Programming Project
Degree in Industrial Engineering

GENERAL INFORMATION

The objective of this project is developing a software application to sell and buy second-hand items named iBuy. iBuy has three types of users: anonymous users, registered users, and the administrator user. Users can access to different user options according to their type. Registered users can post offers to sell items. Both registered and anonymous users can browse item offers. Registered users can also rate items on sale and star other registered users as favorite sellers.

Anonymous users are offered the following options:

```
1. Log in
2. List all items on sale
0. Exit
```

Registered users are offered the following options (after log in):

```
1. Change my profile info
2. List my favorite sellers
3. Star seller as favorite
4. List all items on sale
5. List items put on sale by my favorite sellers
6. Rate an item
7. Put an item on sale
8. Logout
0. Exit
```

The administrator user is offered the following options (after log in):

```
1. Register a new user
2. Modify user data
3. List all users
4. List sellers starred by a user
5. List items put on sale by a user
6. List all items on sale
7. Logout
0. Exit
```

iBuy shows the anonymous user menu on start. If an anonymous user selects `Log in`, the application requests a login and a password. If they match to an entry of the registered users list, the user logs in as a registered user and the application shows the registered user menu. If they match to the administrator data, the user is logged as the administrator user and shows the administrator menu. A logged user can select any option available on the corresponding menu. After processing a user option, the application shows the showcase (see below) and returns to the previous menu. If the option is `Logout`, the application shows the anonymous user menu and does not allow to access to the logged user options.

Registered users can rate items. There are three possible item ratings: *1. Like*, *2. Deal*, and *3. Sold*. If a registered user selects `Rate an item`, the application shows a list including all

the items on sale. For each item, the application shows the item identifier, name and price. The user then selects an item by its identifier and the rating to assign, which are stored by program. Next, the program asks the user if he/she wants to rate another product or to return to the registered user menu. Please notice that, for the sake of simplicity, the application does not allow users to remove items.

The showcase is a list with some interesting highlights about items on sale:

* The 5 most recent items put on sale
* The 3 items with more "like" votes
* The 3 items with more "deal" votes

The application shows the name and the description of each highlighted item. It must list in each case as many items as possible; e.g., if there are only 4 items on sale, the application must show 4 most recent items instead of 5.

REQUIREMENTS

USERS

The application stores the following data for registered users:

* UserID: number. The UserID is an internal number to identify a user. It is automatically assigned by the application when the administrator registers a new user in the system starting from 1.
* Login: string (10 characters at most). Login values must be unique; i.e., the application does not allow two users to have the same login value.
* Password: string (exactly 8 characters). Login and password data is used to access to the application as a logged user.
* Name: string (25 characters at most).
* Surname: string (20 characters at most).
* Number of favorite sellers: number. The amount of sellers starred by the user.
* Favorite sellers UserIDs: list of numbers (30 numbers at most). List of UserIDs of the sellers starred by the user.

The application have 30 registered users at most. The UserIDs of the users are numbers in {1, ..., 30}. Once a user is registered into the application, he/she cannot be removed (see below administrator options).

The administrator is a single special user with more privileges that registered users. Administrator's data cannot be changed, and is defined as follows:

* Login: "root"
* Password: "1234"
* UserID: 0

(Notice that administrator data should not be stored in the same data structure as registered users data.)

ITEMS

The application stores the following data for items on sale:

- ItemID: number. The ItemID is an internal number to identify an item. It is automatically assigned by the application when a registered user puts a new item on sale starting from 1.
- Name: string (64 characters at most).
- Description: string (256 characters at most).
- Price: number.
- SellerID: number. The SellerID is the UserID of the user who put this item on sale.
- Number of "like" ratings
- List of users who gave a "like" rate to the item
- Number of "deal" ratings
- List of users who gave a "deal" rate to the item
- Number of "sold" ratings
- List of users who gave a "sold" rate to the item

The application manages 100 items at most.

FUNCTIONALITY

As described before, the application shows different options according to the logged user type.

Anonymous users

An anonymous user is allowed to:

1. Log into application. To do so, the anonymous user is asked for a login and a password. If valid login and password are not provided after three tries, then the application shows again the anonymous user menu. If a valid login and password is provided, then the application changes to registered user mode or administrator mode. (That means that the application shows the registered user or the administrator menu.)
2. List all items on sale. The application shows the ItemID, name and price of all items.
3. Exit the application. The application finishes.

Notice that the showcase must be shown after an option is completed.

Registered users

A registered user is allowed to:

1. Change user's profile info. The application asks the user for the new name, surname and password values. The login cannot be changed.
2. List user's favorite sellers. The application shows the name, surname and login of the user's favorite sellers.
3. Star seller as favorite. The application asks the user for the login of the user who he/she wants to add as a favorite seller. If the login of the new favorite seller is not valid or it is already in the user's favorite sellers list, the application shows an error

message and returns to the registered user menu. Otherwise, the user's favorite sellers list is updated. The administrator user cannot be starred as a favorite seller.

4. List all items on sale. The application shows the ItemID, name and price of all items.
5. List items put on sale by the user's favorite sellers. The application shows the ItemID, name and price of items put on sale by any seller included in the user's favorite sellers list.
6. Rate an item. The application lists all the items on sale. The user selects the item to rate (by its identifier) and the rating to assign (1. Like, 2. Deal, 3. Sold). If the item identifier or the rating to assign is not valid, the action is discarded; otherwise, the rating is assigned to the item. In both cases, the application asks the user if he/she wants to rate another item or to go back to the registered user menu. The same user cannot rate the same item twice with the same rank.
7. Put an item on sale. The application asks the user for the data of the new item to be put on sale (name, description and price) and add the item to the item list.
8. Log out. The user is logged out and the application changes to anonymous user mode.
9. Exit the application. The application finishes.

After running options 1) to 7) the registered user menu is presented again. After running option g), the anonymous user menu is presented. The application ends after running option h). Notice that the showcase must be shown after an option is completed.

Administrator user

The administrator user is allowed to:

1. Register a new user. The application asks the administrator for the information of the new registered user (login, password, name and surname.) If the login is already in use by other registered user, the applications shows an error message and returns to the administrator menu. The UserID is automatically generated by the system –it is the UserID of the last user plus 1.
2. Modify user data. The application asks the administrator for the login of the registered user to update. If the login is correct, the application asks the administrator for the new information (password, name and surname.)
3. List all users' data. The application prints on the screen the information of all the users in the system: UserID, login, password, name, surname and login of favorite sellers.
4. List data of sellers starred by a user. The application asks the administrator for the login of a registered user. If this login is valid, the application shows the name, surname and login of the sellers starred by this user.
5. List items put on sale by a user. The application asks the administrator for the login of a registered user. If this login is valid, the application shows the ItemID, the name and the price of items put on sale by the user with this login.
6. List all items on sale. The application shows all the information of the items currently in the system: ItemID, name and price.
7. Log out. The user is logged out and the application changes to anonymous user mode.
8. Exit the application. The application finishes.

After running options 1) to 6) the administrator user menu is presented again. After running option 7), the anonymous user menu is presented. The application ends after running option h). Notice that the showcase must be shown after an option is finished.

EXTENDED VERSION

The previous description corresponds to the basic version of the project. The maximum grade that can be obtained after solving the basic version is 8. To get the maximum grade (10), the project must be extended as follows:

Item details

After the item list is shown (option 2 of the anonymous user menu, options 4 and 5 of the registered user menu, and options 5 and 6 of the administrator menu), the user is presented a menu to request for the detailed information of an item. If this option is selected, the application reads an ItemID. If the ItemID is correct, the application shows the name of the item, the description of the item, and three lists including the users' logins who rated the item as "like", "deal" or "sold", respectively.

Hiding "sold" items

The items with more than three "sold" ratings are considered as already sold and, therefore, they are not interesting. Accordingly, items with more than three "sold" ratings must not be listed on any item list (including the showcase), except for the administrator options 5 and 6.

Advanced showcase

The 5 most recent items must be shown only if they have three or more "likes". Only items with more than 1 "like" and "deal" ratings must be shown in the most "liked" and best "deal" lists. (The basic version does not limit the smallest number of ratings that is required to appear on these lists.)

ADDITIONAL MATERIAL

Data and functions

Students are provided with a function library to read and write users' and items' data from files. (It is not necessary to manually enter this data each time the application is run.) These functions are based on the data structures defined in *structures.h*. The functions and the provided data structures **must** be used in the project. Data is read at the beginning of the program and saved at the end.

A Dev-Cpp Project named *iBuy_ReadWrite.dev* is provided including the following files:

1. *main.c*
   Main function. Includes an example to use file read and write functions, as well as data structures defined in *structures.h*. This file can be used as a skeleton to develop a program that uses external functions declared in a *.h* file.

2. *ibuy_io.h,ibuy_io.c*
   Files with the declaration (*.h*) and the definition (*.c*) of the file input and output functions. These files must not be changed. It is not necessary to understand how the functions are implemented, just how they have to be called as explained in

html/index.htm. See *ibuy_io.h* to see how functions must be documented in your solution.

3. *users.txt, items.txt*
    Text files with test users and items. New users and items compliant to the file format can be added to these files by using a text editor (e.g., Notepad in Windows).

4. *structures.h*
    File including the declaration of structures and constants used in the program. Students are recommended to use these structures. This file can be changed or extended at convenience.