BuzzBid

BuzzBid is a simple online auction site, similar to, but simpler than, existing online auction sites.

When reading through this project description, please make the following assumptions: unless otherwise specified as optional, all attributes are required; unless otherwise specified, if given a list of potential values, choices should be limited to that list; If a set of values is listed with "and/or", combinations of those values are possible, while "or" indicates only a single value is possible; that you should create normalized schemas, and minimize the use of NULL attributes whenever and wherever possible; ensure that you store non-numeric data that appear as numbers (such as street numbers, phone numbers, postal codes, etc.) as strings and not numeric data types; and avoid "catch-all" forms with unnecessary inputs that the user would leave empty or NULL. You also do not need to be concerned about handling concurrent operations that could conflict and introduce inconsistencies in your database.

You may implement the project UI as a traditional standalone application (e.g., Java GUIs or Python's TkInter) or as a web application (e.g., web scripting languages like PHP or JSP). *The user interfaces depicted in this description merely serve as examples to guide your thinking and may not capture all functionality in its entirety.* Remember that your project will not be graded on its aesthetic appeal, but on its functionality.

Do not create any additional functionality that is not mentioned in this specification (such as email notifications, etc.) or attempt to enhance your final product beyond what the specification requires. Adding unwanted functionality can and will impact your grade!

Logging In to BuzzBid

BuzzBid has two kinds of users: **Regular Users** and **Administrative Users**. Both can list items they have for sale, search for items, bid on items, rate items, comment on items, and purchase items. Administrative users are also able to cancel auctions, delete ratings and to view reports.

Figure 1 shows the BuzzBid login screen. All users are uniquely identified by their **Username**. Providing a valid **Username** and **Password** combination will log the user into the system. Providing invalid login credentials should display an error message and return the user to the login screen.

Figure 1 - BuzzBid Login Screen

After a user logs in to the system, he or she should be presented with a menu with the following options:
- Search for Items
- List an Item for Sale
- View Auction Results

The user's **first name** and **last name** should be listed on the main menu. **Administrative Users** have an additional attribute, the **Position** of the administrator in the company. You should allow any value for this field. When the administrator logs in, his or her **Position** should be displayed on the screen. Administrators also have menu options for each available report.

An example of an administrative user's main menu is provided in Figure 2.
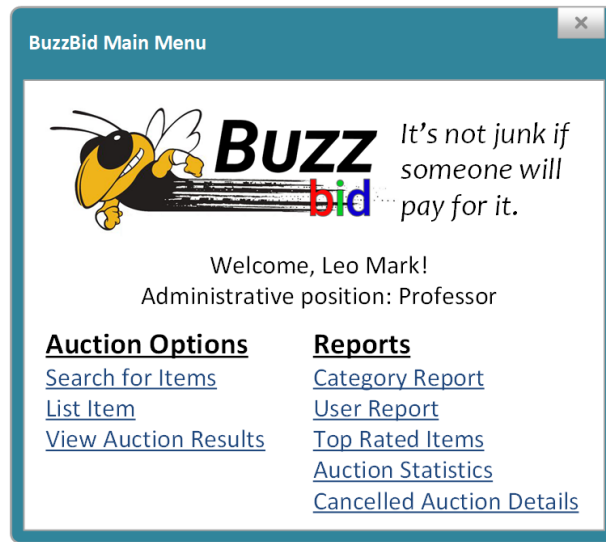
Figure 2 - Main Menu

New User Registration

Users who are new to BuzzBid must register first. A *Register* button is provided on the login page. Clicking this button displays the new user registration form, shown in Figure 3. All fields are required and cannot be changed later. (Users who forget their passwords are just plain out of luck!)

After the user clicks **Register**, the system should verify that all fields are filled in, that the **Username** has not already been registered, and that the **Password** and Confirm **Password** fields are equal. If any of these validations fail, the user should be returned to this screen to make corrections. The user should be provided with meaningful error messages so he or she knows what to correct.

Users who register through this interface do NOT have administrative privileges. Administrative rights will be granted by the database administrator manually updating the database.

Figure 3 – BuzzBid New User Registration Form

Selling Items on BuzzBid

A major feature of BuzzBid is the ability for users to list items they would like to sell. Figure 4 shows the New Item for Auction form. The user enters information about the item so that other users can decide to bid on it. This includes the **Item Name**, a **Description** of the item, an item **Category**, the **Condition** of the item, and if the item is **Returnable**. The user also enters price information including the **Starting Bid**, the **Minimum Sale Price** that the user will accept, the **Auction Length**, and an optional **Get It Now Price**. All price fields are in US Dollars and should only allow two decimal places.

The list of **Categories** is fixed by the system as a dropdown list provided to the user. Even though the categories are fixed, the database administrator can change category names or add new to the database manually. *Do not hard code categories into your application.* The available categories are:

- Art
- Books
- Electronics
- Home & Garden
- Sporting Goods
- Toys
- Other

The list of **Conditions** is also fixed by the system and is guaranteed never to change:

- New
- Very Good
- Good
- Fair
- Poor

Conditions are ordinal and can be compared with each other (e.g., items that are "good or better" or sorted).

The auction rules are as follows:

- **Starting Bid** is the minimum amount required for the first bid. Bids cannot be below this.

- **Minimum Sale Price** is the smallest amount that the user is willing to set for the item. This information is visible only to the user listing the item. Users bidding on the item will not know if the minimum sale price has been met until the auction is over. This gives the listing user peace of mind that an item will not sell too cheaply.

- **Auction Length** of 1, 3, 5, or 7 days. **Auction End Time** is calculated when the user submits the item by adding the selected number of days to the current date and time (you can assume all times are in Eastern Time). For example, if the user creates a new item on March 1, 2023, at 5:00PM with an auction length of 1 day, the auction ends March 2, 2023 at exactly 5:00PM.

- An optional **Get It Now Price**, the price at which the user is willing to sell the item immediately. If another user uses Get It Now, the auction is immediately over, and that user is the winner.

When the user clicks *List My Item*, your application should verify that all required fields are filled in and that the data is valid. In particular, you should consider what constraints should hold among the **Starting Bid**, **Minimum Sale Price**, and **Get It Now Price**. If the user enters invalid data, the item should not be listed. Instead, show an appropriate error message and return the user to the form in order to make corrections.

All items are assigned a unique numerical **Item ID** so that the item can be identified easily. The ID is automatically generated by the system in order as each item is submitted (starting with 1 for the first item, 2 for the second, etc.) and cannot be edited by the user. The ID will be shown on the Search Results screen and the Item Description page.

Figure 4 - New Item for Auction

Searching for Items

Users can search for items for sale using a search interface like the one shown in Figure 5. The following search criteria are available:

- Keyword: An item is returned if the keyword appears anywhere, in the **Item Name** or **Description**, and is case sensitive.

- Category: If a **Category** is selected, only items in that category will be returned. If no category is selected, then items in any category may be returned. The drop down should contain a blank row in case the user does not wish to search on category.

- Minimum Price: If the minimum price field is filled in, items returned from the search must have a current high **Bid** of at least this amount. If no one has bid on the item, then the **Starting Bid** price should be used instead.

- Maximum Price: If the maximum price field is filled in, items returned from the search must have a current high **Bid** of less than or equal to the maximum price. Obviously, if an item's **Starting Bid** is higher than the maximum price, then the item would not be returned in the search. If an item has no bids but the **Starting Bid** is lower than the maximum price, it should be included in the results.

- Condition at least: If this field is selected, then only those items with *the selected condition or better* are returned. For example, if the user chooses the condition "Good," then items with conditions of "Good," "Very Good," or "New" should be returned. This dropdown should have a blank row in case the user does not wish to search on **Condition**.

Figure 5 - Item Search

When the user clicks *Search*, only those items that meet ALL of the criteria will be returned. Not all criteria must be entered for a search. For example, if the user selects the **Category** "Arts" and **Condition** at least "Fair", then only those items that are in the "Arts" category AND have a condition of at least "Fair" will be returned. If the user enters no criteria, then a listing of all items will be returned. The user will be redirected to the *Search Results* screen as depicted in Figure 6.
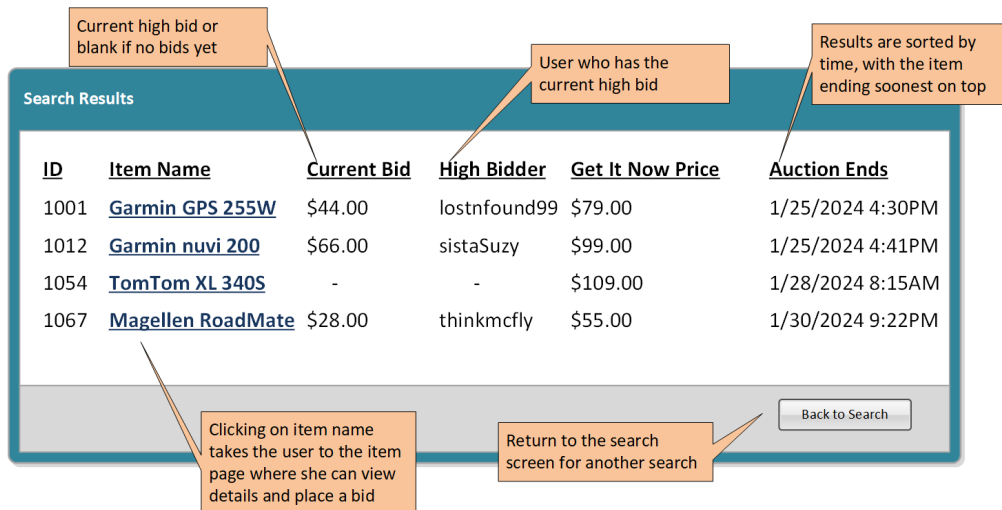
Figure 6 - Search Results

The *Search Results* screen lists all those items that match the user's criteria. The fields listed in the search results include the **Item ID**, **Item Name**, the current **Bid Amount** (if there is one), the **Username** of the user who has the high bid (if there is one), the **Get It Now Price** (if one is set), and the **Auction End** date and time. The results should be sorted in order of the auction end date with the auction ending the soonest listed first. The entire list of results should be displayed.

If the user clicks on the **Item Name**, then he or she is taken to the Item Description page as shown in Figure 7. From this screen the user can see information about the item for sale, including the **Item ID**, **Item Name**, **Description**, **Category**, **Condition**, if the item is **Returnable**, and the **Get It Now Price** if one has been set. Information about the latest four bids (at most) is also shown. The bidding information includes the **Bid Amount**, **Time of Bid**, and the **Username** of the person who made the bid. The bids are sorted by the **Time of Bid** with the latest one listed first. If no one has bid on the item, or the item has been cancelled, then the bid information will be empty.
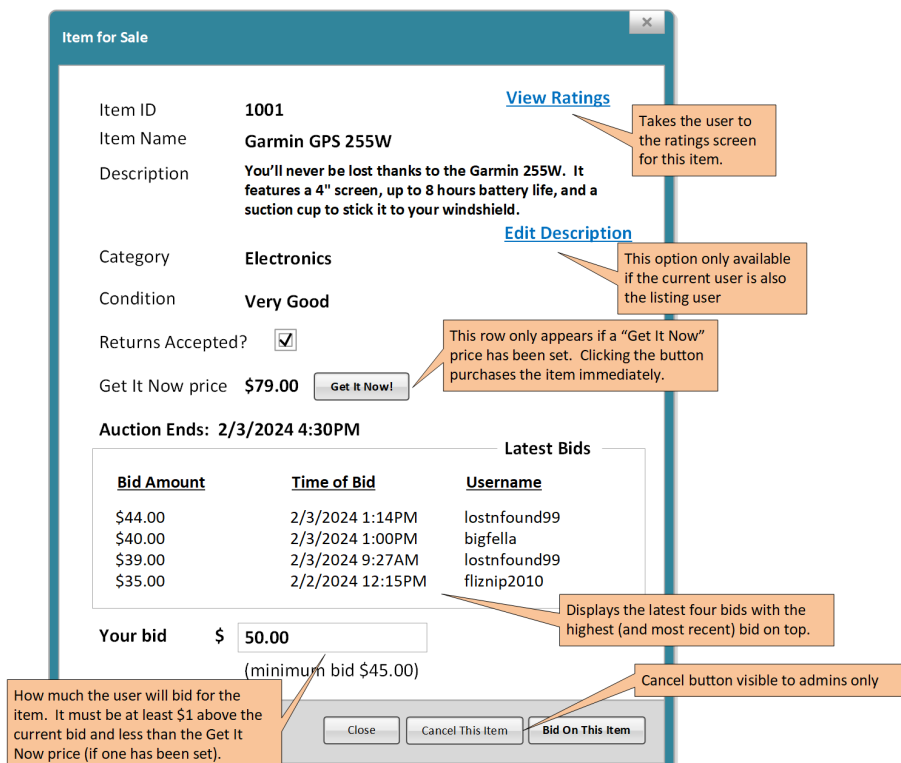

Figure 7 - Item Description - Bidding

From this screen, the user has several options:

- The user can click *close* to return to the *Search Results* screen.

- If the user viewing the item is also the user who listed the item, then the user is allowed to edit the item description. When the user clicks *Edit Description*, display a popup window to enter the new description. The existing description should then be replaced with the new one. Note that this is the only field that the user can update after the item has been created. If the user viewing the item is not the listing user, then the *Edit Description* option should not be visible.

- The user can click *View Ratings* to see ratings and comments about the item (see Figure 8).

- The user can purchase the item immediately if a **Get It Now Price** has been set, with a button allowing the user to make the purchase. This immediately ends the auction (even if the time is not yet expired) and sets the current user as the **Winner** of the auction.

- The user can bid on the item. Users cannot bid on their own items. Bids must be at least one dollar higher than the current (highest) **Bid Amount**. The bid must also be less than the **Get It Now Price**. If the user attempts to bid higher than the **Get It Now Price**, an error message should be shown suggesting that the user click Get It Now instead of bidding.

- An administrator can click *Cancel This Auction* to cancel the item listing. A prompt for the optional **cancellation reason** should be provided and stored. The **date and time** of cancellation will be recorded as the auction's end time.
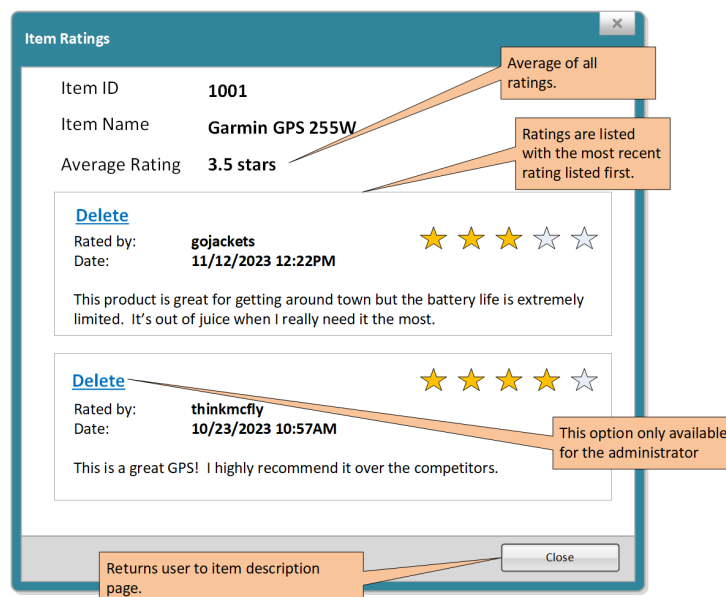
View Ratings

Figure 8 - Item Ratings

The Item Ratings screen (see Figure 8) shows existing ratings for all items with the same, identical name (including case) as the listed item, sorted in the order that the ratings were entered with the most recent rating listed first. In addition, the average star rating is also calculated (rounded up to one decimal place) and listed at the top of the page. Administrators can delete any rating and should have a *Delete* option present, which deletes the rating from the database and refreshes the page.

Auction Results

The Auction Results screen (see Figure 9) shows information about auctions that have ended. The fields shown are the **Item ID**, the **Item Name**, the final sale price, the **Username** of the **Winner**, and the **Date and**

Time that the auction ended. This list should only include information about auctions that have already ended. The list should be sorted by the auction end date/time with the most recently ended auction listed first and can display all results at once, or if desired, paginated. Clicking on the item name will load the Item Results screen with the final auction details (shown in Figure 10).

Figure 9 - Auction Results

The sale price and winner fields should be calculated in the following way:

- If the item was purchased using the Get It Now option, then the sale price is the **Get It Now Price** and the winner is the **Username** of the person who purchased the item.

- If, at the time the auction is over, the high **Bid** is greater than or equal to the **Minimum Sale Price,** then the sale price is the value of the high **Bid** and the winner is the **Username** of the person with the high **Bid**.

- If no one purchased the item using the Get It Now option, and if the highest **Bid** is still lower than the **Minimum Sale Price** (or there are no **Bids** at all), then both the sale price field and the winner field should be left blank.

- If the auction was cancelled, then the sale price will be left blank, the winner listed as "Cancelled", and the cancellation date/time listed.

An implementation decision you will have to make is when to determine auction winners. A recommended strategy is the following: Whenever any user chooses to view the Auction Results screen or reports that rely on auction results, before showing any results, first search the list of items for any auctions that do not yet have a declared winner but have already ended (based on the current time). Then, update those auctions with the winner (if there is a winner) before showing results.

The Item Listing screen for completed or cancelled listings is shown in Figure 10. Any bidding or item editing capabilities should not be shown when viewing a finished auction. If there was a winner for the auction, then the bid history should highlight the winning bid's row in green. If there were bids, but no winner, then the bid history should highlight the last bid's row in yellow. For cancelled items, the cancellation date and time should be listed in the bid history, showing "Cancelled" as the bid amount, the cancellation date and time in place of the bid time, and "Administrator" as the user, with the cancellation row highlighted in red. Different variations of the bid listing are shown in Figure 11.
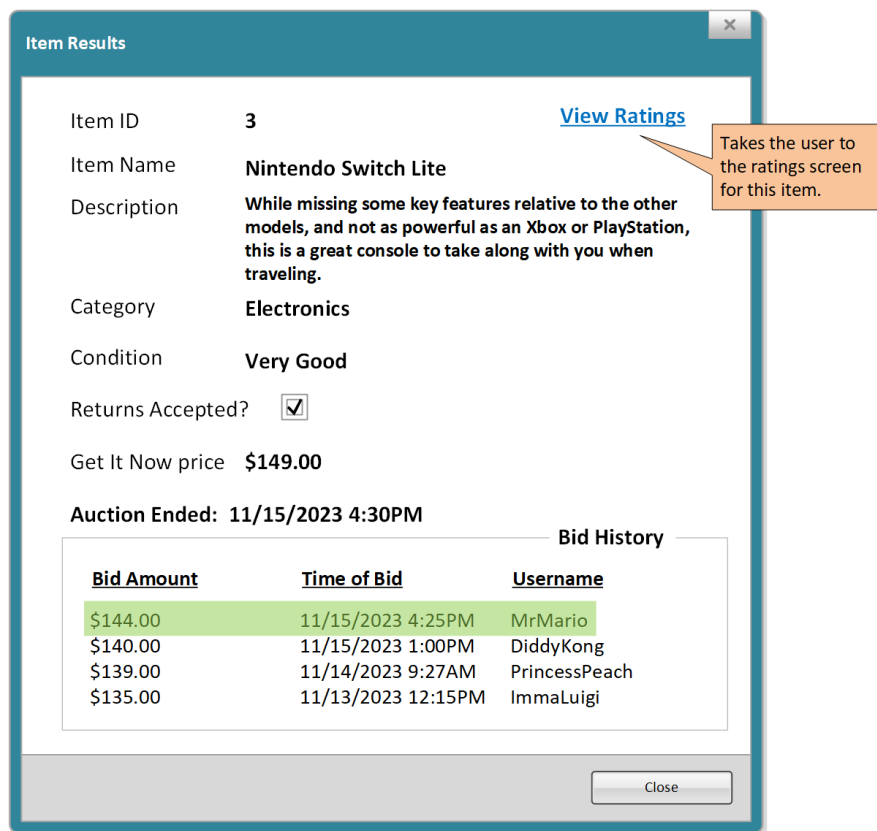
Figure 10 - Item Results

Figure 11 - Sample bid listings

From Item Results, Item Ratings can also be accessed. If the user is the winner of the item, they may enter a rating from this screen. Users can rate items on a scale of zero to five stars and optionally provide **Comments** on the item. Previous ratings should be shown for previous items with the same, identical name (including case) as the listed item, sorted in the order that the ratings were entered with the most recent rating listed first. In addition to listing each rating separately, the average star rating is also calculated and listed at the top of the page. When a new rating is submitted, the system will record the user who made the **Rating**, the **Number of Stars**, the **Comment**, and the **Date and Time** of the **Rating**. The Rate Item screen as displayed for an auction winner is shown in Figure 12.

Figure 12 - Item Rating Submission

If the user does not want to enter a new rating, he or she clicks *Close* to return to the Item Description page. Your system should make sure that a user may only rate an item listing once. A user can submit multiple ratings for different listings they have won that have the same identical name (including case).

If a listing has already been rated by the user, the "View Ratings" form as shown in Figure 13, where the user also can delete their own ratings. If a rating is deleted, the form must refresh to the ratings entry as shown in Figure 13 to allow the entry of a new rating for the item.
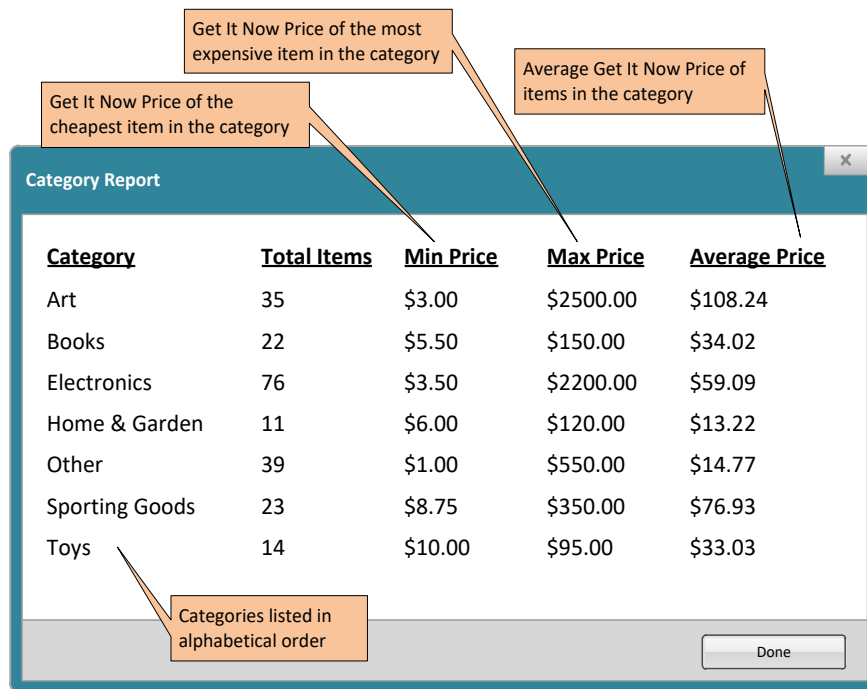

Figure 13 - Existing Rating View

BuzzBid Reports

Administrative users can view several reports to help them administer the system and provide insight into user activity.

When writing SQL statements for these reports, use as few SQL statements as possible. The important thing to remember is to let the database do the work. Do not load the necessary tables as variables and do the grouping/aggregation and selection using programming language constructs. The DB query processor can do it much more efficiently than any host language. *The output returned from your SQL query should match the information for the final report.*

Category Report

The Category Report (see Figure 14) aggregates information about items by **Category**. The fields in the report are the **Category** name, the total number of items in the category, the minimum **Get It Now Price** across all items in the category, the maximum **Get It Now Price** across all items in the category, and the average **Get It Now Price** across all items in the category. The report should be sorted alphabetically by category name. Keep in mind that some items may not have a **Get It Now Price**. They should be included in the item count, but their prices should not be part of the min, max, or average prices. (In other words, if an item does not have a **Get It Now Price**, do NOT assume it has a **Get It Now Price** of $0). This report should include both items that have already been sold (the auction has ended) or that are still for sale, but not cancelled auctions.

Figure 14 - Category Report

User Report

This report shows aggregate information about users. The fields in the report are **Username**, the total number of items listed by the user (whether sold or not), the total number of items sold by the user (either via Get It Now or auction), the total number of items won by the user (either via Get It Now or auction), the total number of items that the user rated, and if the user has listings, the most frequent item **condition** for the

user's listings (in the event of a tie, the lowest-quality condition should be used). If the user has no listings this field should display "N/A". Figure 15 shows an example User Report.
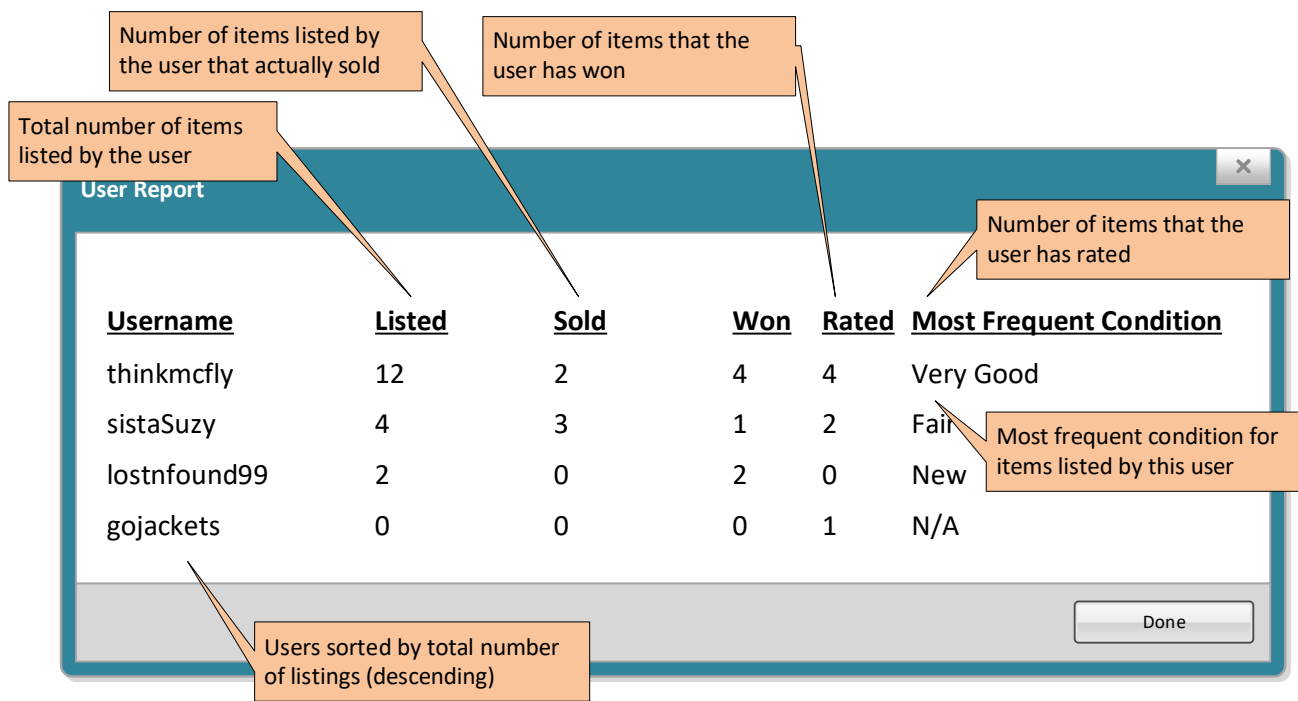

Figure 15 - User Report

Top Rated Items

This report will list the top 10 rated items in the BuzzBid database, sorted by average rating (rounded up to one decimal place) descending, then by name ascending. Item listings without ratings should not be included in the average rating calculation. In the event multiple items have the same average ratings, the results should still be limited to 10 items. The item name, average rating, and count of ratings should be displayed.
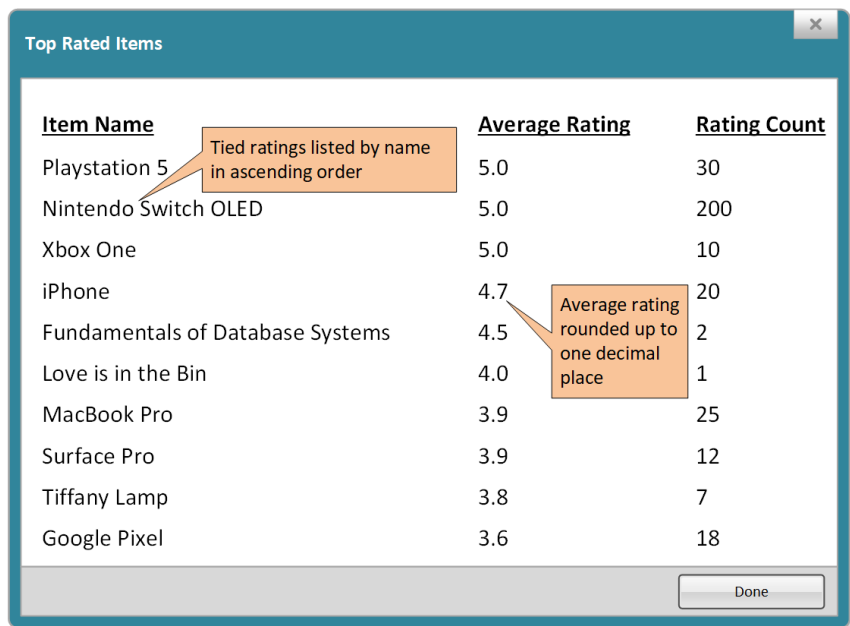

Figure 16 - Top Rated Items

Auction Statistics

While somewhat simple, this report will show a summary for all auctions in the database. With appropriate labels, it should show: the count of active auctions (auctions which have not closed), the count of finished auctions (auctions that have ended with or without a winner but were not cancelled), the count of won auctions (those that have successful winners), the count of cancelled auctions, the count of rated items, and the count of any unrated items.
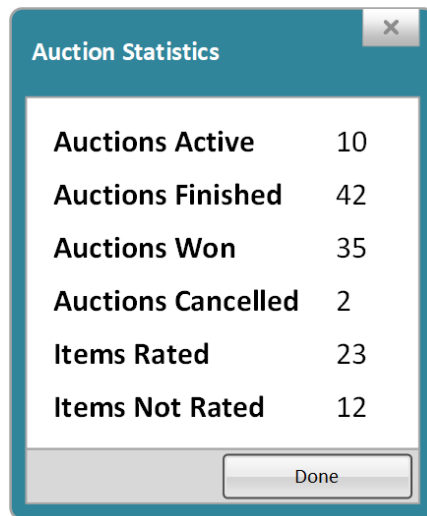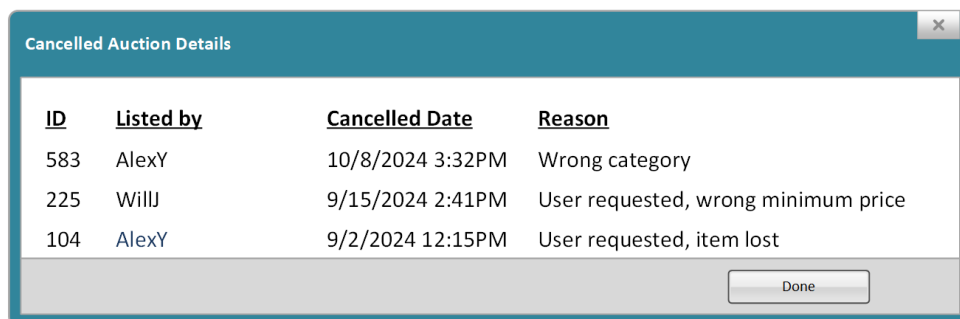

Figure 17 - Auction Statistics

Cancelled Auction Details

While infrequent, users may ask administrators to cancel an auction for some reason (such as entering an incorrect minimum price), or the administrators may cancel an auction for their own reasons (an item listed in an incorrect category). This report will provide the details for all cancelled auctions so that administrators can see if there are frequent requests from a single user, frequent user errors, or other trends that cause auctions to be cancelled. The item ID, associated user, cancellation date/time, and cancellation reason should be displayed, sorted by item ID descending.

Figure 18 - Cancelled Auction Details

Document Version Info

Version	Notes	Date
1.0	Original version	1/22/2023