

June 2017 Final Exam

Available time: 3 hours

You are asked to develop a modular program for managing users in an *online dating service*. The program will consist of three modules: *ClientList*, *DateList* and *main*.

ClientList Module (4 points)

Declare a structured type `tClient` with these fields: *login* (string), *register date* (string), *age* (int) and *city* (string). Implement a subprogram called `display()` to print on the screen the information of one client, as shown on next page.

Declare a type `tClientList` for lists of (up to 50) clients, implemented with a **static array of pointers to dynamic data** (pointers to `tClient`). Implement, at least, the next subprograms:

`load()`: Loads the list of clients from the file `clients.txt`. The file contains four lines for each client: *login*, *date*, *age* and *city*. Ends with XXX as *login* (sentinel).

`show()`: Prints the client list. Implement the traversal **using recursion**.

`free()`: Frees the dynamic memory used by the structures in this module.

DateList Module (4 points)

Define a type `tDate` with two fields pointing to clients (pointing to clients already existing in the list of clients), *place* (string) and *rating* (an integer from 0 to 5).

Declare a type `tDateList` for lists of `tDate`, implemented as a **dynamic array and sorted by rating**. The module implements, at least, the next subprograms:

`newList()`: Creates a new list with an initial size of 10 elements.

`insert()`: Adds a date to the list. If there are no free slots, 10 more slots will be added to the list.

`display()`: Prints all the information about the dates (see an example in next page).

`free()`: Frees the dynamic memory used.

Main Module (2 points)

First load the information from the file `clients.txt` in a list of clients and creates a new date list with an initial capacity of 10 dates. Then, print the next menu:

1. Display Client List
2. New Date
3. Display Dates
0. Exit

Option 1 prints the list of clients (see format in option 2). Option 2 lets the user choose two clients from the list of clients, asks for the rest of information about the date, and inserts the date in the list of dates (user input in bold typeface).

Choose an option: 2

Date between two clients. Choose two numbers separated by a space...

```
1: john          15/06/07   42 years Madrid
2: rose          15/06/08   27 years Madrid
3: ann           15/06/08   18 years Avila
4: mary          15/05/09   23 years Burgos
5: george        18/06/14   25 years Salamanca
6: scott         25/05/15   40 years Madrid
```

Clients: 1 2

Date's place: **Burgos**

Date's rating (between 0 and 5): 5

Option 3 shows the date list, sorted by rating (ascending order):

Choose an option: 3

Date List...

```
-----
ann           15/06/08   18 years Avila
scott         25/05/15   40 years Madrid
```

Date in Segovia. Rating: 3

```
-----
john          15/06/07   42 years Madrid
rose          15/06/08   27 years Madrid
```

Date in Burgos. Rating: 5

All dynamic memory must be freed before exiting.

Submit the source code (.cpp y .h only) compressed in a ZIP file.

Remember: The subprogram to be called at the beginning of main() to display the non-freed memory is:

```
_CrtSetDbgFlag(_CRTDBG_ALLOC_MEM_DF | _CRTDBG_LEAK_CHECK_DF);
```

You need to create and include the next library:

checkML.h

```
#ifdef _DEBUG
#define _CRTDBG_MAP_ALLOC
#include <stdlib.h>
#include <crtDBG.h>
#ifdef DBG_NEW
#define DBG_NEW new ( _NORMAL_BLOCK , __FILE__ , __LINE__ )
#define new DBG_NEW
#endif
#endif
```

