LionAuction-Phase 1 for CMPSC 431W

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1. Introduction

This project is dedicated to creating an auction system for Lion State University (LSU). This project is called LionAuction, it is an auction-based online e-commerce platform that helps university members and local businesses buy and sell goods online.

1.1 Statement of Objectives

- Creating a global platform that users can easily navigate and access
- Users should be able to register, login, or delete their account
- Users could either register a business account or a personal account
- Registration for HelpDesk account should be approved by manager of LionAuction
- For personal account, any information could be changed after registration except their email address and social security number (SSN)
- For business account, any information could be changed after registration except their email address, and company name
- All users newly registered are set as a bidder, in order to become a seller user needs to contact HelpDesk. HelpDesk will help upgrade users' accounts to sellers, which would grant access to listing products for sale
- Bidder will have the same amount of schema as seller, but they can't access it until granted permission
- Seller account would also have access to bidding
- Seller can only sell product base on their account type
- Sellers during sale have to set a reserve lowest bid price which can't be 0, bid would still start at 0, but when auction ends and highest bid is lower than the reserve bid price, no one gets notified to be the winner, the product would not be sold
- When an product is listed on the market, the page of the listed product should have a category, description, current bid price, a way to set a new bid, and a place to directly send a message to the seller, and all messages would be private
- Three different web pages that host sales either from individual sellers, big company sellers, or local vendors.
- If there are multiple copy of the same product, the would all be given a different unique ID
- Users should be able to leave a ticket to the HelpDesk inorder to request for an upgrade or edit any unchangeable account information
- HelpDesk should be able to view, reply, and change the status of the ticket
- HelpDesk would be able to view and change any information of the system upon request or if any issue occurs
- Difference accounts can't have similar payment information (Credit card/ Bank account)

- If a bidder or seller tries to bid or sell without a payment method binds to their account, they would be asked to assign a payment method
- When an auction ends, products will be delisted and no other users can be added to the bidders list
- Winner would be notified when the auction is over
- If a bidder wins a bid, they will have a 24 hours to pay for the bid, if they cannot pay within 24 hours, or decide to not pay for it, the next highest bidder will be notified for the bid
- If the bidder wins the bid, they would be notified and removed from the bidder list, if they pay for it, everyone else will be removed from the bidder's list. If they decide not to pay for it the next highest bidder will be notified on the list, and if they pay for it, then the rest of the list gets removed
- Each account will have a default balance of 0 when first registered, users can charge bid payment from their credit card/bank account to account balance and use those balance to bid, or charge bid payment directly from their credit card/bank account
- For sellers after a product is sold, payment will be added to their account balance. They can choose to transfer those balance into their credit card/bank account
- If a user is trying to delete their account while still containing balance within their account, they will not be able to delete their account.
- For sellers selling special products, must contact HelpDesk. If sellers leaves the market, all information about the product will be removed similar to normal sellers, but only for special product, all auction history will also be removed
- There will be a history tab for all listed and sold products accessible for the user
- Bidders will be able to rate the seller after they win and paid for the product
- Each bid that is placed must be at least $1 higher than all previous bids and must be placed before the auction ends
- Each category may have multiple subcategories. Bidders can traverse the category hierarchy to narrow down the interested products in a specific category
- Seller should not be able to bid on their own product
- Bidder can only bid over a different user's bid
- Products for sale will have a starting time and an ending time, bits can only be place within this time frame

1.2 Company Constraints

- If a business wants to change their email, company name after rebranding, or upgrading their current account, contact helpdesk with documents of prove is required
- If a user wants to change their email address, social security number (SSN), or upgrading their current account, contacting helpdesk is required
- Under NO Circumstances should key personal information (social security number (SSN), credit card, and bank account) should be shown to other users, all key personal information should be private only to the owner, and should be removed after user deletes their account

2. Requirement Analysis

This section provides detailed information about the required functions and items of the project. Based on the type of account the user creates, different information should be gathered and stored.

2.1 Personal Account: (Bidder/Seller)

Registered Users: (Description)

- Email would be used to identify user's account
- Emails would all be tracked in one schema, any emails already registered as Personal, Business, or HelpDesk should not appear again or as a different role
- Seller and bidder information would be removed if a user deleted their account, all current ongoing bids or sales from that user would be stopped and removed from the platform, all participants of that ongoing sale of the removed user should be dropped from the bid list, and should not be charged. Bidding/selling history of that product should be keeped

Registered Users: (Functions)

Bidder:

a. Products:
   i. Every product being listed can only have exactly ONE category
   ii. Every listed product has their own unique ID, the same product of that ID can not be listed more than once
b. Bidding:
   i. If a bidder removes their account, the bidder would be dropped from any bids they participate in, and other bidders below them should move up a slot. If that account is the only bidder, then the bid should be changed back to 0, and show no bidder
   ii. Winner would be identified by the highest bid price, and bid prices would be the key
   iii. Each bid will have their own ID and will be used to keep track of bidding history
c. Category Hierarchy:
   i. Bidders can traverse the category hierarchy to narrow down the interested products in a specific category
d. Tickets:
   i. Tickets should have their own ticket ID and Status

Seller:

a. Products:
    i. Products for sale should be assigned to exactly one category, if there are no categories available for this product, contact HelpDesk and a new category will be created for that product
    ii. For each of the same product with a different ID, they would all be auctioned at the same time. Every product will have a unique ID
b. Selling:
    i. Each sale will have their own ID and will be used to keep track of sale history
c. Category Hierarchy:
    i. Each category can have multiple products, but each products can only contain one category
d. Tickets:
    i. Tickets should have their own ticket ID and Status

2.2 Business Account: (Bidder/Seller)

Registered Users: (Description)

- Email would be used to identify user's account
- Emails would all be tracked in one schema, any emails already registered as Personal, Business, or HelpDesk should not appear again or as a different role
- Seller and bidder information would be removed if a user deleted their account, all current ongoing bids or sales from that user would be stopped and removed from the platform, all participants of that ongoing sale of the removed user should be dropped from the bid list, and should not be charged. Bidding/selling history of that product should be keeped

Registered Users: (Functions)

Bidder:

a. Products:
    i. Every product being listed can only have exactly ONE category
    ii. Every listed product has their own unique ID, the same product of that ID can not be listed more than once
b. Bidding:
    i. If a bidder removes their account, the bidder would be dropped from any bids they participate in, and other bidders below them should move up a slot. If that account is the only bidder, then the bid should be changed back to 0, and show no bidder
    ii. Winner would be identified by the highest bid price, and bid prices would be the key
    iii. Each bid will have their own ID and will be used to keep track of bidding history
c. Category Hierarchy:
    i. Bidders can traverse the category hierarchy to narrow down the interested products in a specific category
d. Tickets:
    i. Tickets should have their own ticket ID and Status

Seller:

a. Products:
    i. Products for sale should be assigned to exactly one category, if there are no categories available for this product, contact HelpDesk and a new category will be created for that product
    ii. For each of the same product with a different ID, they would all be auctioned at the same time. Every product will have a unique ID

b. Selling:
    i. Each sale will have their own ID and will be used to keep track of sale history
c. Category Hierarchy:
    i. Each category can have multiple products, but each products can only contain one category
d. Tickets:
    i. Tickets should have their own ticket ID and Status

2.3 HelpDesk Account:

Registered Users: (Description)

- Email would be used to identify user's account
- Emails would all be tracked in one schema, any emails already registered as Personal, Business, or HelpDesk should not appear again or as a different role

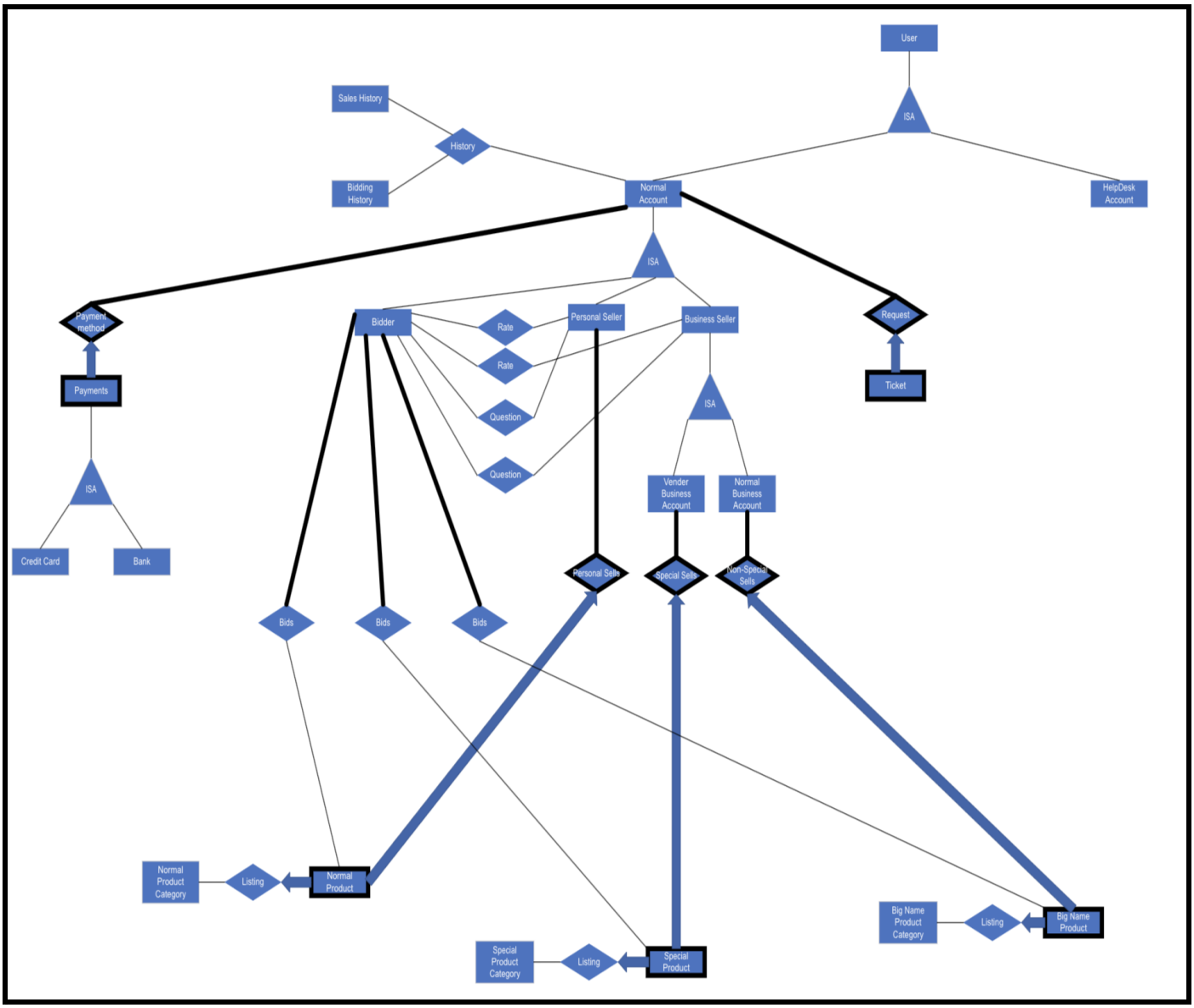
Registered Users: (Functions)

- HelpDesks users will be granted access to all information of all users except their credit card or banking details. Last four digits of social security number (SSN) will be provided for security measures in order to validate any suspicious transactions
- HelpDesks users will be able to upgrade or change information for the user if the user requests to
- HelpDesks users should be able to view, reply, and change the status of the ticket

3. Conceptual Database Design

This section provides ER-Diagrams on the database design of the project. Based upon the outline in the last section, a visualized design is created inorder to show how the project should be structured.

3.1 Overall Diagram:



[Figure 1: Overall Diagram]

Description:

1. ISA:
    a. User: Users will have an ISA hierarchy connected to the Normal Account entity set and HelpDesk Account entity set. This ISA hierarchy identifies that the user can either choose to create a HelpDesk Account or a Normal Account, which due to company constraint HelpDesk account can only be created if approved by an administrator.
    b. Normal Account: Normal Account also has an ISA hierarchy, which user could either be a bidder, personal seller, or business seller.
    c. Business Seller: Business sellers also have an ISA hierarchy which business sellers can either be a vendor or a normal business.
    d. Payments: Payments have an ISA hierarchy which could be either credit card payment or bank payment.

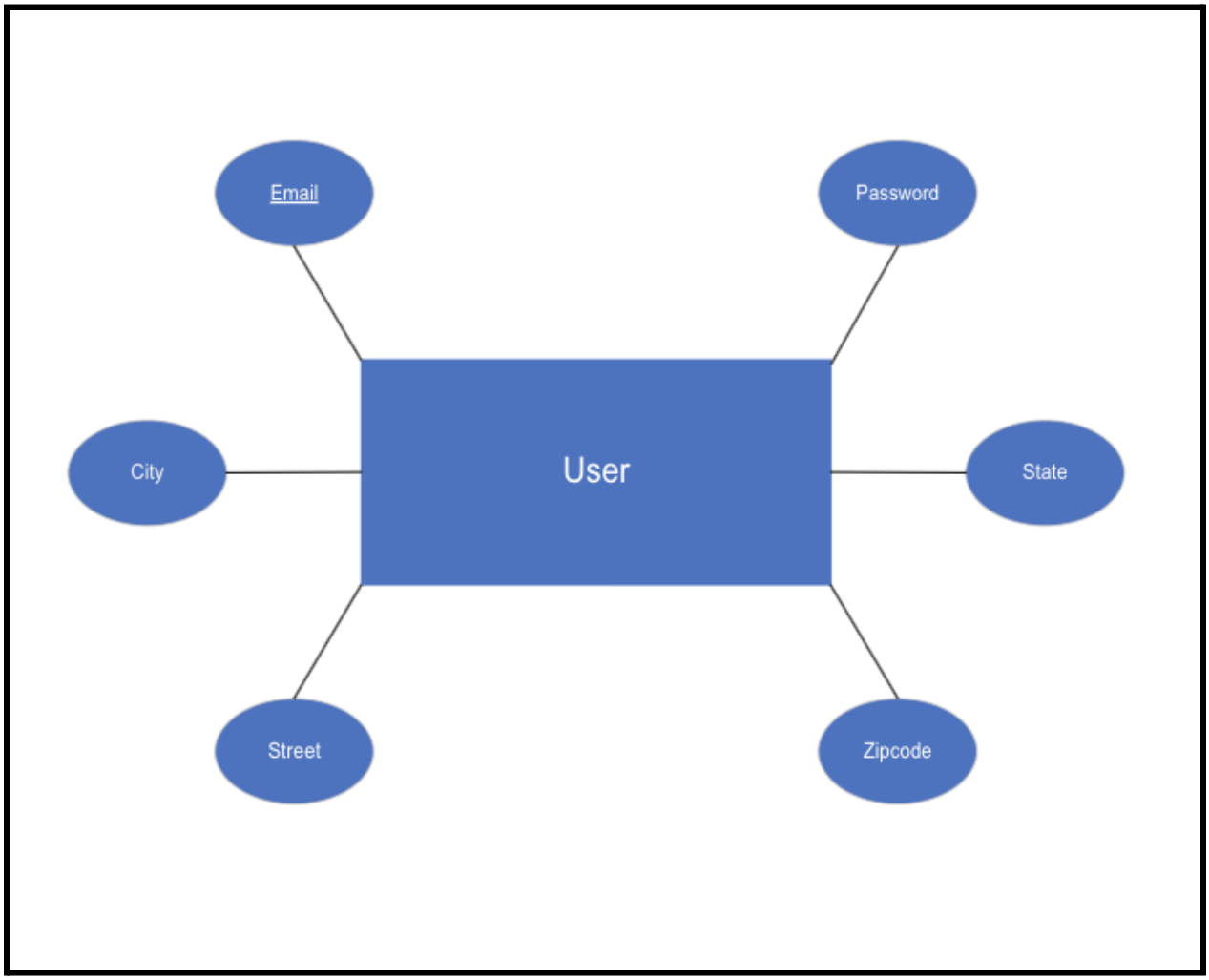
2. Strong and Weak entity sets:
    a. Personal Seller - Personal seller is the strong entity set, the weak entity relation are the Personal Sells, which connects to the Normal Product (Aka. Individual Seller Products) and each normal product will have and only have one Normal Product Category that it will be assigned to.
    b. Vender Business Account - Vender accounts are the strong entity set, the weak entity relation are the Special Sells, which connects to the Special Product and each special product will have and only have one Special Product Category that it will be assigned to.
    c. Normal Business Account - Normal business accounts are the strong entity set, the weak entity relation are the Non-Special Sells, which connects to the Big Name Product and each big name product will have and only have one Big Name Product Category that it will be assigned to.
    d. Normal Account - Normal account is the strong entity set, while the weak entity relations are the Request and Payment Method. Request is connected by Tickets (tickets user can send to HelpDesk), and Payment Method is connected by Payments which contains two different ways of payments.

3. Normal relationship:
    a. History - History is a normal relationship with an account, which means sales history and bidding history would be kept as it is no matter what happens to the user.
    b. Product Category - All product categories will be a normal relationship, which means product categories will all be kept no matter what happens to the user, and can only be changed by HelpDesk.

c. Bidder - Bidder has a bolded line to bids which means bidder has to bid, and all bids are available to the bidder.
d. Rate - Bidder can choose to rate the seller, and only bidder who won the bid can rate the seller
e. Question - Bidder can ask questions to the seller

3.2 Breaking It Down:

1. User:

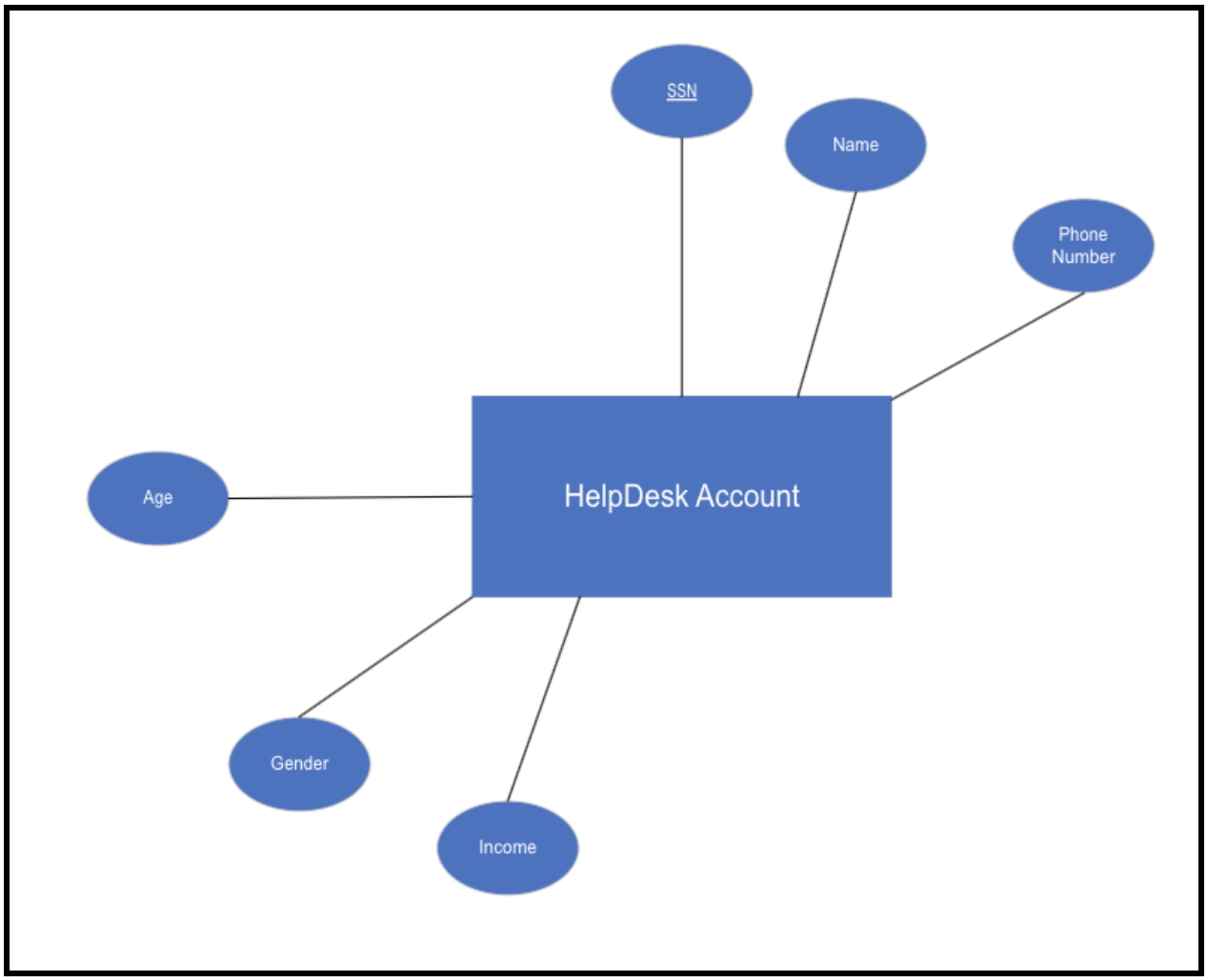


[Figure 2: User attributes]

Description:

User is the head of the ISA Hierarchy, it would contain all shared elements, such as Email, Password, City, State, Street, and Zipcode. Email is the key, every user has to register with an email, and there cannot be multiple of the same email being used for registration. This is mostly due to company constraints, but also it will prevent any issue that might cause with shared email across multiple accounts. If a user wants to change the email address or change they account into a different type, they either have to recreate their account or contact HelpDesk to change it manually.

2. HelpDesk Account:

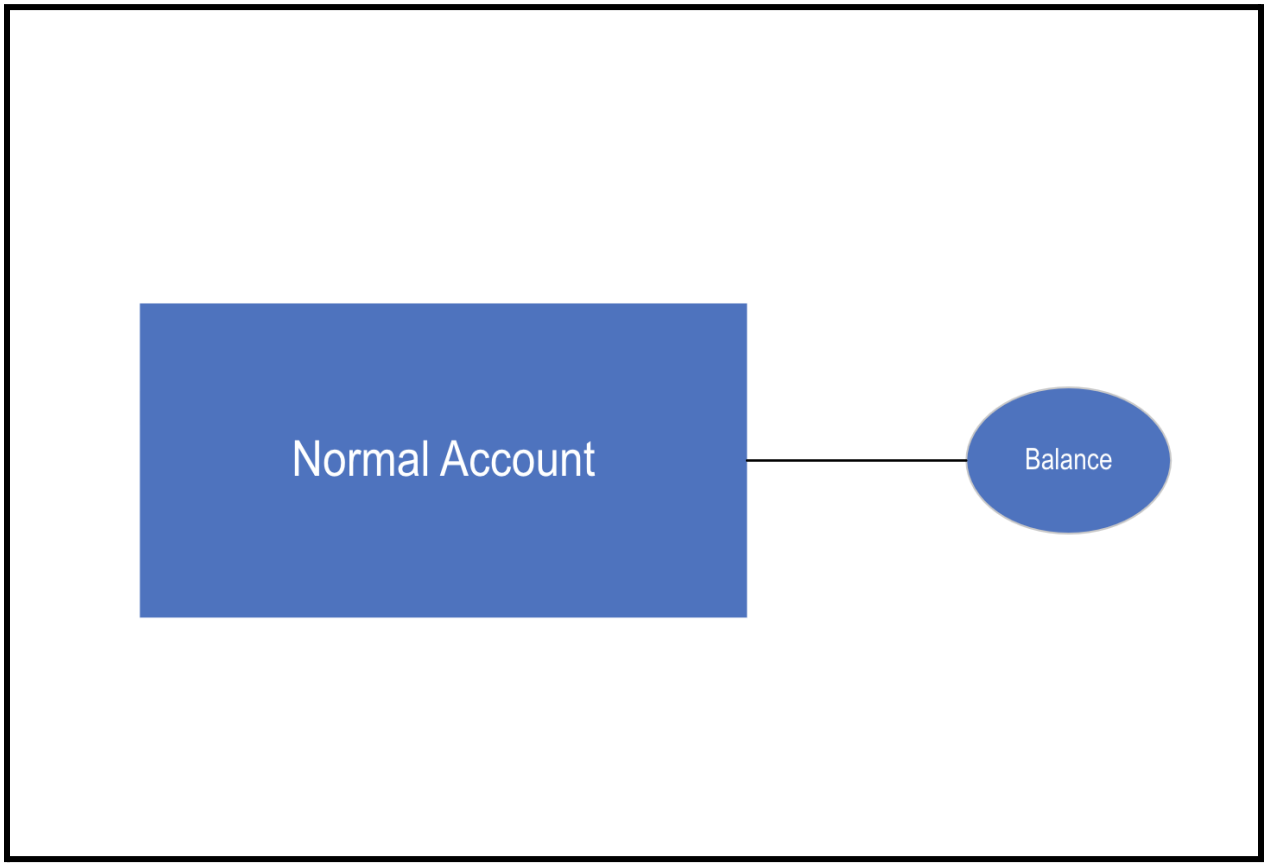


[Figure 3: HelpDesk Attributes]

Description:

HelpDesk Account has the attribute of SSN, Name, Phone number, Age, Gender, and Income. SSN are key inorder to identify the user of the account. The HelpDesk account does not have any other relationship due to the functionality of the program. The HelpDesk account will act like administrators who are giving access to all the data within the system. They will receive tickets from the user, and they can manually change the status of the ticket that user sent after reviewing the tickets. The HelpDesk Account can only be created with the authorization from an administrator of the company, This account is different from any normal account due to normal users of the site can not create a HelpDesk account.

3. Normal Account:

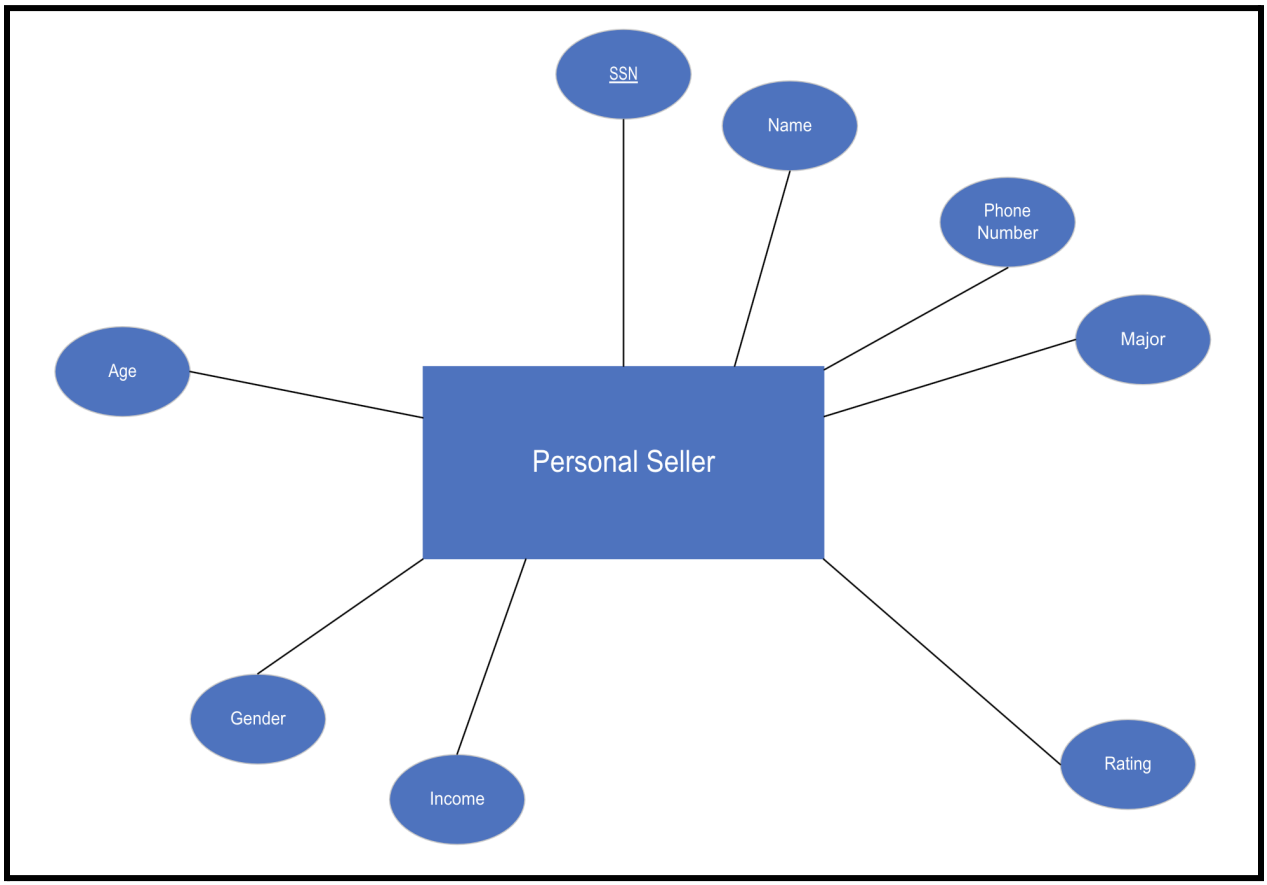


[Figure 4: Normal Account Attributes]

Description:

Normal Account will have the attribute of balance. Every account will have its own balance, users can store money or receive money from sales into their account. These balances can be used when bidding or withdrawn to their designated payment method. Balance here is not a key, this is so that users can have similar balances.

4. Personal Seller:

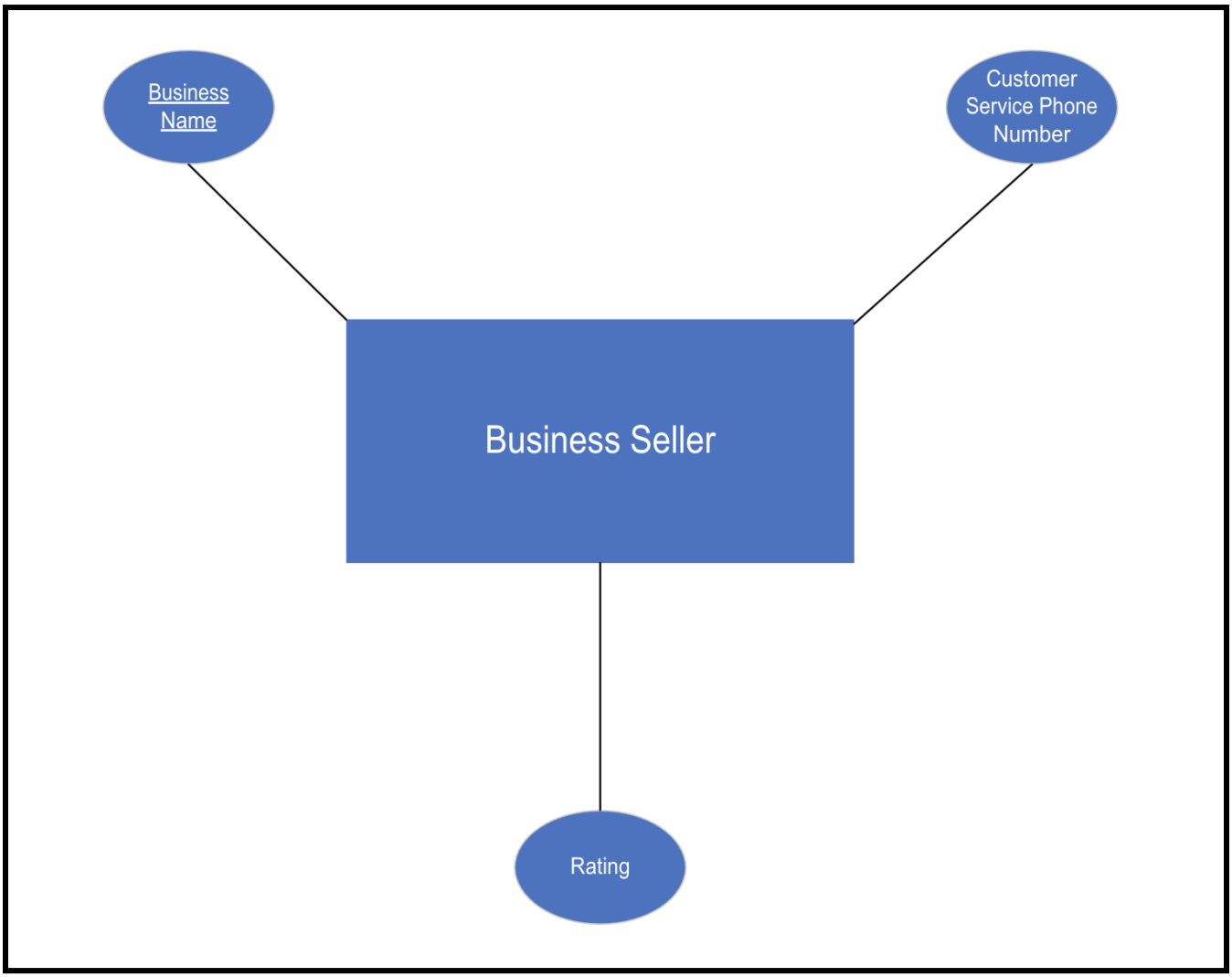


[Figure 5: Personal Seller Attributes]

Description:

Personal Sellers are a type of Normal Account, this is an account granted access to the selling function. A personal seller has the attribute of SSN, Name, Phone number, Major, Rating, Income, Gender, and Age. Personal Sellers are identified by the SSN, which would be the key that will keep all personal seller's information. SSN here is a key so that no multiple sellers could have the same SSN, and SSN is not changeable due to company constraints. Personal Seller's age, gender, major, and income are tracked for advertisement usage. Rating is also a part of the seller, after each sale, the bidder who wins the bid can leave a rating to that seller after their payment.

5. Business Seller:

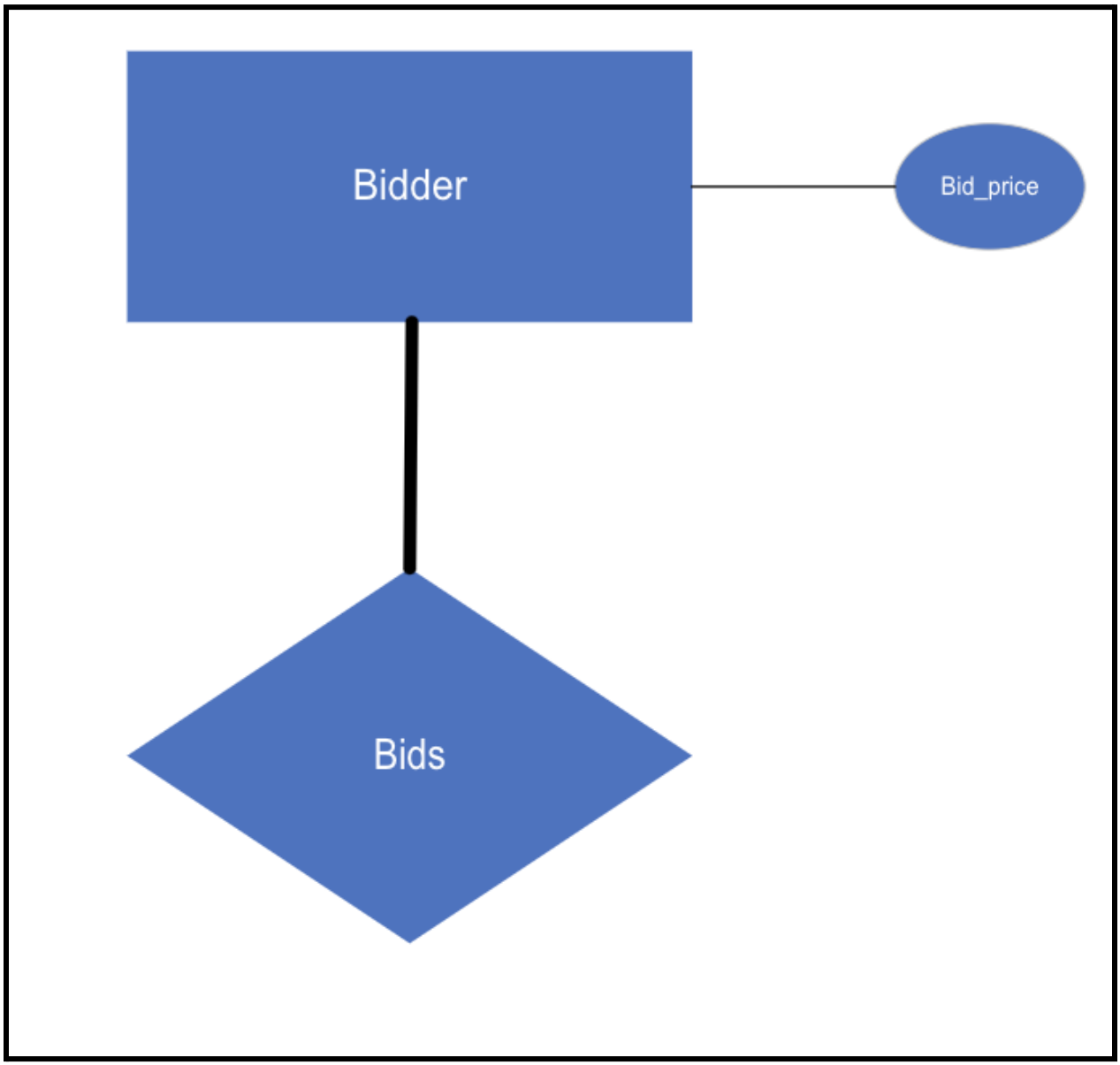


[Figure 6: Business Seller Attributes]

Description:

Business Seller are a type of normal account, there are also two types of business accounts one being the vendors and the other being accounts for big companies. These accounts will have attributes of Business Name, Customer Service Phone Number, and Rating. Business Seller would be identified by their Business Name, There shouldn't be more than one company with the same business name within the system. Rating is also a part of the seller similar to how personal seller rating works, the bidder who wins the bid can leave a rating to the seller after their payment.

6. Bidder Bidding:

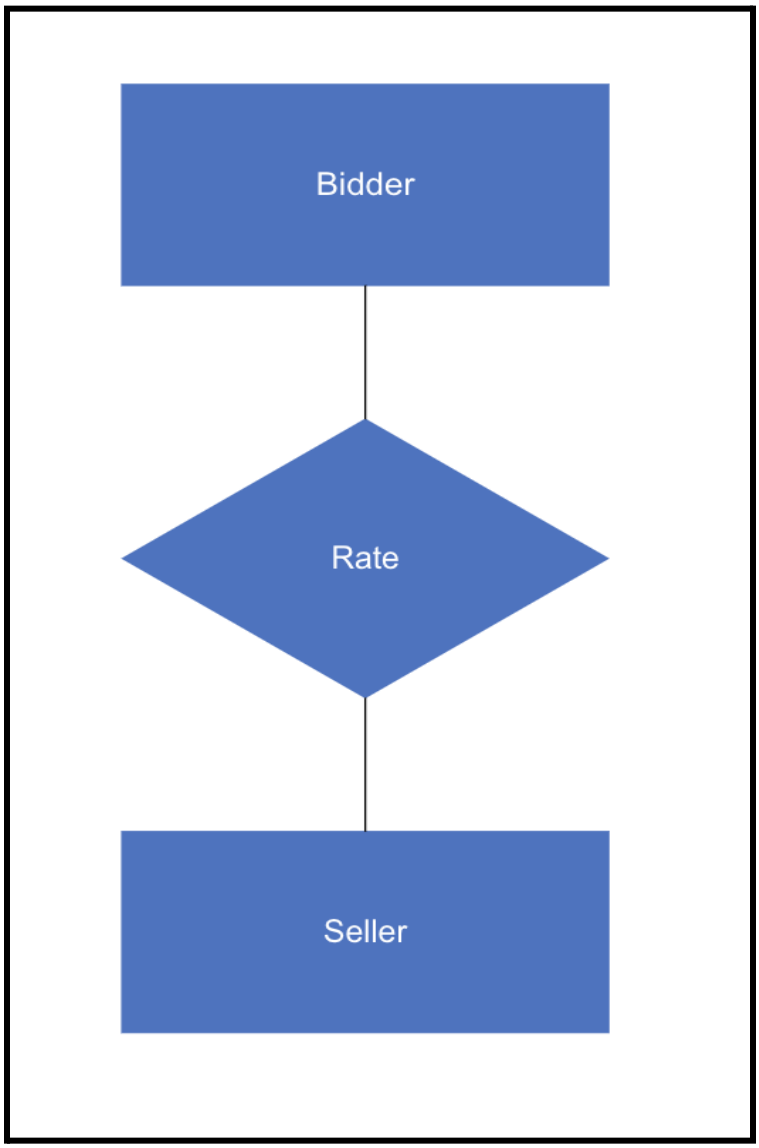


[Figure 7: Bidder Attribute and relationship]

Description:

White normal users could be sellers, they are also bidders. All normal accounts when first registered are bidders, which means every normal account should have access to bidding. Bidder will store information about bid prices and bid id would be generated and stored in the bid history. Bidders will be tracked by email and Bid_price will be an attribute. Each account could bid more than once, but only the highest bid would matter for the final bid result.

7. Bidder Rating:

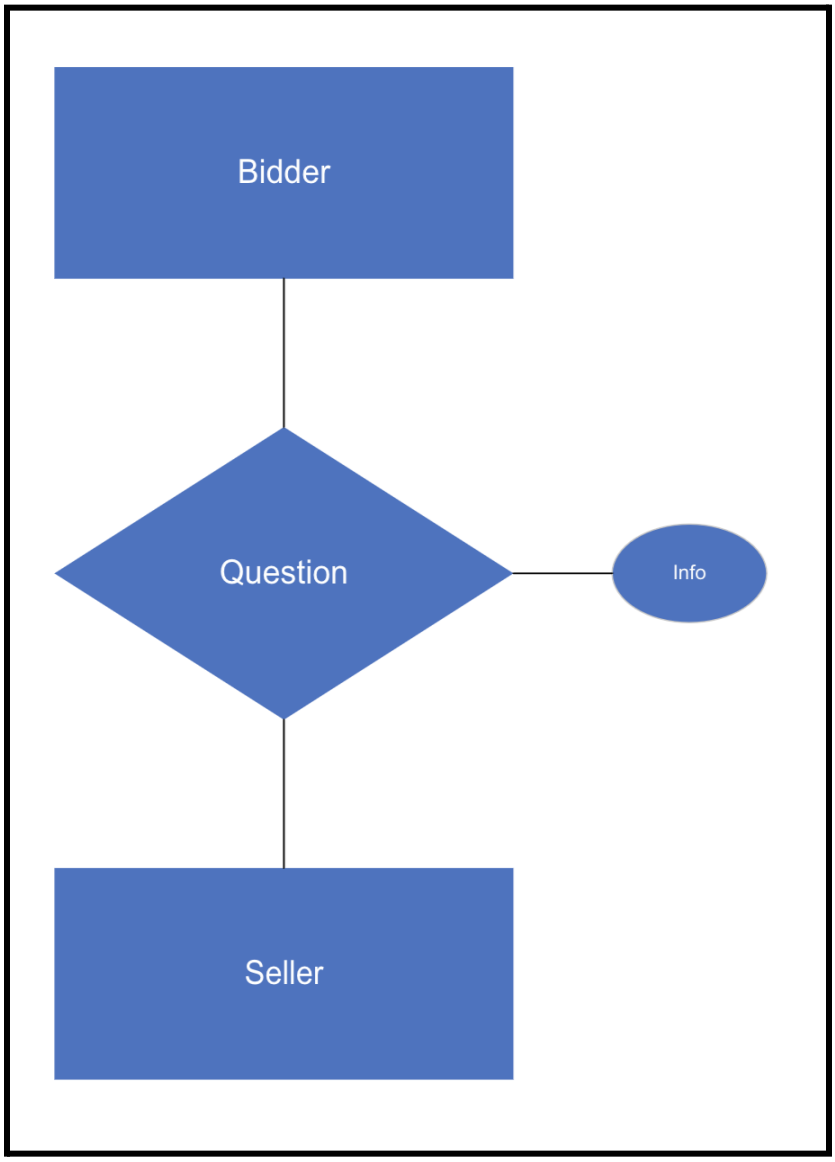


[Figure 8: Bidder Rating Seller]

Description:

Bidders are able to rate sellers only after they win the action and after their payment. Rating of the seller would be kept and reflected on the seller rating schema. Seller's rating would be calculated as the average of all ratings.

8. Bidder Asking Question:

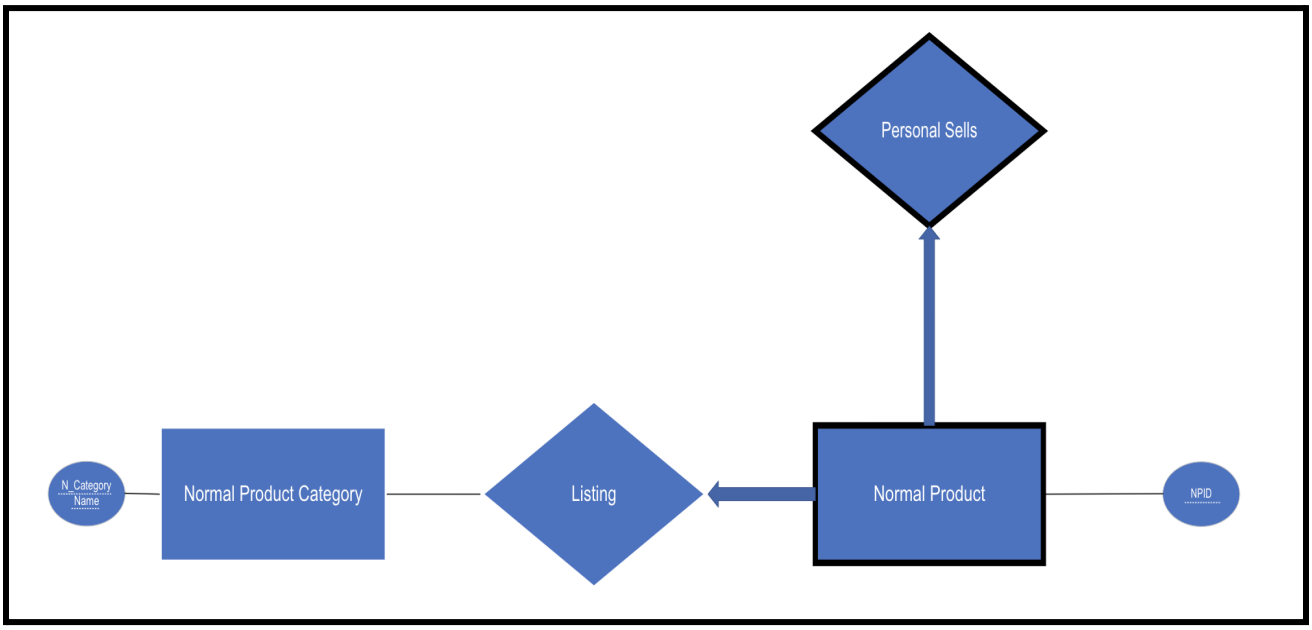


[Figure 9: Bidder Asking Question]

Description:

Bidders can send questions to sellers, questions have the attribute of info, the information that bidder sends to sellers will be stored. Sellers can also reply to the bidder, seller will see the information that was sent by the bidder since the latest information was stored.

9. Personal Sells:

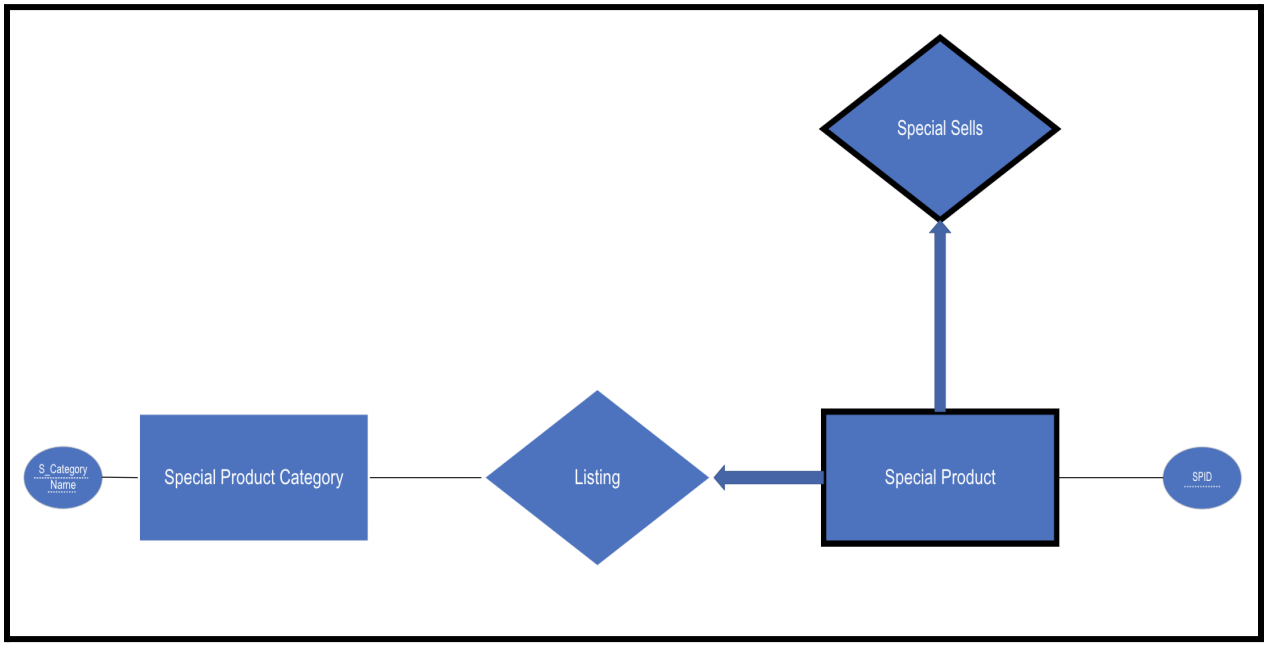


[Figure 10: Personal Product Relationship]

Description:

Personal Sellers can sell normal products. Each normal product that is listed will have a NPID which stands for normal product id. Each type of product will have their own type of ID, and each product will have their own category they fall into. Normal product has to be listed within a category and each normal product can only have one Normal Product Category that it falls into. Normal Product Category contains all types of categories and each category will have their own unique name. These categories can be added or removed by HelpDesk. Each category can have multiple products, but every product can only have one category.

10. Special Sells:

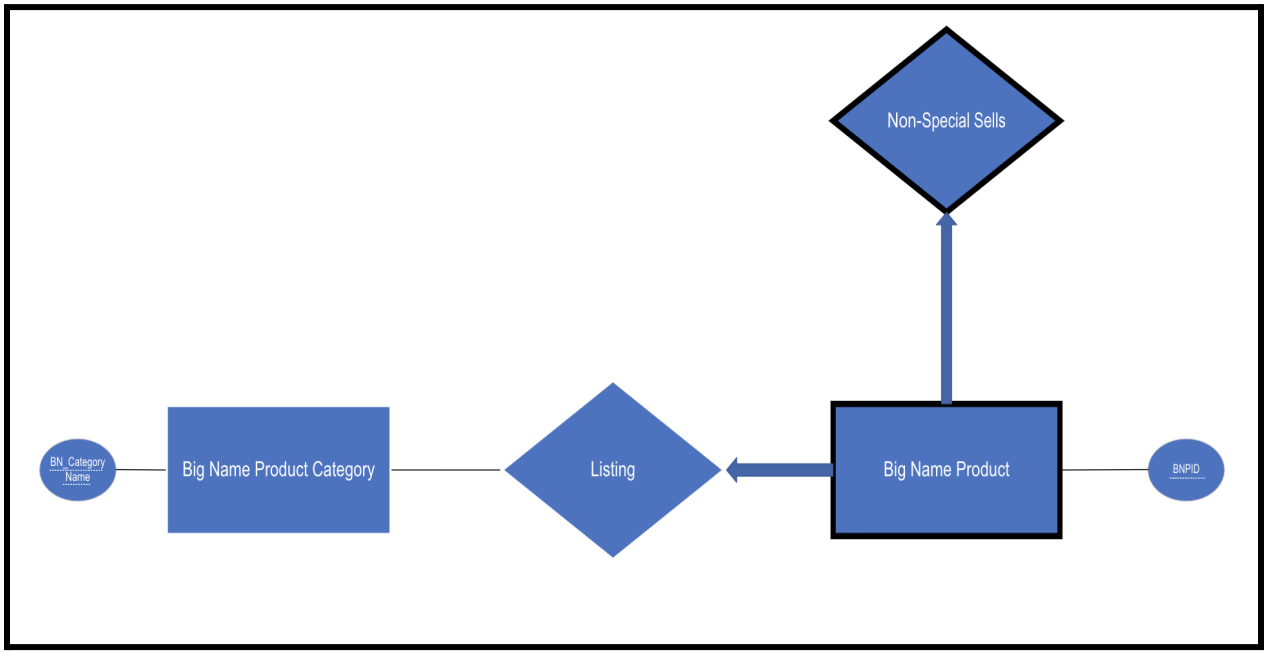


[Figure 11: Vendor Product Relationship]

Description:

Venders can sell special products. Each special product that is listed will have a SPID which stands for special product id. Each type of product will have their own type of ID, and each product will have their own category they fall into. Special products have to be listed within a category and each special product can only have one Special Product Category that it falls into. Special Product Category contains all types of categories and each category will have their own unique name. These categories can be added or removed by HelpDesk. Each category can have multiple products, but every product can only have one category.

11. Non-Special sells:

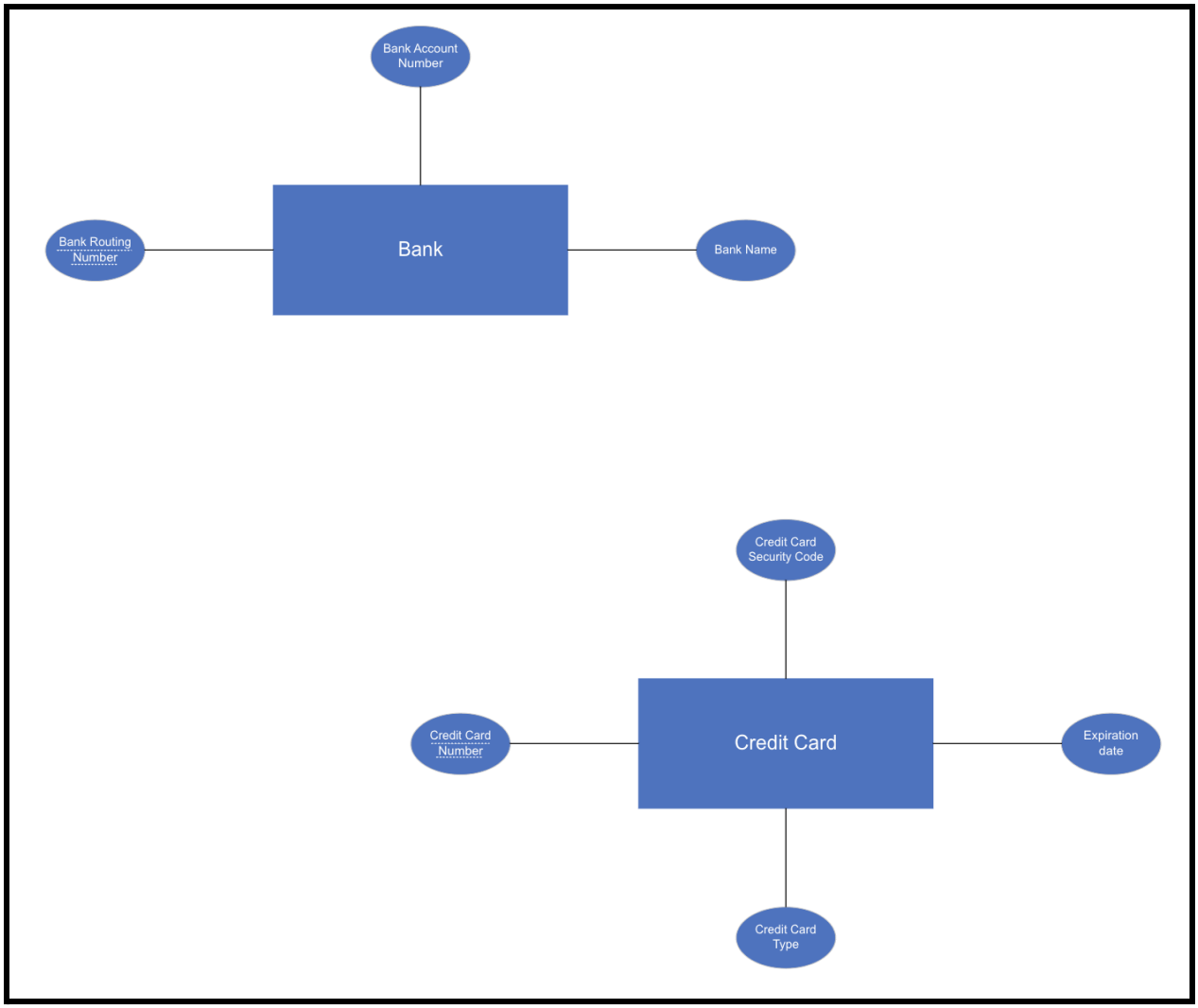


[Figure 12: Large Business Product Relationship]

Description:

Large businesses can sell big name products. Each big name product that is listed will have a BNPID which stands for big name product id. Each type of product will have their own type of ID, and each product will have their own category they fall into. Big name products have to be listed within a category and each big name product can only have one Big Name Product Category that it falls into. Big Name Product Category contains all types of categories and each category will have their own unique name. These categories can be added or removed by HelpDesk. Each category can have multiple products, but every product can only have one category.

12. Payments:

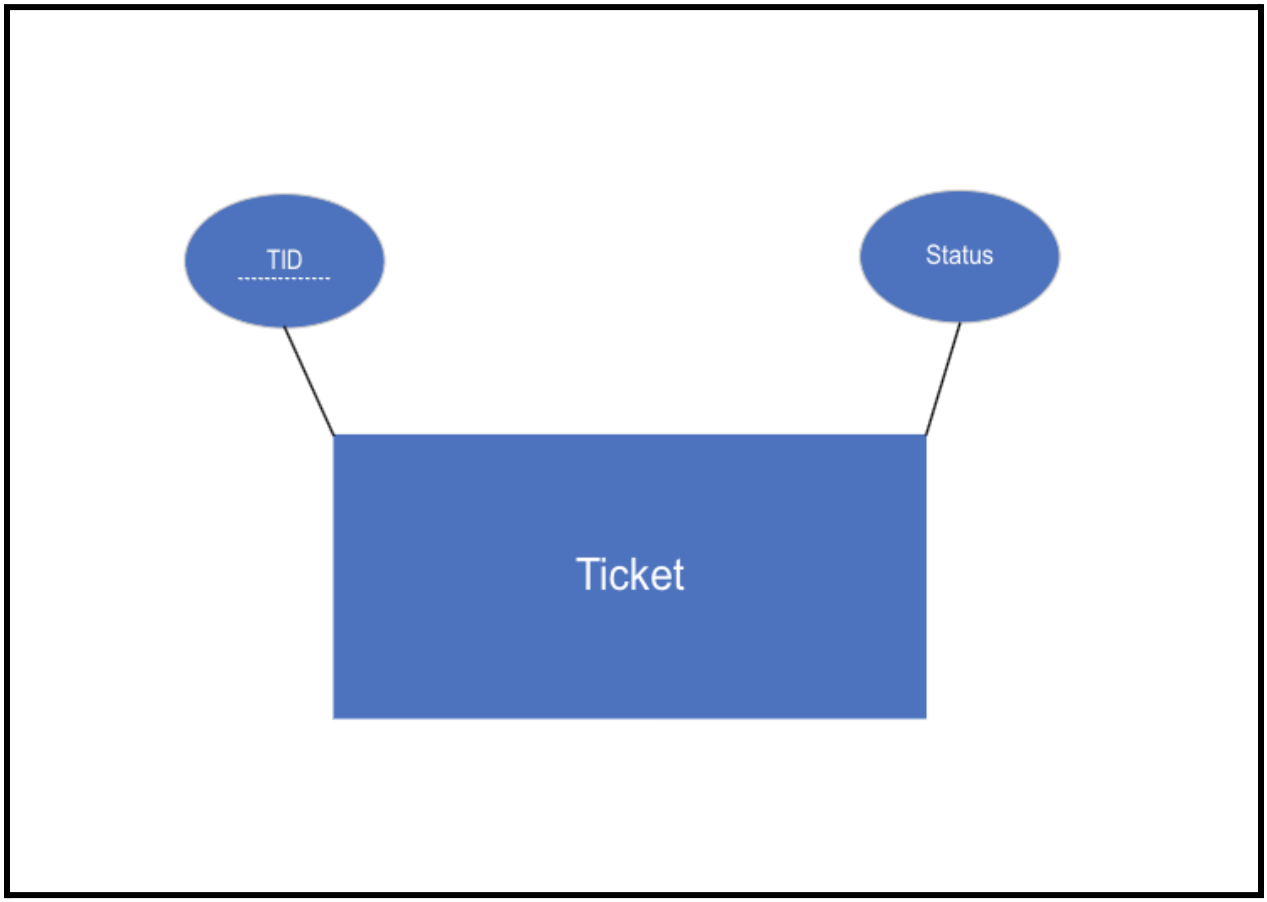


[Figure 13: Payment Attributes]

Description:

There are two types of payment methods, one is credit card payment and the other is bank payment. Normal users can choose which payment they want to use for either bidding or selling. Credit card payments have the attribute of Credit Card Number, Credit Card Security Code, Expiration Date, and Credit Card Type. Each credit card will be uniquely identified by their credit card number since no credit card can have the same number. Bank payments can have the attribute of Bank Routing Number, Bank Account Number, and Bank Name. Bank routing number will be the unique identifier since every bank account has a unique routing number. Payment relationship with a normal user also allows usage of the same card on different accounts.

13. Ticket:

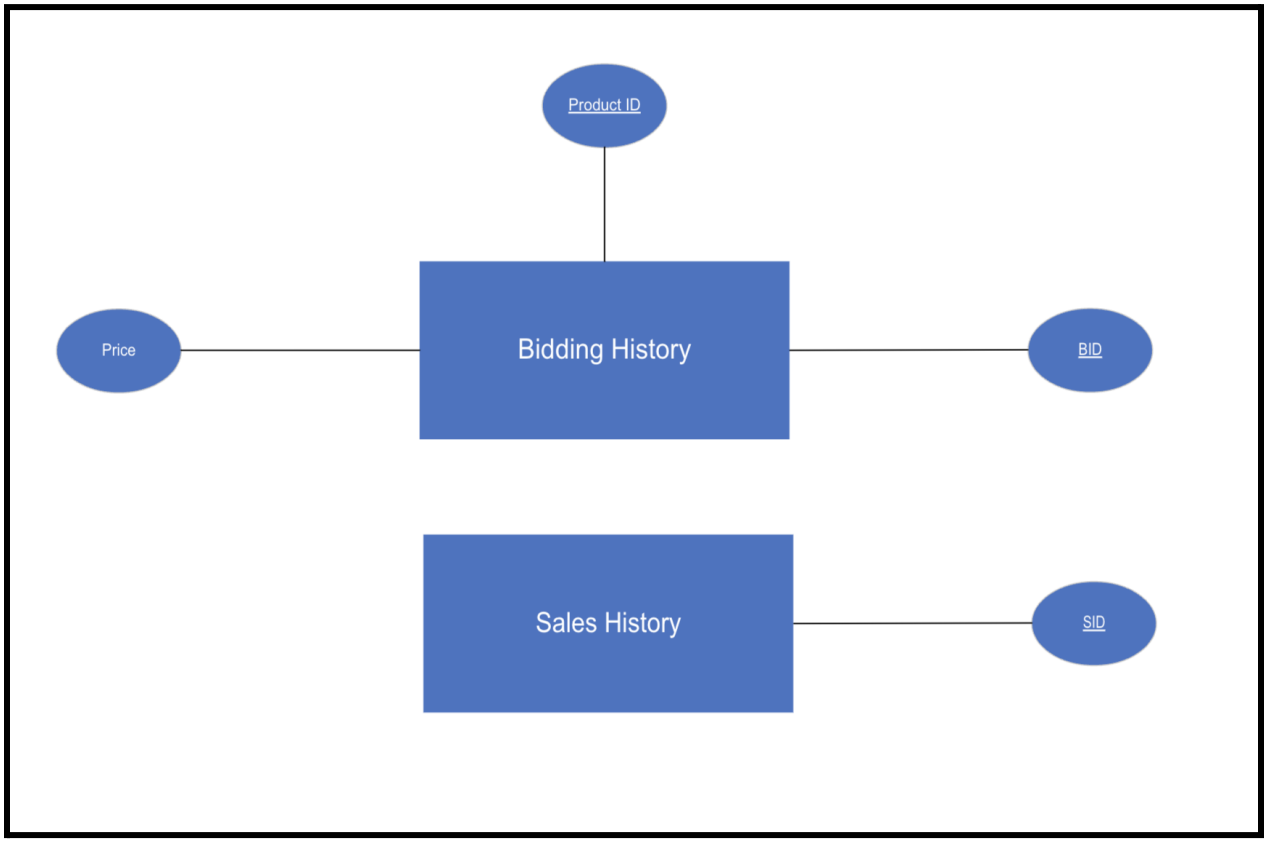


[Figure 14: Ticket Attributes]

Description:

Tickets could be sent by the user to the HelpDesk. Ticket contains attributes that are TID and status. Status refers to the current status of the ticket, HelpDesk could refer to these status to process each ticket. TID are the identifier of each ticket, every new ticket that is created will have a new TID automatically generated. Each ticket will be referred to the corresponding email by their TID.

14. History:



[Figure 15: Auction History Attributes]

Description:

All website activity will be stored no matter if the account is removed. All bids will be identified by their BID and Product ID (depending on the seller, you can have different types of Product ID), and stored within the bidding history with their Bid Prices. All sales will be identified by their SID, and stored within the sales history.

4. Technology Survey

This section provides detailed information about current IDEs and programming languages that can help develop a well organized database, and provide tools to implement useful functions in order to collect and utilize these data.

4.1 Java:

Java is a programming language that is widely used for developing web applications. It is a fast, secure, and reliable programming language for coding softwares, big data applications, Artificial Intelligence, etc.

Pros:

1. Java Code can take responsibilities in different layers of the application
2. Java contains a rich amount of user defined data types
3. Java does not harm the integrity or security of the database

Cons:

1. Java is slow and memory consuming
2. Java contains many complex syntaxes

4.2 Netbeans:

Netbeans is an IDE that provides users with a wide range of programming languages and tools, in order to design programs easily and efficiently. Netbeans also provides auto implementation for basic features so users do not have to manually code them.

Pros:

1. Wide range of programming languages (Java, Javascript, PHP, etc.)
2. Wide range of integrated features (database management, task manager, etc.)

Cons:

1. Slow debugger
2. Lack of customization
3. Inconsistent plugin compatibility

4.3 Microsoft Visual Studio Code:

Microsoft Visual Studio Code is a code editor that provides users with a wide range of tools, customizability, and extensions for their own comfort. For building databases, with the wide range of extensions that are available, development tools such as Python, Jupyter, Flask, etc. are all freely available to the user.

Pros:

1. Wide range of customization options
2. Wide range of extensions that are available to the user
3. Built in web-support
4. Available GitHub integration

Cons:

1. Not as feature rich as other IDE for application development
2. Add-on dependent

4.4 Flask:

Flask is a web framework that allows developers to develop applications easily. It runs in python and it is also a micro framework that does not contain ORM (Object Relational Manager).

Pros:

1. Provides better performance than other frameworks
2. Simple to navigate and utilize for development
3. Users can create multiple applications and distribute across all servers

Cons:

1. Lack of built-in tools
2. Extension dependent
3. Security risks

4.5 Python:

Python is a high-level object-oriented programming language. It is a dynamic typed language that offers lots of flexibility for users' needs. Python is easy to read and makes it easier for the user to debug. Python offers a wide range of library sources and can be used across many platforms.

Pros:

1. High-level programming language, easy to read and debug
2. Flexible and can be used across many platforms
3. Wide range of library resources
4. Compiled at runtime and automatically allocates memory

Cons:

1. Slower than many other programming languages such as Java
2. High memory usage
3. Lack of database support compare to Java

4.6 PyCharm IDE:

PyCharm is an IDE that proves a wide range of tools and customizability for the users' needs. It is mainly built for web, and data science development. It is only based on python, but also contains lots of extensions users can use that are also based on python.

Pros:

1. Provides user with an efficient debugger
2. Built for data science

Cons:

1. Lack of support for extension
2. No github integration
3. Lack of language support

4.7 SQLite:

SQLite is a library for C programming language, that is cross platform and compatible with most development tools. For database development, schemas are easy to develop with the installation of SQLite, with the wide range of libraries available users can develop their program in many different ways.

Pros:

1. Syntax are easy to understand
2. Efficient in speed
3. Low resource cost

Cons:

1. Unable to view data directly from file
2. Limited data ranges
3. Limited operations, unable to run multiple operation at once

4.8 My Recommendation:

I personally would recommend Microsoft Visual Studio Code, mainly due to it having the largest range of support of all types of programming languages users can navigate around. When working with a database and a website, Microsoft Visual Studio Code provides users with lots of support that are already available at stock. The fact that it can have extension to multiple languages, makes it more viable due to some languages being better in some other functionalities than the other.

5. Logical Database Design and Normalization

This section contains schemas that are based on the Conceptual Database Design that has been developed. These schemas will all be refined and reduce redundancy to the 3rd Normal Form.

5.1 Relational Schema: (ER-Diagram)

1. ***Table 1 - User:***

Email	**Password**	**Account Type**	**Street**	**Zipcode**
sample@mail.com	******	Personal	1st Street	16802

Email ⇒ (Password, Account Type, Street, Zipcode)

Zipcode	**State**	**City**
23875	PA	State College

Zipcode ⇒ (State, City)

Description:

This is the schema for users and it is in 3rd normal form. Tables for users should contain information about their Email, Password, Account Type, Street, and Zipcode. Zipcode is also a key to identify the state and city. This schema makes it so that only one email can be registered per user, and there is no need for more than one of the same zipcode stored in the database.

2. ***Table 2 - User ISA HelpDesk Account:***

SSN	**Name**	**Phone Number**	**Gender**	**Age**	**Income**
*********	John Smith	(***)***-****	M	48	$890,372

SSN ⇒ (Name, Phone Number, Gender, Age, Income)

Description:

This is a schema for HelpDesk account, it is already in the most simplified form. This schema stores SSN, Name, Phone Number, Gender, Age, and Income. Company will store these information for security measurement.

3. ***Table 3 - User ISA Normal Account ISA Personal Seller:***

SSN	Name	Phone Number	Gender	Major	Age	Income	Balance	Rating
*********	Alan Li	(***)***-****	M	CMPSC	32	$87,408	$280	4.6

SSN ⇒ (Name, Phone Number, Gender, Major, Age, Income, Balance, Rating)

Description:

This is a schema for Personal Seller account, it is already in the most simplified form. This schema stores SSN, Name, Phone Number, Gender, Age, Income, Balance, and Rating. Rating in this case will be average of all rating received, which are stored in another code generated schema.

4. ***Table 4 - User ISA Normal Account ISA Business Seller:***

Business Name	Customer Service Number	Balance	Rating
System Corp.	(***)***-****	$987,345,345	4.8

Business Name ⇒ (Customer Services Number, Balance, Rating)

Description:

This is a schema for Business Seller account, it contains the shared information of both vendor and large corporation business account. Business Name, Customer Service Number, and Balances are stored as usual. Rating in this case will be average of all rating received, which are stored in another code generated schema.

5. ***Table 5 - Bids:***

Bid_Price	Product ID	BID	Email
$89,355	89739	23	sample@mail.com

Bid_Price, Product ID, BID ⇒ (Email)

Description:

This is a schema for bids. This schema will be created for every bid that exists, it will contain all the bid prices, their assigned product, bid ID, and all the email that participated in the bid. After the auction is over, no more bids could be placed, and the system will sort through this table for a winner.

6. ***Table 6 - Bid History:***

BID	**Product ID**	**Bid_Price**
23	89793	$98,587

BID, Product ID ⇒ (Bid_Price)

Description:

This is a schema for bid history, this schema will be automatically filled in as soon as a bid is placed. Bid will not be recorded if the bidder deletes their account before the bid ends. Bid history will not be affected if the user removes their account.

7. ***Table 7 - Sale History:***

SID	**Product ID**	**Email**
38	89793	sample@mail.com

SID ⇒ (Product ID, Email)

Description:

This is a schema for sell history, this schema will be filled in by program, and sales will not be recorded if the seller deletes their account before the sale ends. Sale history will not be affected if the user removes their account.

8. ***Table 8 - Card Information:***

Card Number	**Security Code**	**Expiration Date**	**Card Type**
**********	***	8/99	Visa

Card Number ⇒ (Security Code, Expiration Date, Card Type)

Description:

This is a schema for card information, this schema contains information of the user's credit card that the user enters. This schema will be bound to the user and if the user deletes their account their card information also gets removed. Users can also freely change their card information, but users will need a payment option in order to bid or sell.

9. *Table 9 - Bank Information:*

Routing Number	**Account Number**	**Bank Name**
*********	*********	America Bank

Routing Number ⇒ (Account Number, Bank Name)

Description:

This is a schema for bank information, this schema contains information of the user's bank account that the user enters. This schema will be bound to the user and if the user deletes their account their bank information also gets removed. Users can also freely change their bank information, but users will need a payment option in order to bid or sell.

10. *Table 10 - Product Information: (Personal, Vendor, Business)*

Product ID	**Category Name**
394875	Clock

Product ID ⇒ (Category Name)

Description:

This is a schema for Product Information, and it works similarly for all personal, vendor, and business accounts. The only difference is the column name will be different but still works the same way. Every product will be identified by their product ID and they are all assigned to one category each. One category can have multiple products, but each product can only belong to one category. When the user owns the product deletes their account, their product and all their listing and bidding information will also be deleted.

11. *Table 11 - Rating Schema:*

SID	**Email**	**Rating**
48	sample@mail.com	4

SID ⇒ (Email, Rating)

Description:

This is a schema that will be generated by code, it will contain information about the sale and the person who rated for that sale. All sale's ratings will be tracked within this schema. Only the winner of the sale who paid can rate.

12. Table 12 - Product:

Email	**Product ID**	**Quantity**
sample@mail.com	3498676	90

Email ⇒ (Product ID, Quality)

Description:

This is a schema that will track the information about the product that the seller is selling. The seller is able to sell multiple of this product, but has to auction all of them at once.

13. Table 13 - Question:

Email	**SID**	**Info**
sample@mail.com	48	Context

Email, SID ⇒ (Info)

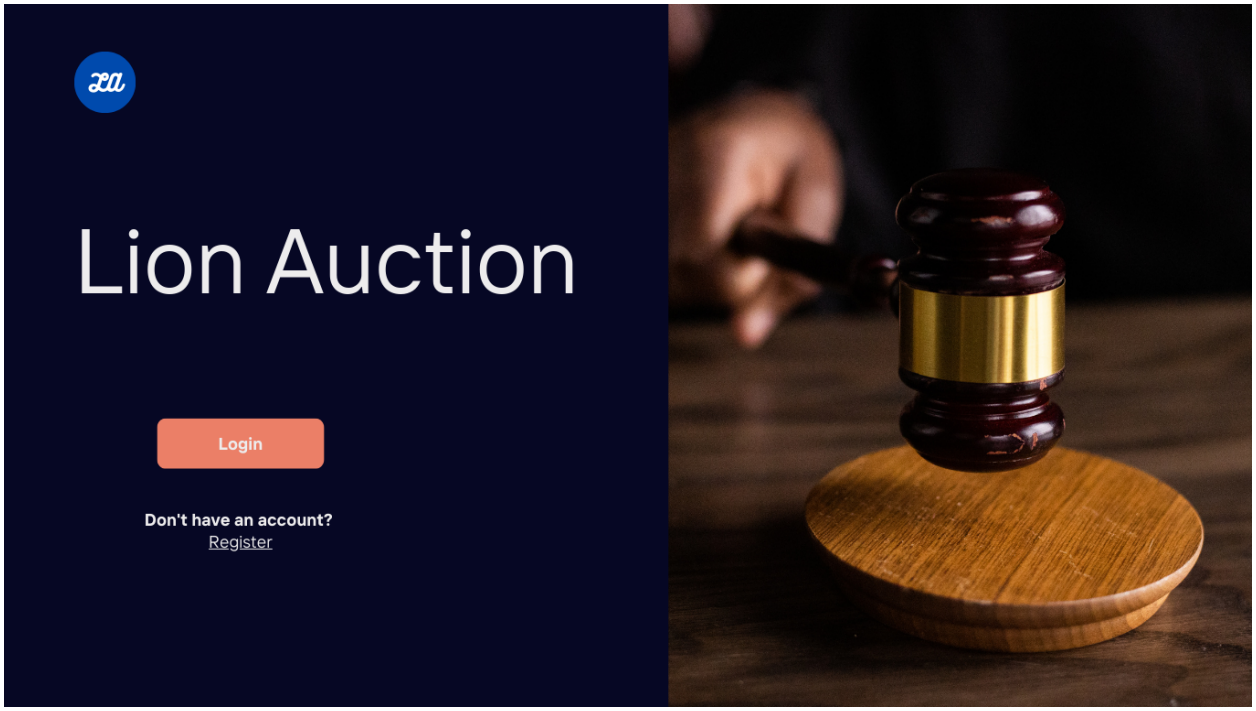
Description:

This schema tracks all the information that is being sent between the bidder and the seller. Bidders will be able to send information to the seller and that information will be stored in order for the seller to view.

6. Project Visualization

This section contains images of the prototype websites

6.1 Login Page:

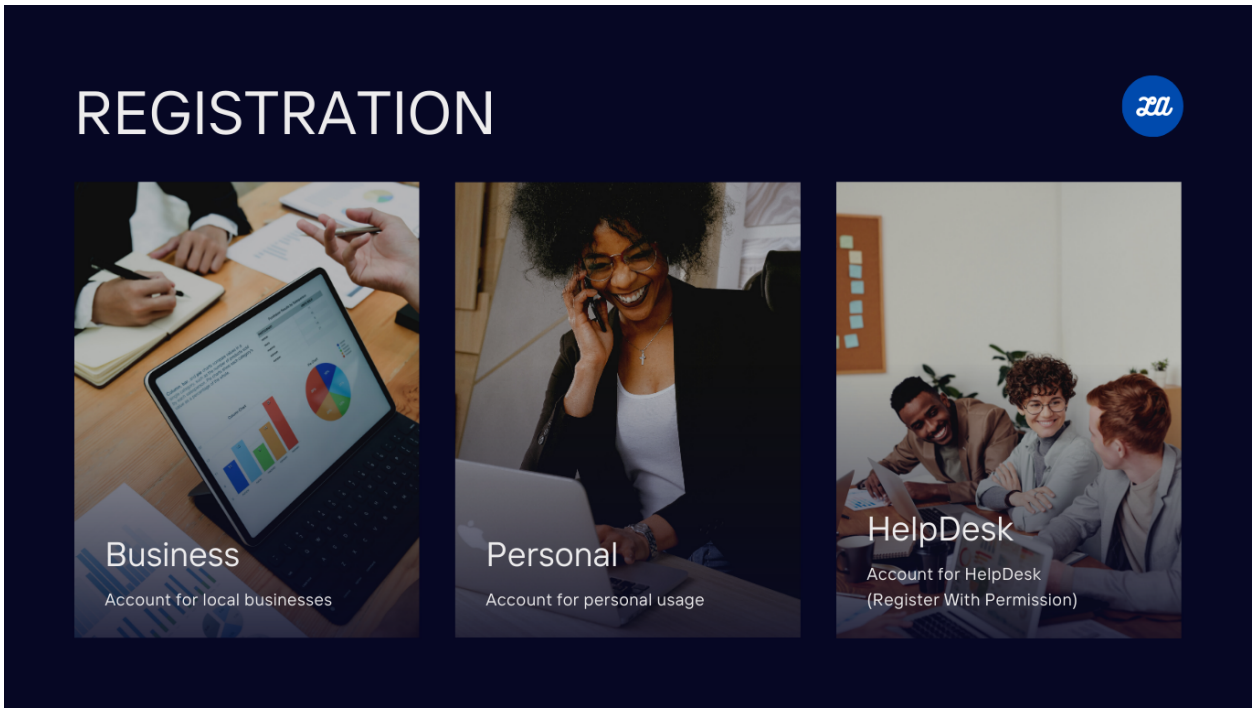


[Figure 16: Login Page]

Description:

This is the login page of the website, when a user arrives at this website, they can either select to login or register for an account.

6.2 User Registration Page:



[Figure 17: Registration Page]

Description:

This is the registration page of the website, user can register accounts base on what they are using it for. HelpDesk accounts can only be registered if given permission by the administrator. It is still an option for registration, but the user needs access code given by the administrator to continue. Other than help desk account, user can also register for their own company or personal use.

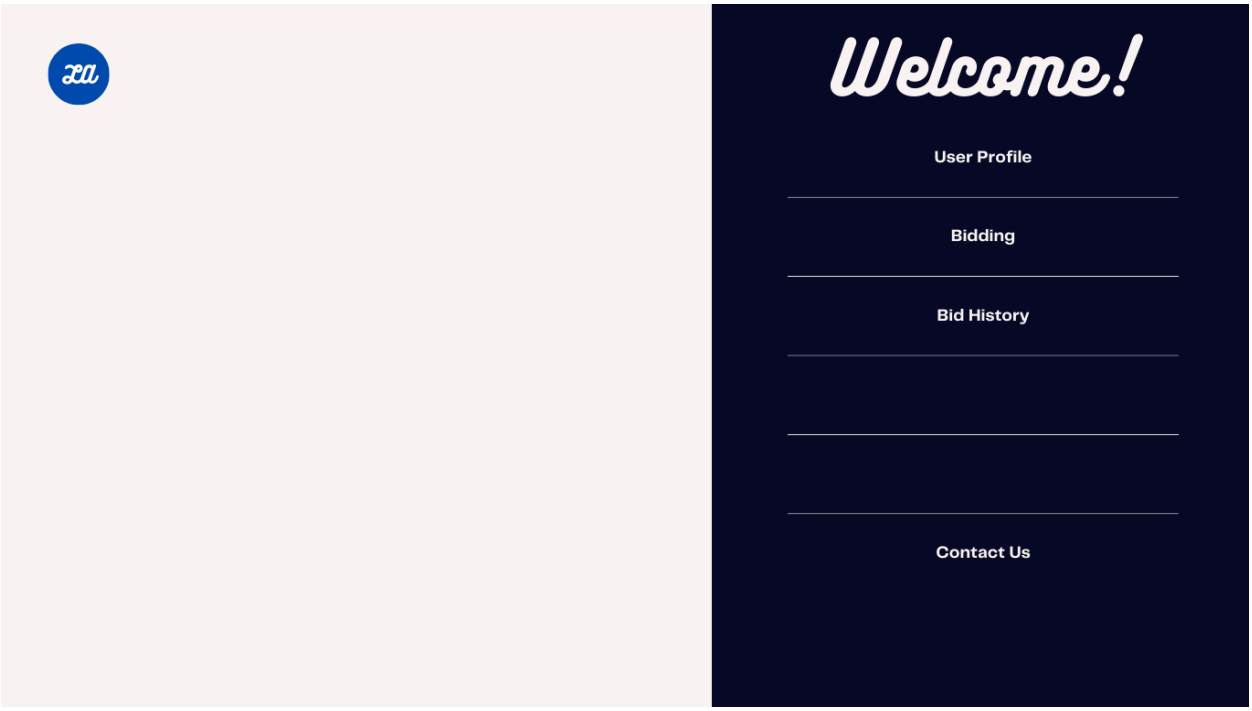
6.3 Business Registration Page:

[Figure 18: Business Registration Page]

Description:

This is the registration page dedicated to businesses, user can choose between registering for a large corporation or as a local vendor. Information user needs to register is similar for both of these accounts, but product they are able to sell will be affected by the account they choose to register.

6.4 Bidder Home Page:

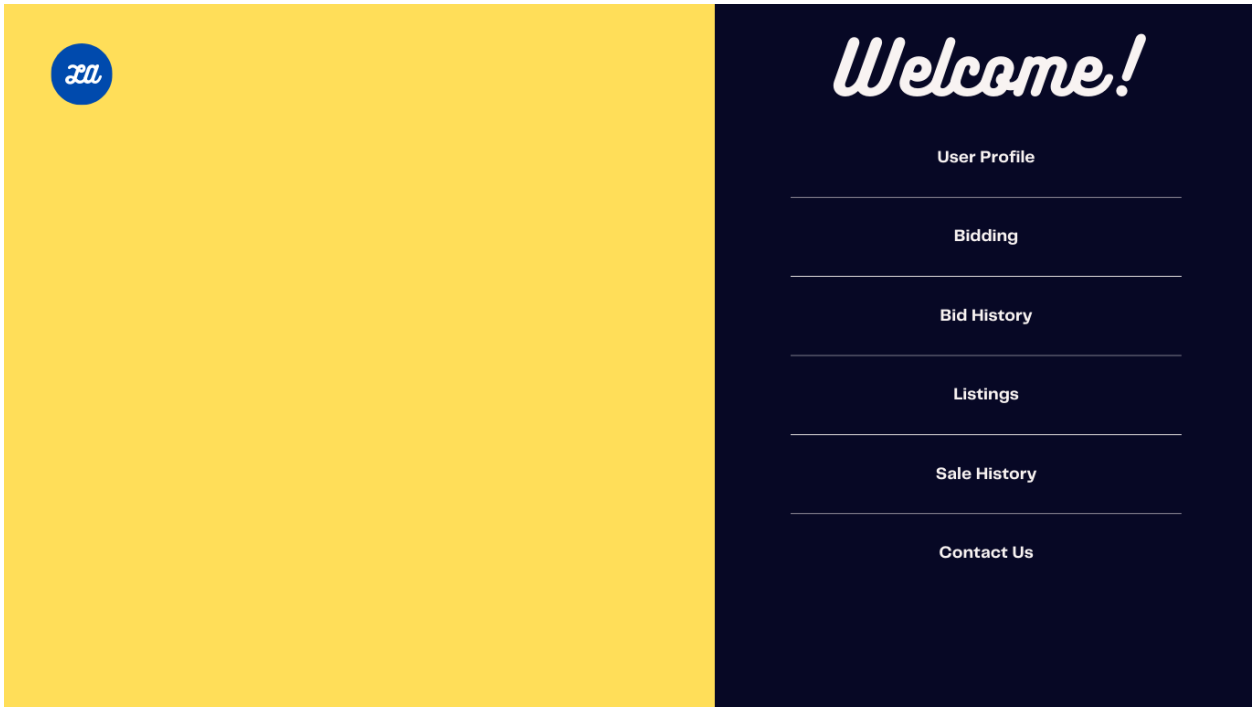


[Figure 19: Bidder Home Page]

Description:

This is the home page for newly registered accounts, users will be limited to a certain amount of options. Newly registered users will be automatically viewed as a bidder, users will have access to bidding and bid history. Users can also change their personal information via User Profile, and users can also contact HelpDesk through Contact Us selection on the homepage.

6.5 Seller Page:

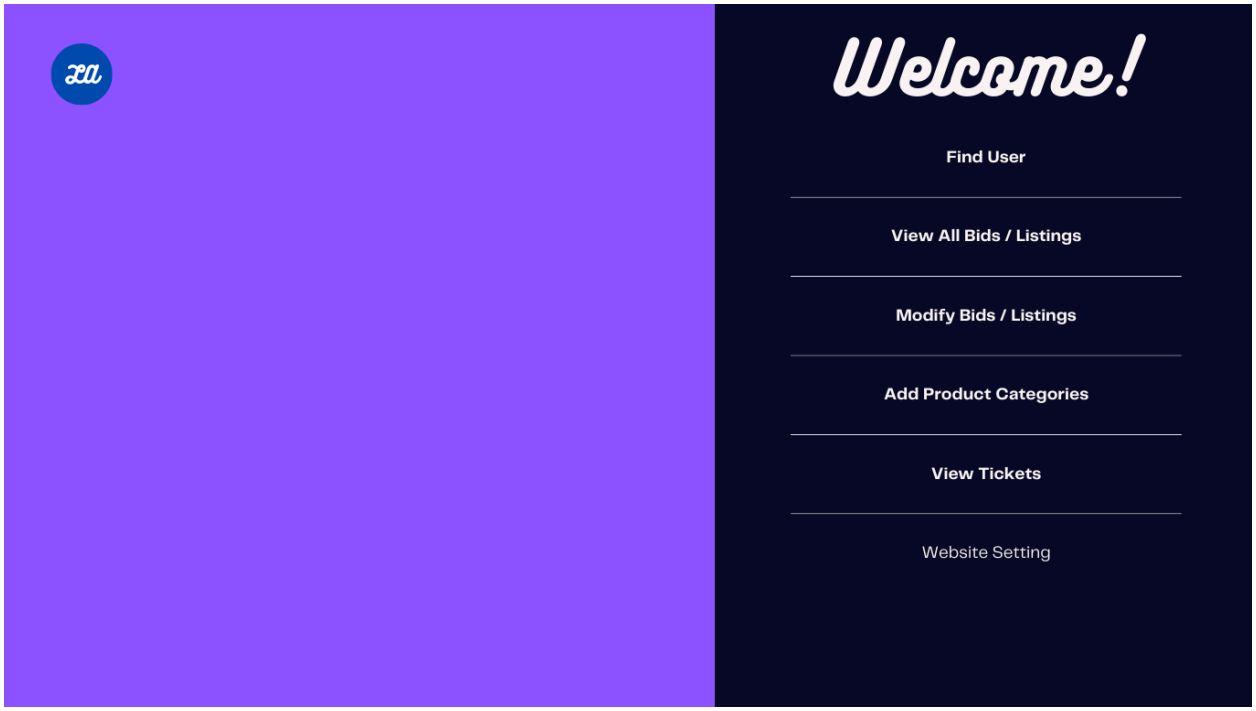


[Figure 20: Seller Home Page]

Description:

This is the home page for sellers, users will be open to all possible options for a normal user. They will still have access to bidding and bidding history, but sellers can also list products they want to sell, and also view their sale history. Sellers can still change their personal information via User Profile, and contact HelpDesk through Contact Us selection on the homepage.

6.6 HelpDesk Page:

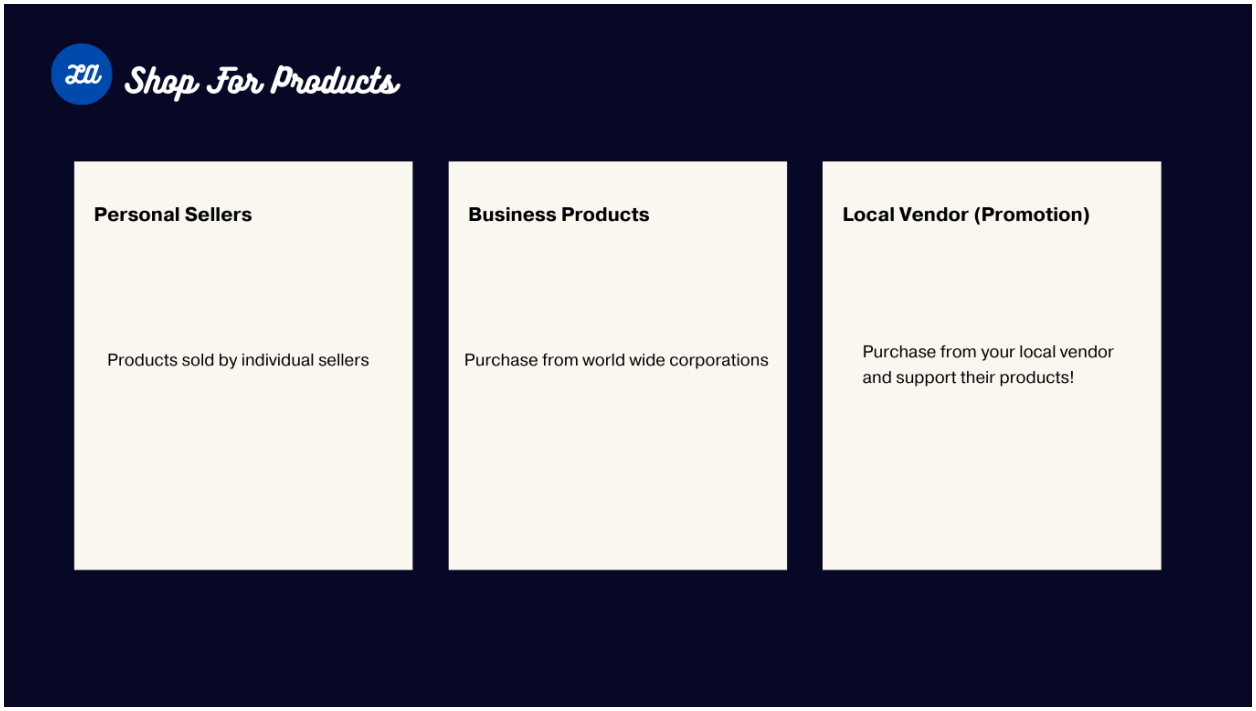


[Figure 21: HelpDesk Home Page]

Description:

This is the homepage for HelpDesk members, HelpDesk members contain different functionality than normal registered users. HelpDesk members can find a user that is contained within the database and view their information. They have access to all bids and listings and are able to modify these bids and listings in case of any issue that occurs. They are also able to add categories for products, view tickets that were sent to them, and are able to control the setting of the website for all clients.

6.7 Bidding Page:

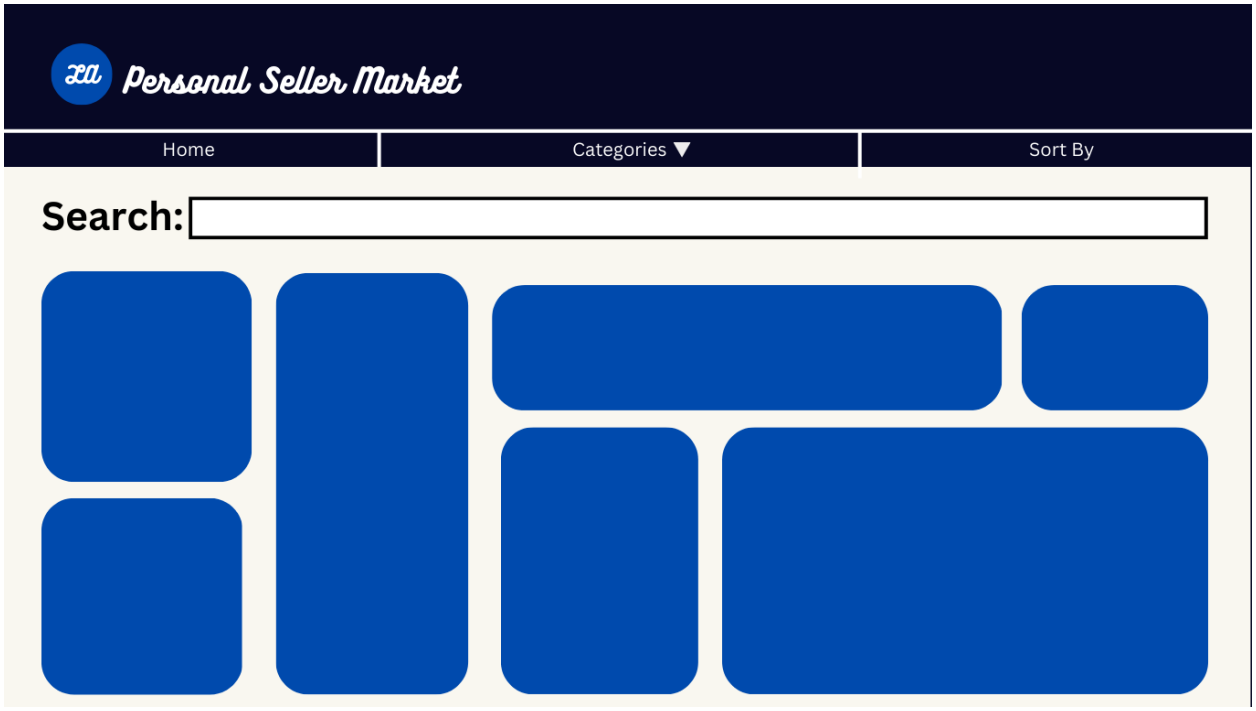


[Figure 22: Shopping Selection Page]

Description:

This page is used for selecting the source of the product users want to bid for. The users can either choose between personal sellers, business products form large corporations, or promotional products from their local vendors.

6.8 Individual Seller Bidding Page:



[Figure 23: Personal Seller Market Page]

Description:

Personal products will be shown as pictures within these blue boxes. Users on this webpage will be able to navigate through all the products that are currently available for auction, they can also search for items they want to bid via search box. Users can also go to the home page, select categories, and sort all products by the selections on top.

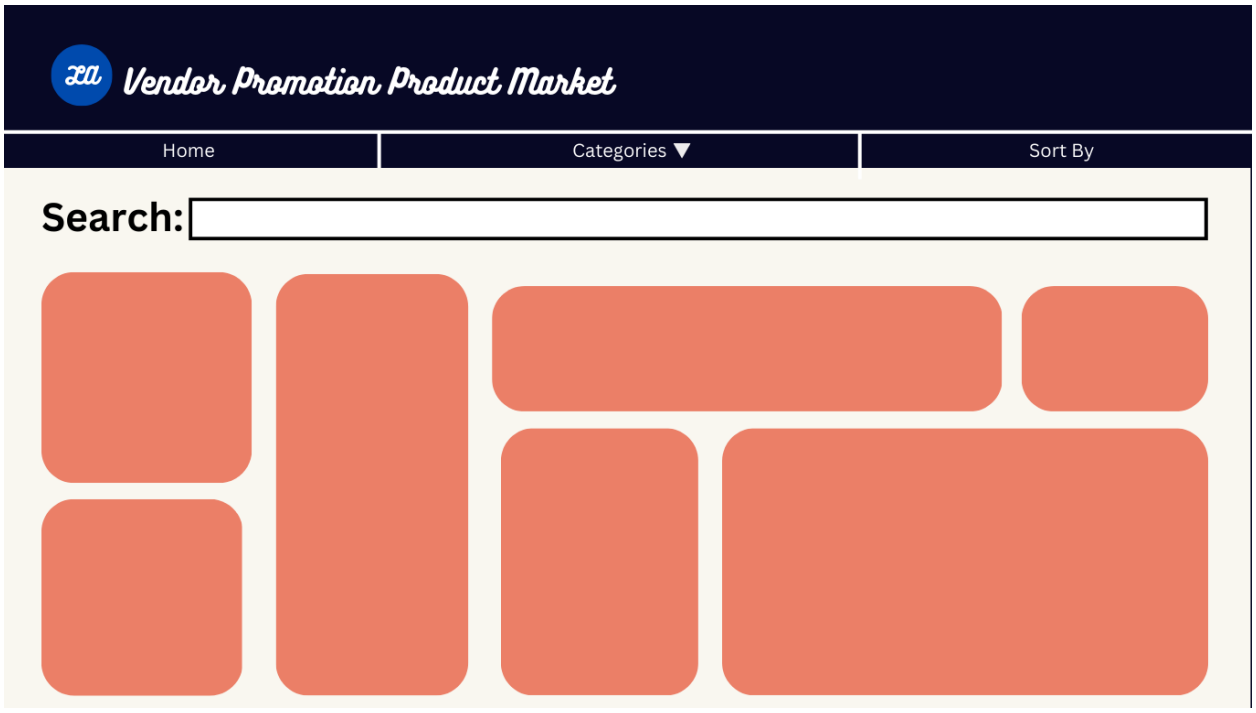
6.9 Large Corporation Bidding Page:

[Figure 24: Corporation Product Market Page]

Description:

Large Corporation products will be shown as pictures within these green boxes. Users on this webpage will be able to navigate through all the products that are currently available for auction, they can also search for items they want to bid via search box. Users can also go to the home page, select categories, and sort all products by the selections on top.

6.10 Vendor Product Bidding Page:

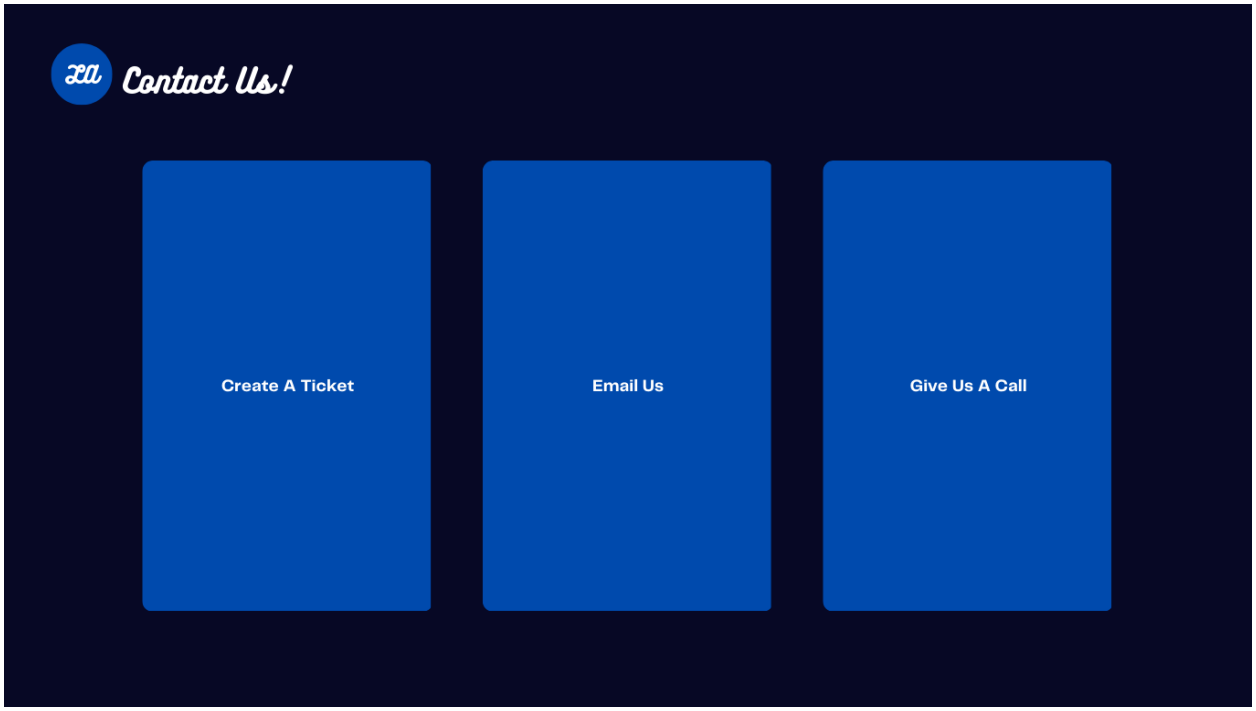


[Figure 25: Vendor Promotional Product Market Page]

Description:

Promotional products from vendors will be shown as pictures within these orange boxes. Users on this webpage will be able to navigate through all the products that are currently available for auction, they can also search for items they want to bid via search box. Users can also go to the home page, select categories, and sort all products by the selections on top.

6.11 HelpDesk Support Page:



[Figure 26: HelpDesk Support Page]

Description:

This page is dedicated to the support function of the website. Users can access this webpage by selecting the “contact us” option at the home page. Here users can choose to send a ticket directly from the website to the support members, send an email to the support team, or call the support team with the customer support phone number.

7. Appendix

7.1 Project Timeline

- Released - 1/30/2023
- Idea Drafting - 1/30/2023 to 2/8/2023
- Rough Draft - 2/8/2023 to 2/14/2023
- Milestone 1 Part (1,2,3,4) - 2/15/2023 to 2/24/2023
- Milestone 2 Part (5,6) - 2/25/2023 to 2/27/2023
- Milestone 3 Part (7,8,9) - 2/28/2023 to 3/1/2023
- Final Draft - 3/1/2023
- Delivery - 3/3/2023

7.2 Definitions

- **Constraints** - Rules that limites occurrence of events
- **Relationship** - Relation between entity sets
- **Entity Set** - A collection of entities
- **ER-Diagram** - Entity and relationship diagram
- **Relational Schema** - Set of tables that are related to each other
- **ISA Hierarchy** - Entity sets connected below ISA is inherited by the entity set that is connect to the top of ISA
- **Strong Entity** - Owner of the weak entity, it contains the primary key to identify the weak entity
- **Weak Entity** - Entity that can be identified uniquely only by the primary key of the other entity
- **Total Participation** - All entity within the entity set has to participate at least once in the relationship
- **Attributes** - Descriptive properties of each entity
- **Entity** - Real-world object distinguishable from other objects
- **Foreign Key** - Set of fields in one relation that can be used to refer to a tuple in another relation

8. Reference

Basic Information:

1. CMPSC 431W Course Material

Technology Survey:

Java:

1. https://aws.amazon.com/what-is/java/#:~:text=Java%20is%20a%20widely%2Dused,as%20a%20platform%20in%20itself.
2. https://infocenter.sybase.com/help/index.jsp?topic=/com.sybase.dc31652_1251/html/java/X32107.htm

Netbeans:

1. https://netbeans.apache.org/about/index.html#:~:text=Most%20developers%20recognize%20the%20NetBeans,%2B%2B)%20will%20be%20incorporated%20soon.
2. https://www.quora.com/What-is-the-pros-and-cons-of-Netbeans-IDE-for-web-development
3. https://www.quora.com/What-are-the-advantages-and-disadvantages-of-NetBeans-and-Eclipse

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1. https://pythonbasics.org/what-is-flask-python/
2. https://www.quora.com/What-are-the-advantages-and-disadvantages-of-using-Flask-as-a-web-framework

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1. https://www.python.org/doc/essays/blurb/
2. https://www.linode.com/docs/guides/pros-and-cons-of-python/

Pycharm:

1. https://www.jetbrains.com/help/pycharm/quick-start-guide.html

SQlite:

1. https://www.sqlite.org/index.html
2. https://www.trustradius.com/products/sqlite/reviews?qs=pros-and-cons#reviews

3. https://www.quora.com/What-are-the-disadvantages-of-SQLite

Diagram Images:

1. All images for Conceptual Database Design is created by me

Website Prototype:

1. All websites are created by myself using https://www.canva.com/
2. All images that are used to create website template are stock photo provided by https://www.canva.com/