Requirements Analysis Document

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Realtime Commerical Bidding System
Team 10

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1 Introduction

A realtime commercial bidding system is an online system for auctioning off items and services for commercial businesses. Contractors selling their services and looking for goods in large quantities find these systems invaluable.

The following document is a requirement analysis of an implementation of a realtime commercial bidding system for Blackbit Trading, Inc. In the following sections we will cover: a high level overview of the system, a detailed description of the requirements, and UML analysis including class, use case, state, and sequence diagrams.

1.1 Problem Description

Realtime commercial bidding systems are similar to their sister systems, consumer bidding systems, but add an additional element into the mix: reverse-auctions. Like Ebay, a popular consumer bidding system, users are allowed to create auctions and bid on auctions. The highest bidder at the end of the auction’s specified ending time wins the item up for bid. Unlike Ebay, however, a user may also create and bid on reverse-auctions. In reverse-auctions the lowest bidder at the end of the auction’s specified ending time wins the item up for bid.

1.2 Motivation

Our client, Blackbit Trading, Inc., has requested us to design a realtime commercial bidding system for their business. Blackbit Trading, Inc. is looking to expand their market to the online community with this product when completed.

2 Overview

Users will be presented with a login screen where they can choose between logging in with an existing account or creating a new account. If the user chooses to create an account he/she is taken to the "Create Account" screen. From there the user will enter his/her account info (login name, real name, password, etc). After a successful completion of account info the user will be automatically logged into the system.

If a user chooses to use his/her already established account from the login screen they will be authenticated by the master server. After authentication, in both cases, the user is taking to the main menu with the following options: create an auction, create a reverse-auction, bid/view an auction, and bid/view a reverse-auction.

Creating an auction and creating a reverse-auction are almost identical screens besides the obvious differences, as described in the Problem Description, of high bid/low bid. From this screen the user is able to enter information pertaining to to the item/service he wants to put up for bid. After the information is verified (for completion/correctness) the auction is create, bidding is opened, and a timer is started in order to signal the end of the auction.

The bid/view screen shows the user the list of currently running auctions and some selected properties of them (i.e. name of auction, short description, current high/low bid, auction end time, etc). From here the user can click on an auction and look up more information on the auction by clicking a 'details' button. A screen will pop up after pushing the 'details' button and in it there will be more information pertaining to the auction. A bid text box and bid button will also show up on this screen so the user can place a bid on this item. Also located on the bid/view screen is
a bid text box and a bid button in case the user already knows what the auction is and just wants to bid immediately.

3 Requirements

3.1 Specific Requirements

3.1.1 Before Bidding in an Auction takes place

When a user goes to the Real-time Commercial Bidding System website, there is one or two things that can be done. Those things are to sign in (Assuming that the user already has a username and password), look at the terms and conditions of bidding using our bidding system, or the user can create a new account with our bidding services.

3.1.2 Creating a new account

When the user creates a new account, he/she the user will have to supply the following information to the Bidding System and this information will be stored in the systems database.

- Name
- Email (The Email will be entered by the user twice to assure accuracy)
- Address
- Telephone Number
- Credit Card
- Credit Card Address
- Username
- Password (The Password will be entered by the user twice to assure accuracy)

3.1.3 To confirm user information of a created account

The name, credit card number and credit card address will be validated by the company that issued the credit card (i.e. visa). The bidding system program will check the username and password. This is to make sure that the username and password are not already in use by another user. All information that was stated on the form, as well as the terms and conditions of bidding on our system, will be emailed to the user and the user will have reply to the email, to make sure that the email address that was provided is accurate. Once the user has done all of the previous steps and the credit card is authorized, they will be able to logon to the Bidding Site.

3.1.4 After Login

After the user has been authorized to bid by the Real-time Commercial Bidding System and their credit card company. The user has the option to create a new Auction or to join an existing auction.
3.1.5 Creating An Auction

When a user decides to create a new auction the user will have to login again. After the user logs in this time the user name will be stored and that will be the name of the owner of the auction in the create auction menu. A title for the auction (required field) is to be provided. This will be the title that users see when they are trying to join an existing auction. The title should be very brief (only a sentence) and is set up to distinguish (at a glance) between auctions. For further detail of the item that is being auctioned, a description of the item is required. This text fields purpose is similar to that of the title, but more detailed (about a paragraph or two). This is to get the buyers to have a better idea of the item at the auction. Since the real-time bidding system program can handle auctions and reverse auctions, the owner of the auction will have to state which option he wants. (A reverse auction is when the owner of the auction is trying to buy an item from the site and they are looking for the lowest price.) Next the owner of the auction will have to determine if the auction is going to be a reserved auction or an unreserved auction. In a reserved auction, a minimum price must be met to complete a sale. In a no reverse auction, the high bidder wins regardless of price. Dead time and start-time can also be set here. Dead time is the time when the auction will be over and a winner (if there is a winner) will be declared. The default dead time is 10 minutes. Start-time is up to the owner of the auction and is a required field. The owner of the auction will be able to change that value to whatever he/she desires. Once the auction starts, this time will not be changed. After the previous information has been entered, there will be a dialog box asking the owner of the auction if they are sure. Once the auction is started, the information about the auction is stored on the system database (in case the owner of the auctions computer crashes or the owner of the auction logs-off) and the auction will start at the start-time requested. The auction information will be stored in the database for two weeks after the auction ends.

3.1.6 Joining an Auction

Instead of creating an auction the user can choose to join a reverse auction or a regular auction. When the user chooses either auction version. A list of auctions appears with the title, minimum bid (if there is a minimum bid), and dead time. Dead time will not be a countdown but the real-time from when the auction was created plus the dead time that the owner of the auction set (default real-time is 10 minutes). Once the user decides to go into an auction, his/her personal information will be checked with the owner of the auctions personal information. If the addresses are the same, then the bidding system will not let that user bid in the auction, but they are free to watch. (This function is set-up to make it hard for a client to login his/her own auction to fluctuate the price of the item he/she is selling).

3.1.7 During Bidding

Once the user is in the auction, they are free to bid (unless the bidder blocks that user from bidding). At this screen there will be a timer that will tell when the auction will be over. The number of people currently viewing the auction, the current best bid, and does that client has the best bid. The bidder is free to read the description of the item and make a bid if they desire. A bid placement occurs when the bid arrives at the auctioneer.

3.1.8 Computer Crash

In the event that a bidders computer crashes or gets logged off the network. The auction will still proceed as normal as if the user left the auction. In the event that the users computer crashes and
they hold the high bid, the auctioneer will keep the bidders information on file. The auction will
continue as normal and if the user was not out bided, he/she will be notified by email that he/she
won the auction. The user will also have to live up to their legal and oblications for winning the
auction as stated in the terms and conditions.

3.1.9 Bid Ties

In the event that there is a tie bid with amount and time of bid. The person that has the highest
rating (rating for reliability) will win the highest bid. If all three of the criteria are the same, a
buyer will be chosen at random and the other people/persons information is be sent to the owner
of the auction for the next best bid. If the owner of the auction chooses not to sell to the best bid,
they must sell to the next best bid.

3.1.10 Bid Blocking/Bid Rejecting

The credit rating and/or reliability rating for the users will remain on the auctioneer system with
their personal information. A bidder can be blocked from an auction or a bidders bid can be turned
down by the owner of the owner of the auction (if the bidder the bid if there credit rating is not
up to par). The reliability is for reverse auctions. The owner of a reverse auction will rate the
reliability of the supplier to make sure that supplier forfills their responsibilities.

3.1.11 Reserved Price

The person that sets-up the auction will set reserved price. When the first bidder, bids on in
auction, his/her bid is checked by the auctioneer with the reserved price. If the bid is not higher
then the reserved price (or lower in the event that that the auction is a revered auction) then the
bid is rejected and a dialog box will be displayed telling the bidder that their bid, did not meet the
reserved price.

3.1.12 End Auction

An auction ends at dead time or if the owner of the auction decides to take the auction off the
Real-time Commercial Bidding System. Everyone that is looking at the auction at dead time or
placed a bid in that auction will be notified that the auction is closed. Likewise everyone that is
looking at the auction when the owner cancels the auction, notafiction that the auction has been
taking off the bidding will appear on the screen of everyone that is looking at the auction.

3.1.13 Winning a Auction

After a user has won an auction, the auctioneer will display notification on the screen and also
send notification via email. (The auctioneer will send notification confirmation over email in the
event that the users computer logs off the network. In the event that the bidder leave the auction,
he/she will be notified and still have to live up to the agreement of the auction.)

3.1.14 Cancelling Auctions

If there are no bids in an auction, the owner of the auction can cancel the auction and take it off the
system. The client will be reminded that they will still be charge for advertising their items for sale
and be asked if he/she is sure that they want to cancel the auction. If they proceed notification that
the auction has been canceled, a cancellation message will be sent to all those that are currently
looking at the auction. Information about the auction will still be stored on the database for 2
weeks after cancellation.

3.1.15 Reserving Payment
After the auction is finished, the auctioneer will email contact information of the highest bidder to
the client and both parties will handle the monetary transaction. The client will receive a bill from
the Real-Time Bidding System for the auction services.

3.1.16 No Winners
In the event that there are no winners in an auction. Notification will be sent to the client and to
all bidders that are viewing the auction that the auction is over and there are no winners.

3.2 Data Dictionary
- **RegisterList** - List of users that are registered in the Auction Site
- **UserList** - List of users actually logged in the Auction Site
- **AuctionName** - Title for an existing auction
- **AuctionType** - Type of auction, it can be a normal or a reverse auction
- **AuctioneerID** - The Id of the current Auctioneer
- **BidHistory** - The biffing history for a certain auction
- **startTime** - The time when an auction starts
- **initialPrice** - The base price for the product being auctioned
- **TimeLeft** - The time left before an auction ends
- **LoginName** - The name a user uses to login the auction site. This name is unique
- **Password** - The unique password to access the auction site with a determined LoginName
- **AuctionBidList** - The current auctions in which a user is bidding
- **LowestBid** - The actual lowest bid for a normal auction
- **highestBidderID** - The ID of the actual highest bidder
- **AuctionList** - A list of all the auctions in the auction site
- **AddAuction()** - Add an auction to the AuctionList
- **Regulate()** - Regulates an Auction
- **NotifyBidList()** - Notifies the best bid to all the users bidding in a certain auction
• **AuctionTimeout()** - The time when a determined auction ends
• **AuctionCreated()** - Sends a signal that an auction has been created
• **UpdateBidHistory()** - Updates the bid history every time a new bid is placed
• **SetAuction()** - Creates a new auction
• **Bid()** - Place a bid on a selected auction
• **ConnectAuction()** - Connects a user to an auction so the user can start bidding
• **CreateAuction()** - Sends a signal showing that the user is creating a new auction
• **LogIn()** - Logs in a user into the auction site
• **logOut()** - Logs out a user from the auction site
• **ConnectAuctionSite()** - Connects a user to the auction site through a network
• **newUser()** - Creates a new user so he can log in the auction site
• **ViewAuction()** - View a certain auction
• **UpdateLowestBid()** - Updates the lowest bid value for a reverse auction
• **UpdateLowestBidderID()** - Updates the value of LowestBidderID when a new lowest Bid is placed by a user in a reverse auction
• **UpdateHighestBid()** - Updates the highest bid value for a normal auction
• **UpdateHighestBidderID()** - Updates the value of HighestBidderID when a new highest Bid is placed by user in a normal auction
• **CheckInfo()** - Checks the registration information entered by the user for errors or incompleteness
• **UpdateUserList()** - Updates the list of users connected to the auction site
• **outbidded** - Signals the user that he has been outbidded
• **InfoCorrect** - Signals the auction site that the info entered by the user is correct
• **InfoCorrect** - Signals the auction site that the info entered by the user is incorrect
4 UML Analysis

4.1 Use Cases

4.1.1 Login

<table>
<thead>
<tr>
<th>Use case:</th>
<th>Login</th>
</tr>
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<tbody>
<tr>
<td>Actors:</td>
<td>User</td>
</tr>
<tr>
<td>Type:</td>
<td>Primary</td>
</tr>
<tr>
<td>Description:</td>
<td>What happens from at/from the login screen.</td>
</tr>
<tr>
<td>Cross-reference:</td>
<td>Before Bidding in an Auction takes place, Creating a new account</td>
</tr>
<tr>
<td>Uses:</td>
<td>none</td>
</tr>
<tr>
<td>Extended by:</td>
<td>Login</td>
</tr>
<tr>
<td>Extends:</td>
<td>none</td>
</tr>
</tbody>
</table>
4.1.2 Create Auction

**Use case:** Create Auction

**Actors:** User

**Type:** Primary

**Description:** What happens when a user creates an auction.

**Cross-reference:** After Login, Creating An Auction

**Uses:** none

**Extended by:** none

**Extends:** Login
4.1.3 View Auction

<table>
<thead>
<tr>
<th>Use case:</th>
<th>View Auction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors:</td>
<td>User</td>
</tr>
<tr>
<td>Type:</td>
<td>Primary</td>
</tr>
<tr>
<td>Description:</td>
<td>What happens when a user views and auction.</td>
</tr>
<tr>
<td>Cross-reference:</td>
<td>After Login, Joining an Auction, End Auction, Winning a Auction</td>
</tr>
<tr>
<td>Uses:</td>
<td>none</td>
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<tr>
<td>Extended by:</td>
<td>none</td>
</tr>
<tr>
<td>Extends:</td>
<td>Login</td>
</tr>
</tbody>
</table>
4.2 Object Model

4.2.1 Description

The auction site runs on a network that has one or more registered users logged-in. This auction site consists of one or more auctions that can either be normal or reverse auctions. Each user is allowed to create and bid on one or more auctions at the same time, but they are not obligated to do so because they have the option of just viewing the auctions. For every auction there exists a mediator whose function is to receive the bid information from the users and to notify the users of the status of a certain auction.

4.2.2 Diagram
4.3 Dynamic Model

4.3.1 Auction State Diagram
4.3.2 Auction Sequence Diagram
4.3.3 Auction Site State Diagram

[Diagram of an auction site state diagram showing transitions between states such as 'idle', 'Check', 'Update', 'Login', and 'new User[InfoEntered]' with actions like 'do/CheckInfo', 'do/UpdateRegisterList', 'do/UpdateUserList', and 'InfoCorrect[ ]'.]
4.3.4 Auction Site Sequence Diagram
4.3.5 Auction Site Network Sequence Diagram
4.3.6 Auctioneer State Diagram
4.3.7 Auctioneer Sequence Diagram
4.3.8 New User Stat Diagram

```
\node (n1) at (0,0) [circle, draw] {new user};
\node (n2) at (1,1) [rectangle, draw] {Idle};
\node (n3) at (1,2) [rectangle, draw] {Auction Title};
\node (n4) at (1,3) [rectangle, draw] {Auction Reserve Price};
\node (n5) at (1,4) [rectangle, draw] {Registered User};
\node (n6) at (2,4) [rectangle, draw] {registered[data_correct]};
\node (n7) at (3,3) [rectangle, draw] {missing data[]};

\draw [->] (n1) -- (n2);
\draw [->] (n2) -- (n3);
\draw [->] (n3) -- (n4);
\draw [->] (n4) -- (n5);
\draw [->] (n5) -- (n6);
\draw [->] (n6) -- (n7);
\draw [->] (n7) -- (n2);
```

```
4.3.9 Normal Auction State Diagram
4.3.10 Normal Auction Sequence Diagram
4.3.11 Reverse Auction Sequence Diagram
4.3.12 User State Diagram
4.3.13 User Sequence Diagram