs.eclipse.org/bugs/).
- Write methods to implement the various actions. Have your listeners call these methods, rather than implementing the full event handling capability within the listener's body.

General Advice:

GUI programming is often done using existing code and altering it to suit your needs. The skeleton that is provided to you contains much of the functionality you need in order to implement the address book.

## Configure Eclipse to use the SWT Library and Run an SWT-based Application:

- Download the stable SWT release at http://www.eclipse.org/swt/
- Read the article "Developing SWT applications using Eclipse" and follow the instructions

**הוראות הגשה:**

קראו בעיון את קובץ נוהלי הגשת התרגילים אשר נמצא באתר הקורס.

הגשת התרגיל תעשה ע"י במערכת ה VirtualTAU בלבד.

הגשת התרגיל תתבצע ע"י יצירת קובץ zip שנושא את שם המשתמש. לדוגמא, עבור המשתמש zvainer יקרא הקובץ zvainer.zip.

קובץ ה zip יכיל:

- קובץ פרטים אישיים בשם details.txt המכיל את שמכם ומספר ת.ז. הזהות שלכם.
- קבצי ה-java. של התכניות שהתבקשתם לכתוב.
- קובץ טקסט עם העתק של כל קבצי ה Java.