

## **Analysis and design of an online trading system**

Your company CEO has had yet another brilliant idea. He wants to set up an internet based trading site “iBuy.com” allowing millions of buyers and sellers to trade any sort of object across the world. Of course, as lead technical team, you have been chosen to design this new system.

### ***Description of iBuy and definition of requirements.***

Any user can visit the site of iBuy without being registered. Users only need to register to buy and sell objects. Before posting objects for sale on iBuy, users must open a seller account so that iBuy can check their credentials. iBuy offers two ways of creating a seller account:

- By filling a form on internet: the user simply has to provide references of his credit card. These references will not be used to debit money from the seller, but only to check the coordinates the seller gave. However the same credit card can be used to pay seller fees later on.
- By addressing a surface mail request to iBuy, containing the same information, which may take a few days of processing and allows to receive a confirmation code at home.

In any case, the seller needs to give his personal references (name, last name, physical postal address, phone, email) as well as bank references: either credit card information or a BIC bank identifier code or IBAN.

To sell an item, the seller fills an online form that provides information useful to potential buyers:

- A clear and attractive title
- A full description of the item, indicating both qualities and potential defects to avoid later questions and problems
- A photo of the object
- An attractive price
- In the case of an auction sale, the duration of the sale (3, 5, 7 or 10 days), you should remember to include a weekend as many buyers use iBuy mostly during the weekend.
- The categories the item belongs to
- Keywords that describe the item.

There are two ways of selling an item:

- A direct sale sets a fixed price for the item, and allows any buyer to directly buy the item.
- An auction sale allows buyers to place their biddings until the end of the sale. At the end of sale date, the buyer that placed the highest bid buys the item.

The iBuy web site offers two ways for users to find items:

- Navigating by categories: from the home page of the site, users can navigate by categories and subcategories to browse available items.

- Navigating by keyword: from the home page, the user can search for items that refer to given keywords.

Once users have found interesting items, provided they are registered as buyers, they can according to the sale type of the item either place a bid or directly buy the item. To register as a buyer the user must provide his personal contact information and choose a login and password. Banking information is not required as actual sales are handled outside iBuy. To place a bid, the buyer must set the highest amount that he is willing to pay for the item. iBuy will automatically bid for the buyer in small increments up to this maximal amount, if other buyers bid at a higher price.

At the end of a sale, whether direct or by auction, the seller can accept or refuse the sale. If it is accepted, it is then considered a contractual obligation linking the buyer and seller.

To buy an object immediately provided the seller offers this option, the buyer has simply to accept the seller's price and the sale will immediately go for validation.

To pay an item that has been bought on iBuy, the buyer needs to contact the seller, ask for the total item cost (including transport fees) if it is not already given in the item description, and directly send him the money in one of the ways agreeable to the seller. To contact the seller, buyers use the email that is provided at the end of the sale. The seller will only send the item once payment has been received. Once the item is received the buyer can leave an evaluation of the seller, and the seller will also evaluate the buyer.

## I. Analysis

1. Provide a use case diagram of the system. Comment all actors, and provide at least one line of description for each use case.
2. Provide the detailed use case description of the use case: "Direct sale"
3. Provide an analysis class diagram. An artificial iBuy class will carry the operations the system needs to perform.
4. Provide an analysis level sequence diagram representing an auction sale involving one seller and two buyers.
5. Provide at least three validation tests covering steps of the auction sale. An example format for validation tests is provided here.

| <b>Title : Register a book return</b> |   | <b>Er1</b> |
|---------------------------------------|---|------------|
| <b>Context :</b>                      | Nominal "return a book" test<br>User of id U1 is registered as a user.<br>The book copy of id BC1 exists in the system.<br>A loan of this book copy has been registered under the id L1                           |            |
| <b>Entry :</b>                        | The book copy id « BC1 », the book copy state « new »   |            |
| <b>Scenario :</b>                     | 1) The librarian starts the application.<br>2) He chooses the functionality return a copy.<br>3) He inputs the book copy id (BC1) and the state of the copy (new).<br>4) The librarian validates the book return. |            |
| <b>Expected Result :</b>              | The system displays a confirmation that the book return is recorded.  |            |
| <b>Verification means :</b>           | Visual for the confirmation box, manual browsing of the book copy state should show it is noted as "available", and manual browsing of the user U1 loans should not contains BC1.                                 |            |