TECHFAM

CMPSC 431W

Phase Two: Shoe Retailers' Database

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1. INTRODUCTION

When forming our startup, we considered several different items to sell. We wanted to distribute a popular product that was easy to categorize for simple website navigation. We brainstormed and decided to join the $52-billion-dollar shoe industry. [5]

After choosing to create an online shoe store, we looked at competing companies to see how they displayed their products. We noticed Amazon provides a name, description, price, image, company name, delivery information, and availability (sometimes including number in stock). [1] While looking at eBay, we found additional important details, like current bid amounts and condition of the product. [3] This gave us a general idea of what information we needed to store for each sales item.

Next we looked directly at the competition, and began browsing shoe sites. We noticed that stores like Designer Shoe Warehouse allowed you to search for shoes based on category, brand, size, and color. [8] We also discovered that shoe stores often sell other products like socks, backpacks, and shoe care items. [2]

Using our knowledge on Database Management Systems we will develop an envisioned model that helps customers shop for shoes in the most intriguing way possible. We will meet the following requirements described further in this analysis.

2. ANALYSIS AND CONCEPTUAL DESIGN

2.1. Sales Item

With our initial research complete, we designed the **Sales_Item** entity to represent each product (See Figure 1). It is identified by its unique key, *item_id*. Every sales item has a *name* and *description* so sellers can properly market their product. We added a *brand* attribute so users can search for their favorite brands (See Section 2.7). Each sales item has two prices recorded, the *list_price* and the *reserved_price*, which are explained in more detail in Section 2.8 and 2.9. The *state* attribute describes the quality of used products. Finally, the *count* attribute tracks how many items are in stock.

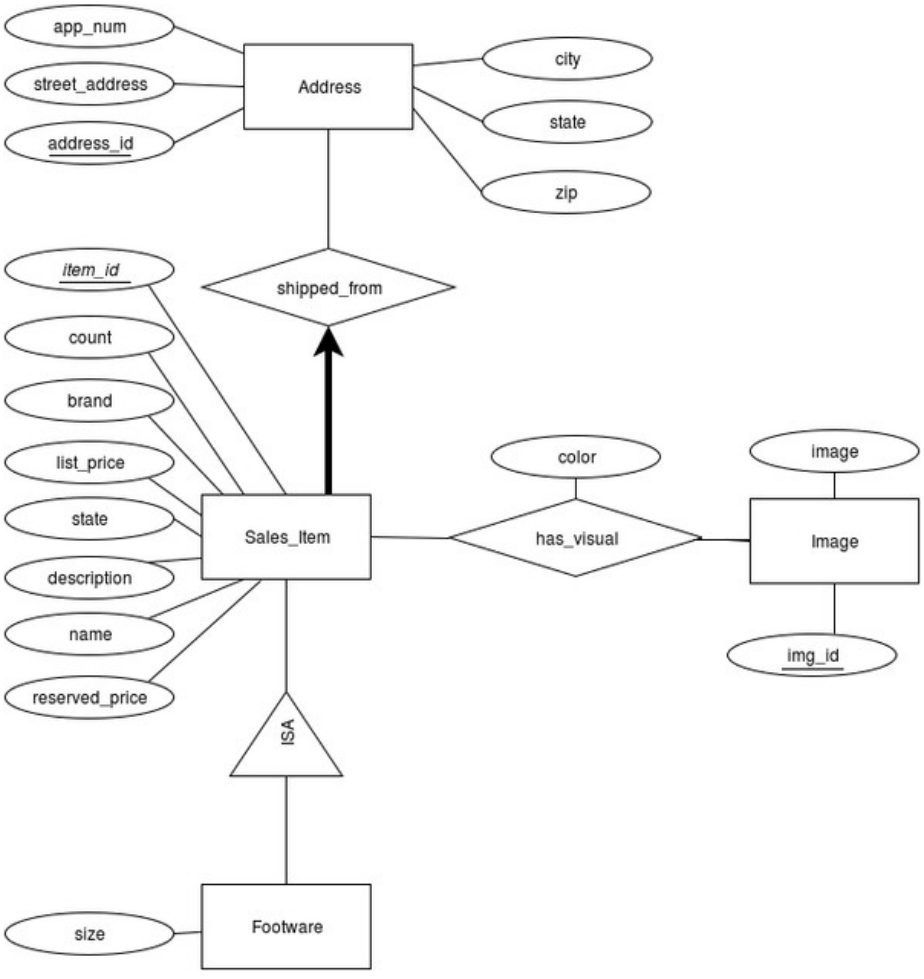


Figure 1 – Sales_Item, Footwear, Address, and Image ER Diagram

The ER diagram displayed in Figure 1 was later converted into a table in our database (See Figure 2), with **Sales_Item** set as the name of the table. *Item_id* was set as the primary key and is stored as an integer value. The rest of the attributes were added as regular columns, where *count* was set as an integer, *brand*, *state*, *description* was set as string values. Also, the *list_price* and *reserved_price* was added as decimal values, only allowing 2 digits after the decimal, thus using the notation for currency.

```
mysql> CREATE TABLE Sales_Item
    -> ( item_id        INTEGER,
    ->   count          INTEGER,
    ->   brand          CHAR(20),
    ->   list_price     DECIMAL(7,2),
    ->   state          CHAR(20),
    ->   description    CHAR(128),
    ->   name           CHAR(20),
    ->   reserved_price DECIMAL(7,2),
    ->   category_id    INTEGER NOT NULL,
    ->   supplier_id    INTEGER,
    ->   address_id     INTEGER NOT NULL,
    ->   PRIMARY KEY (item_id),
    ->   FOREIGN KEY (category_id) REFERENCES Category (category_id),
    ->   FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id),
    ->   FOREIGN KEY (address_id) REFERENCES Address (address_id));
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> ALTER TABLE Sales_Item MODIFY description VARCHAR(999);
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

Figure 2 – Sales_Item SQL Table

Like other shoe websites, we wanted to sell non-shoe items. We provide bags, sunglasses, shoe care items, and socks. Bags, sunglasses, and care items can be fully described by the **Sales_Item** entity, but socks and shoes require additional information. As a result, we created the **Footwear** entity (See Figure 1) to account for these missing fields, which includes the *size* attribute (for socks and shoe size).

In order to show this ISA relationship in the database, we made a new table called **Footwear** (See Figure 3), where a foreign key (*item_id*) from the **Sales_Item** table is used as the primary key. That way, every **Footwear** field is required to have a corresponding **Sales_Item** field, which holds the rest of the data for the **Footwear** field. We also added ON DELETE CASCADE line to the foreign key, so that if the **Sales_Item** field is deleted, the **Footwear** item field that corresponds to the given

Sales_Item will also be deleted. Lastly, the **Footwear** table has a column called size which holds the size of the shoe (recorded as a string).

```
mysql> CREATE TABLE Footwear
    -> ( size    CHAR(20),
    ->   item_id INTEGER,
    ->   PRIMARY KEY (item_id),
    ->   FOREIGN KEY (item_id) REFERENCES Sales_Item (item_id)
    ->   ON DELETE CASCADE);
Query OK, 0 rows affected (0.03 sec)
```

Figure 3 – Footwear SQL Table

Next, **Sales_Items** require information that is too complex to represent as attributes. The **Address** was created as a separate entity because attributes may be reused by other entities, such as users and shipping. Note that every **Sales_Item** is required to have exactly one address. Attributes of the **Address** entity include the *street_address*, *app_num* (apartment number), *city*, *state*, and *zip_code*. Each **Sales_Item** has its own visual, where color is an attribute of the relationship between the S**ales_Item** and the visual. This attribute allows the user to filter out products when searching or browsing, based on the color of bag, shoe, or sock that they desire (See sections 2.7 and 2.8). Visual is represented by the ***Image*** entity (See Figure 1). Every ***Sales_Item*** can have one or more image, which will be displayed on each product's webpage. Each image has a unique *img_id*, as well as an *image* attribute, which holds the actual photo data.

As shown in the Figure 1, the **Address** entity is too complex to be record as a single attribute, so it was turned into its own table called **Address** (See Figure 1). Again, the primary key is the *address_id* (set as an integer) and the rest of the attributes are recorded as strings (or as an integer for zip) in the table. Since a **Sales_Item** is required to have exactly one **Address**, we added an *address_id* foreign key to the **Sales_Item** table, and force all entries in that column to be not null. That way, every field in **Sales_item** will have an address. Note that an address does not necessarily have to have a relationship with a **Sales_Item**.

```
mysql> CREATE TABLE Address
    -> ( address_id     INTEGER,
    ->   app_num        CHAR(20),
    ->   street_address CHAR(40),
    ->   city           CHAR(20),
    ->   state          CHAR(20),
    ->   zip            INTEGER,
    ->   supplier_id    INTEGER,
    ->   PRIMARY KEY (address_id),
    ->   FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id));
Query OK, 0 rows affected (0.03 sec)
```

Figure 4 – Address SQL Table

The **Image** table (Figure 5) on the other hand, only needs a primary key *image_id* (integer) and a column of *image* blobs. As shown in the ER diagram, there is a many-to-many relationship between **Sales_Item** and **Image**, so the **has_visual** table was created to record this relationship. In the **has_visual** table (Figure 6), the primary keys of a **Sales_item** and **Image** are stored, and the combination of these two foreign keys act as the primary key of the table. In addition, the relationship in the ER diagram contains the attribute *color*. This was added to the table and is represented as a column of strings.

```
mysql> CREATE TABLE Image
    -> ( img_id INTEGER,
    ->   image  BLOB,
    ->   PRIMARY KEY (img_id));
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> ALTER TABLE Image MODIFY image LONGBLOB;
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

Figure 5 – Image SQL Table

```
mysql> CREATE TABLE has_visual
    -> (
    ->   item_id INTEGER,
    ->   img_id INTEGER,
    ->   color CHAR(20),
    ->   PRIMARY KEY (item_id, img_id),
    ->   FOREIGN KEY (item_id) REFERENCES Sales_Item (item_id),
    ->   FOREIGN KEY (img_id) REFERENCES Image (img_id)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 6 – has_visual SQL Table

2.2. Categories

There is a variety of footwear to categorize. This categorization will dictate the databases needed for this online business. TechFam must distribute enough styles of footwear to become a central hub for all individuals looking to purchase shoes. However, it is critical to be efficient when creating the databases, avoiding any data redundancies.

TechFam's shoe selection targets people of all genders and ages. As a result, the root node, "All," must have three children, "Men", "Women", and "Kids". The children nodes of these three nodes are categories of the different types of shoe, such as "Boots," "Sneakers," etc. Next, the different types of shoes are broken down even further by subtypes. In addition to the first three children nodes, there is a fourth node, "Accessories," contains items that are not shoes. See Appendix C for an in-depth visualization of the categories.

We researched a few different shoe websites to obtain the categories. Zappos[7] is a general shoe distributor that contains the vastest selection, contributing to the majority of our category ideas. JustFab [11] delved deep into the various types of women's shoes.

The ER diagram in Figure 10 explains the basic outline for how each category will be stored in the database. **Categories** have primary key, *categoryID*, to uniquely identify each other. The *description* attribute briefly details the kind of product that is contained within the category itself. Note that there are relationships between the category and its parent node and children node(s) which follow the classification tree in Appendix C. Each child node points to its parent, and can have a max of one parent. The parent, on the other hand, can have multiple children. This is shown by the **Parent_of** relationship.

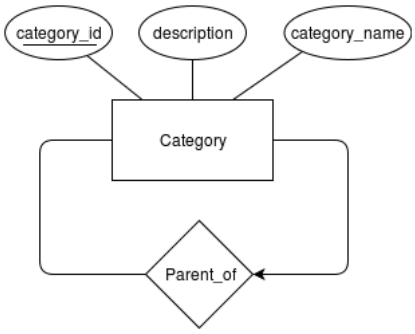


Figure 7 – Category ER Diagram

When this ER Diagram was converted into a table, the **Category** entity and the **Parent_of** relationship were combined into one table called **Category**. This table uses the *category_id* **(**integer) as

the primary key, and contains *description* and *category_name* columns. These components make up the **Category** entity section of the table. Next, the *parent_id* was added so that each child could identify its parent **Category** field. Since *parent_id* is an attribute, we guarantee that each child can only have a max of one parent (or no parent at all if it's the root node), while parents can still have multiple children.

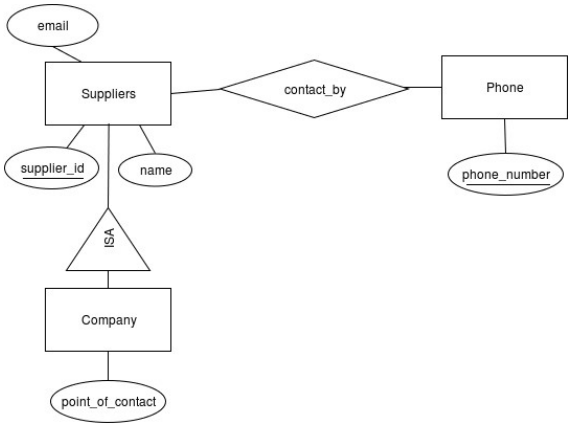
```
mysql> CREATE TABLE Category
    -> ( category_id   INTEGER,
    ->   description   CHAR(128),
    ->   category_name CHAR(20),
    ->   parent_id     INTEGER,
    ->   PRIMARY KEY (category_id),
    ->   FOREIGN KEY (parent_id) REFERENCES Category (category_id));
Query OK, 0 rows affected (0.03 sec)
```

Figure 8 – Category SQL Table

There is one more important relationship in the ER diagram called **member_of**. This shows that every **Sales_Item** is required to have an identifying category. This relationship was merged with the **Sales_Item** table (Figure 2) with the *category_id* column. This is a foreign key that points to the **Category** the **Sales_Item** is a member of. Note also that *category_id* is set to NOT NULL, so that every **Sales_Item** is required to have a **Category**.

2.3. Suppliers

Suppliers is a parent entity of both companies and registered users. A **Suppliers** job is to sell shoes that they manufacture on our website. The attributes for the **Suppliers** entity include the *supplier_id*, *email* and *name*. The supplier is assigned a *name* and is used to identify the supplier.




```
mysql> CREATE TABLE Suppliers (
    ->     supplier_id INTEGER,
    ->     email CHAR(40),
    ->     name CHAR(20),
    ->     PRIMARY KEY (supplier_id)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

Figure 9 – Suppliers, Company, Phone ER Diagram **Figure 10 – Suppliers SQL Table**

Multiple phone numbers of the suppliers is also recorded, as represented by the **contact_by** relationship. The point of contact helps the customer contact the seller in case there are any questions or concerns. This relationship requires two additional tables (besides the **Supplier** table). The first table is the **Phone** table, which simply has a primary key of phone number. The second table is the **contact_by** table. This table takes two foreign keys, the primary key of **Suppliers**, and the primary key of **Phone**. Then it will match a given phone number with a supplier. The primary keys of this table is the combination of both foreign keys.

```
mysql> CREATE TABLE Phone (
    ->     phone_number INTEGER,
    ->     PRIMARY KEY (phone_number)
    -> );
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> CREATE TABLE contact_by
    -> (
    ->  phone_number INTEGER,
    ->  supplier_id INTEGER,
    ->  PRIMARY KEY (phone_number, supplier_id),
    ->  FOREIGN KEY (phone_number) REFERENCES Phone (phone_number),
    ->  FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id)
    -> );
Query OK, 0 rows affected (0.04 sec)
```

Figure 11 – Phone SQL Table **Figure 12 – contact_by SQL Table**

The supplier also has an **Address**, shown by the *location_adddress* relationship. A **Supplier** can have many addresses, but an **Address** can only point to a single **Supplier.** Therefore, there is a one-to-many relationship between **Suppliers** and **Address**. The database records this information by adding the *supplier_id* attribute to the **Address** table (Figure 4), which points to the primary key of a **Supplier**.

2.4. Company

Company is a child entity of **Supplier**. It contains all the information of supplier, with the addition of the *point_of_contact* attribute, which is the name of the person to contact for the given company. **Company** can use the name attribute of **Suppliers** to record the company name, and also use the email attribute as well as the phone and address relationships to record where the company is located, and how to contact them. An important thing to note is that companies cannot buy products; they can only sell.

The **Company** table is fairly simplistic. It uses the **Supplier's** *supplier_id* as its primary key. If the **Supplier's** field is deleted, the corresponding **Company's** field will also be deleted. The **Company** table also has the *point_of_contact* column, which stores strings.

```
mysql> CREATE TABLE Company (
    ->     point_of_contact CHAR(20),
    ->     supplier_id INTEGER,
    ->     PRIMARY KEY (supplier_id),
    ->     FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id) ON DELETE CASCADE
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 13 – Company SQL Table

2.5. Registered Users

Registered_Users is the second child entity of **Suppliers**. Along with selling products, **Registered_Users** can bid or directly buy shoes. This feature asks the user to fill out the following information while they register:

- A user ID or username, which helps users stay anonymous and allows us to identify them.
- A password to secure their account.
- Gender.
- An email and multiple phone numbers as a mode of contact to the registered user. Although these information are located in the in the **Supplier** entity.
- Multiple credit cards and addresses of the registered user, which helps process payments, billing information, and return information.

- Age and income is used to calculate a statistics for each user. The income here stands for the income the user has made on our website.

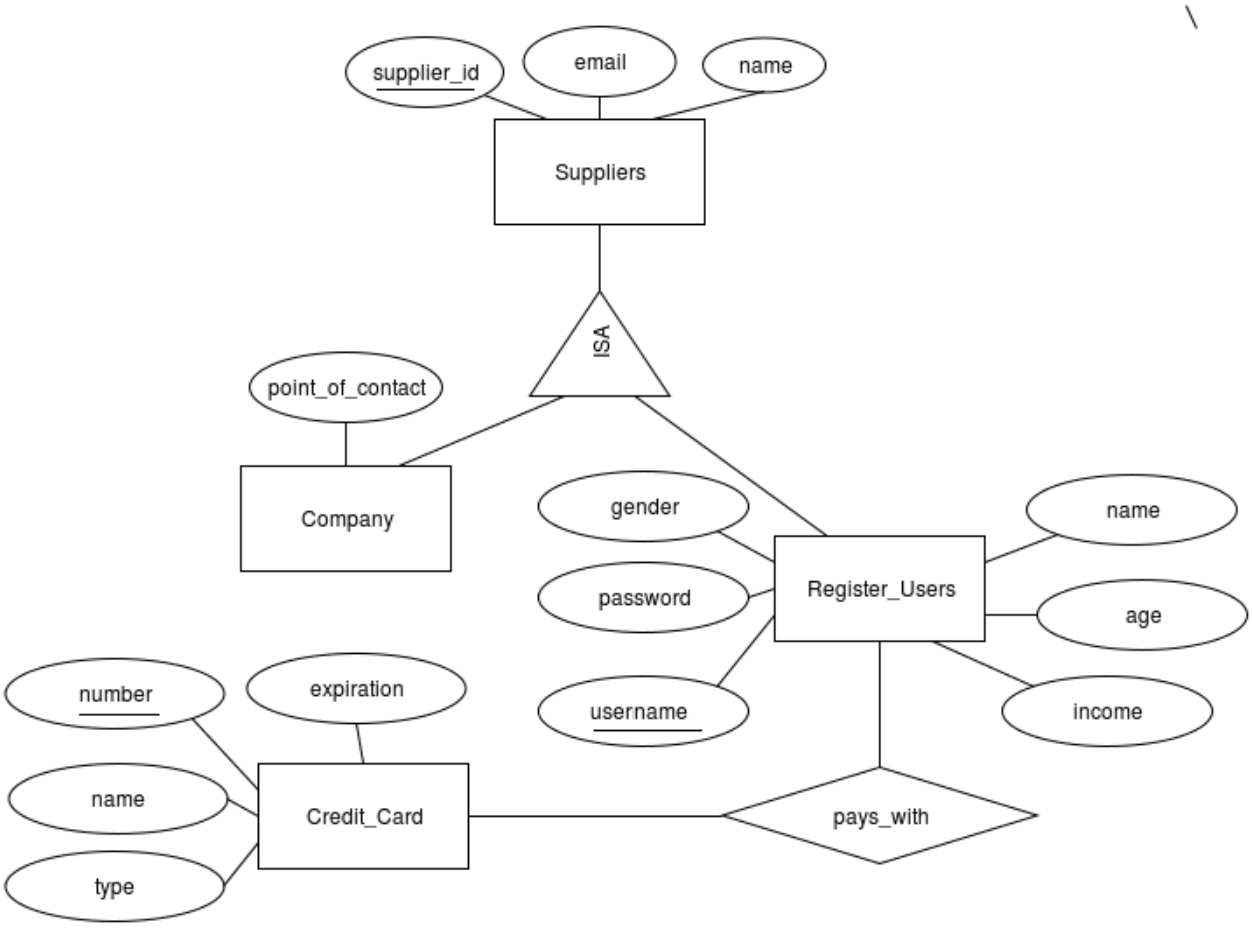


Figure 14 – Registered_Users, Suppliers, Company, Credit_Card ER Diagram

Similar to the **Company** table, the **Register_Users** table has a foreign key that links to a unique *supplier_id*. The *supplier_id* cannot be null, that way every **Register_Users** has a corresponding **Supplier** entity. Like the **Company** table, the **Register_Users** field will be deleted if the **Supplier** field is deleted. Unlike the **Company** table, the **Register_Users** use their own *username* attribute as the primary key. Since every *username* must be unique and is the main way other users will identify one another, we thought *username* would suite as a better primary key.

```
mysql> CREATE TABLE Register_Users
    -> (
    ->  username CHAR(40),
    ->  password CHAR(20),
    ->  email CHAR(40),
    ->  age INTEGER,
    ->  gender CHAR(10),
    ->  income REAL,
    ->  name CHAR(20),
    ->  supplier_id INTEGER,
    ->  PRIMARY KEY (username),
    ->  FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id) ON DELETE CASCADE
    -> );
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> ALTER TABLE Register_Users
    -> ADD UNIQUE (supplier_id);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Register_Users MODIFY supplier_id INTEGER NOT NULL;
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Register_Users DROP COLUMN name;
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Register_Users DROP COLUMN email;
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Register_Users MODIFY password VARCHAR(40);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

Figure 15 – Registered_Users SQL Table

One important relationship to note with **Register_Users** is the **pays_with** relationship. This links the **Credit_Card** entity, **Register_User** entity, and **Address** entity together. This allows each **Register_User** to have multiple credit cards and multiple billing addresses. This information is stored in the table **pays_with**. It records the *username*, credit card *number*, and *address_id* of each member of the relationship. It also uses these three foreign keys as the table's primary key.

```
mysql> CREATE TABLE Credit_Card (
    ->   number BIGINT,
    ->   name CHAR(40),
    ->   type CHAR(20),
    ->   expiration DATE,
    ->   PRIMARY KEY (number)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 16 – Credit_Card SQL Table

```
mysql> CREATE TABLE pays_with
    -> (
    ->  username CHAR(40),
    ->  number INTEGER,
    ->  address_id INTEGER,
    ->  PRIMARY KEY (username, number, address_id),
    ->  FOREIGN KEY (username) REFERENCES Register_Users (username),
    ->  FOREIGN KEY (number) REFERENCES Credit_Card (number),
    ->  FOREIGN KEY (address_id) REFERENCES Address (address_id)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 17 – pays_with SQL Table

2.6. Rating

Rating is an important measure for a seller's reputation. A user might want to know what rating a seller might have. Many websites now have rating system for sellers. For example, sellers on eBay can earn stars based on the number of ratings they get [4]. The rating system on this website can be modeled by a **Rating** entity, which has a relationship with a single **Register_User**, who create the rating, and a single **Supplier**, who the register user rates. The application quality entity **Rating** is created with primary key *rating_id*, a scale based non-key attribute *value*, and a textual non-key attribute *explanation*.

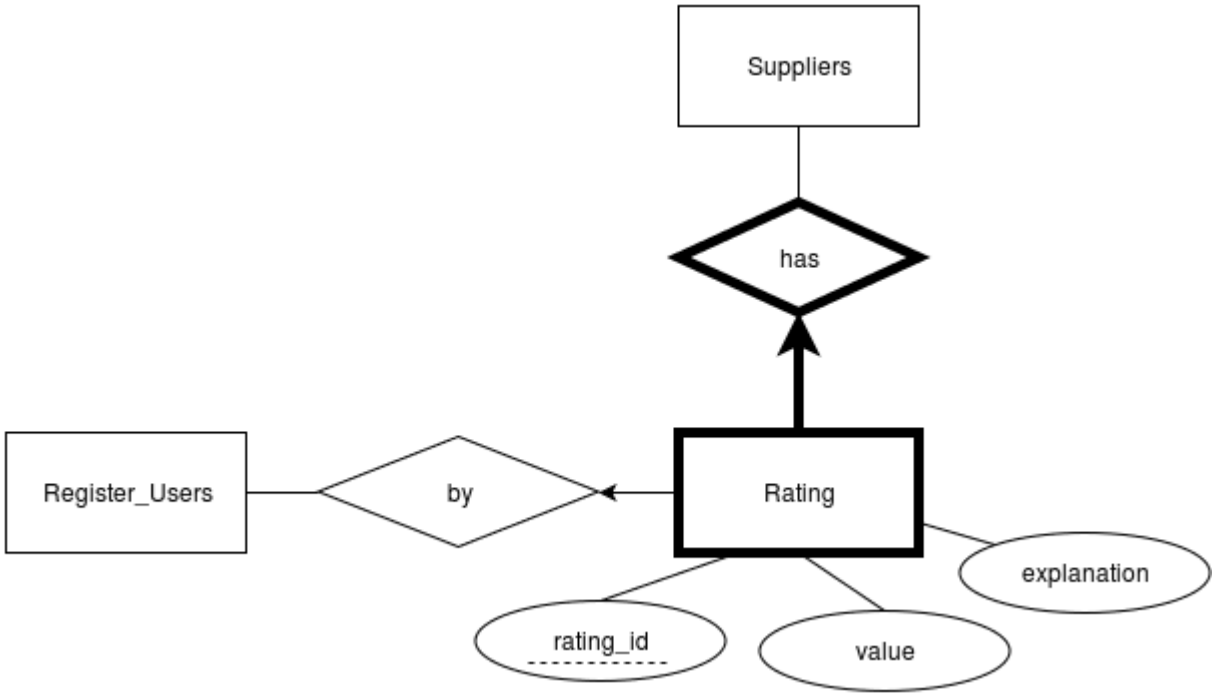


Figure 18 – Rating ER Diagram

The *value* is a scale attribute that can be selected from 1 star to 5 stars. The *explanation* is a textual attribute that allows a user to explain why one gives such scaled-rating or any additional comments. A seller will also have an average rating showing on his/her profile. The average rating calculates the mean of each rating value then rounds to the nearest star scale.

For the table for **Rating**, there is a partial key *rating_id*, in addition to the *explanation* and *value* attributes. There is also a foreign key pointing to the *username* of the reviewer and the *supplier_id* of the company or user being reviewed. These two foreign keys help combine **Rating** with the **by** and **has** relationships. Also, in the ER diagram, **Rating** is a weak entity to **Supplier**. So if the **Supplier** deletes their account, then all the ratings for them will also be deleted. This is done with the ON DELETE CASCADE line where the *supplier_id* is declared a foreign key. **Rating** is given a primary key which combines the *supplier_id* with the partial key *rating_id*.

```
mysql> CREATE TABLE Rating
    -> ( rating_id   INTEGER,
    ->   explanation CHAR(128),
    ->   value       REAL,
    ->   username    CHAR(40),
    ->   supplier_id INTEGER,
    ->   PRIMARY KEY (supplier_id, rating_id),
    ->   FOREIGN KEY (username) REFERENCES Register_Users (username),
    ->   FOREIGN KEY (supplier_id) REFERENCES Suppliers (supplier_id)
    ->   ON DELETE CASCADE
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 19 – Rating SQL Table

2.7. Browsing

Users are able to browse the items by traversing the category tree (Appendix C). When a user chooses a category, the user will want to know all of the categories that are directly linked to that current category. The tree traversal algorithm to be implemented will follow a derivative of the breadth-first search algorithm. At each point, they are given a summary of all the items that appear in that category. For example, if the user is in the “Women’s” category, the provided categories are “Boots”,

“Flats”, “Pump”, “Sandals”, “Sneakers”, and “Wedges”. However, in traditional breadth-first search algorithms, the other nodes in the same level as the previously mentioned categories, will be shown. So our form of the algorithm will limit the traversing within the current node and its children.

Another important browsing feature is to allow the user the ability to traverse both ways through the tree, including moving downwards and upwards through the tree. The user will be able to return to the parent node of their current category. In addition, there will be a home button to traverse the user back to the root node.

In the browser bar, user can access their account information. This includes their profile, feedback, and settings. Profile contains their personal information, items they are selling, current bids, and history. Feedback has ratings and reviews. Settings include login information, credit card information, and shipping/billing address.

There will be a homepage which consists of the current deals and other features usually found in homepages. This homepage is not located anywhere in the classification tree, yet contains various items from different categories.

During our research of other shoe/clothing sites, we were attracted to a certain type of user interface that made browsing very easy and fast. Particularity, Macy’s online store featured a row of tabs near the top of the page. These tabs were the major categories of clothing, “Men”, “Women”, etc. When the user selects one of the tabs, a drop down menu appears, listing all of the categories within that major category. Furthermore, under those categories were subcategories that were indented to easily show its lower levelness. We found this interface in other sources as well and we find this way of browsing to be the most user-friendly because it gives the user a broad overview of the classification tree. TechFam will follow this structure of browsing.

2.8. Searching

On shopping websites, like Amazon, a user might want to search for a series of specific items. This can be modeled by two kinds querying, “User search Items”, and “User choose Categories then search Items”, as shown in Figure 20.

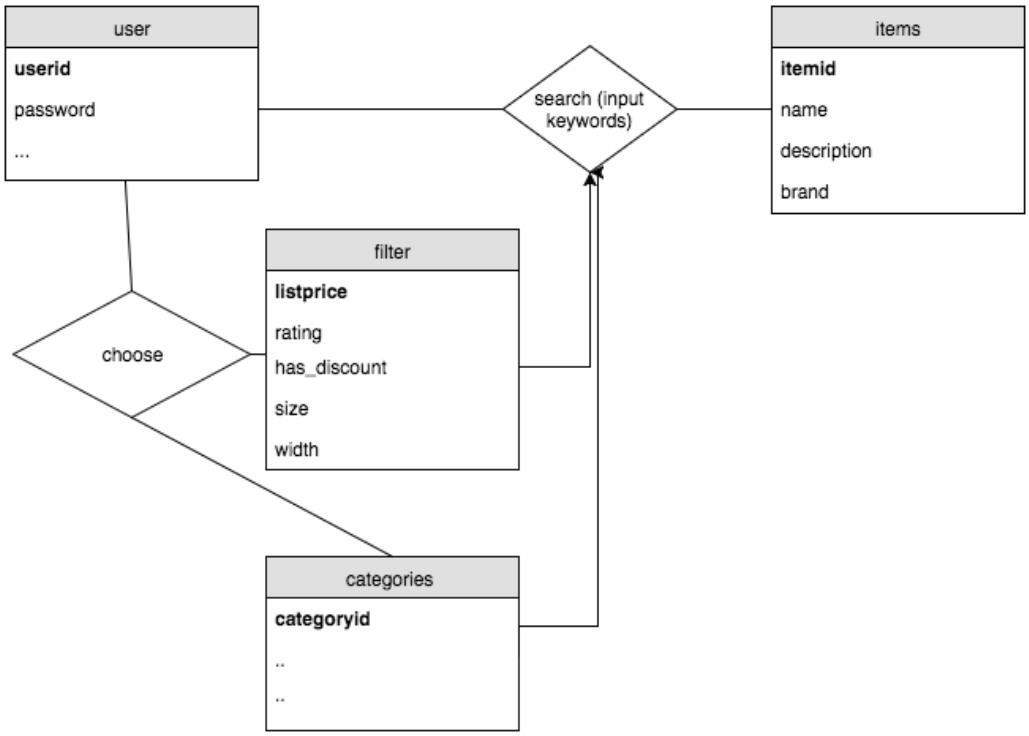


Figure 20 – Searching Process Diagram

If a user chooses to input keywords, the database will look for items that contains these keywords. A user can also choose certain categories or other filters first then input keywords to narrow down the results. Attributes in **Sales_Item** like *name, description, brand,* etc. shall be searchable.

2.9. Sale

Items on sale will be the ones not auctioned off. We will create an option for buying the item now. When the user enters a specific item description, that item information will be pulled from our database. The user interface will display all the items matching that description. The user will be

allowed to add items to the cart, use their credit card information and check out. After the transaction has completed the item count will decrement. The transaction information will remain in the system for six months and will be stored using the ER diagram in Figure 21.

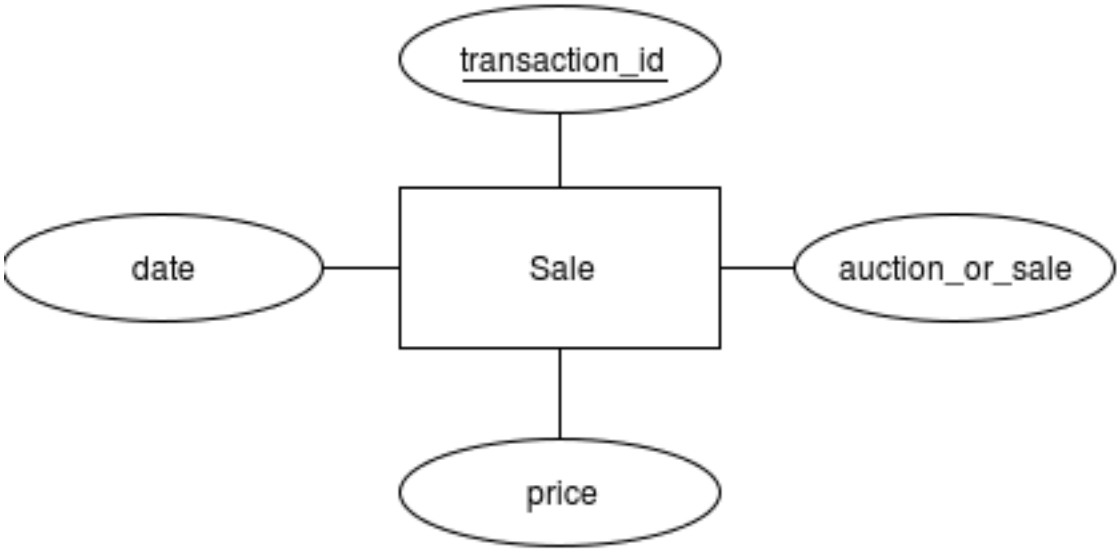


Figure 21 – Sale ER Diagram

```
mysql> CREATE TABLE Sale (
    ->   transaction_id INTEGER,
    ->   price DECIMAL(7,2),
    ->   date INTEGER,
    ->   auction_or_sale BOOL,
    ->   item_id INTEGER NOT NULL,
    ->   username CHAR(40) NOT NULL,
    ->   credit_card_number BIGINT NOT NULL,
    ->   PRIMARY KEY (transaction_id),
    ->   FOREIGN KEY (item_id) REFERENCES Sales_Item (item_id),
    ->   FOREIGN KEY (username) REFERENCES Register_Users (username),
    ->   FOREIGN KEY (credit_card_number) REFERENCES Credit_Card (number)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 22 – Sale SQL Table

We created a table call **Sale**, where we had *tansaction_id* as the primary key. The table checks if it is an auction or a regular sale, using a Boolean. The foreign key that was referenced from **Sales_Item** was item_id, where it was linked on the ER diagram by relationship *item_sold*. It also includes *username* that is a foreign key, which is referenced from **Register_Users**, while *credit_card_number* was referenced from the **Credit_Card** entity.

2.10. Bidding

Unlike many shoe websites, our database will have the option of auctioning items. A user can access these items by searching through the pull-down menu and clicking on an item through the categories included, as well as entering a specific item name through the search bar. The database will retrieve information and after clicking the auctioned items option the user will be able to view the item. The user has the option to sort items based on price from highest to lowest or vice versa.

Bidding Rules:

- Users must remember each bid is a contract.
- Each item will have a specific time stamp listed under description.
- Bids can only be canceled 24 hours prior to time stamp deadline.
- Bids will be in 2 dollar increments.

Selling an item:

- Under options, select selling button and Users can only sell one item at a time.
- Select the item for sale and give a brief description.
- List the timestamp value for the starting and ending.
- Select the reserve price for the item.
- Review everything and select the confirm button.
- You will be notified when the auction has ended and who had the winning bid.

We will feature manual bidding and automatic bidding. First let's talk about the manual way, where the user enters a bid value that is at least $2 more than the current highest bid. The user will be notified when someone overtakes them as the lead bidder. On the other hand, we have automatic bidding, where the user will be prompted to enter the maximum value they are willing to pay for the item being auctioned off. The system will bid $2 more than the current highest bid until your bid reaches the maximum value you are willing to play or the auction ends. The user with the highest bid

wins, and pays the amount they bid. For both bidding options at the end of the auction, the user with the winning bid will be notified, that he or she has won. The system will charge the user's credit card with winning bid amount and after receiving the payment, the seller will be required to ship the item. The transaction will stay in the system for 6 months. The user can view their current bids under the account options.

The **Auction** will have a *time_stamp_start* for the start of the auction and a *time_stamp_end* for the end of the auction. The auction will record all the bids that users place and these will have a relationship **(item_auctioned)** to the sale items.

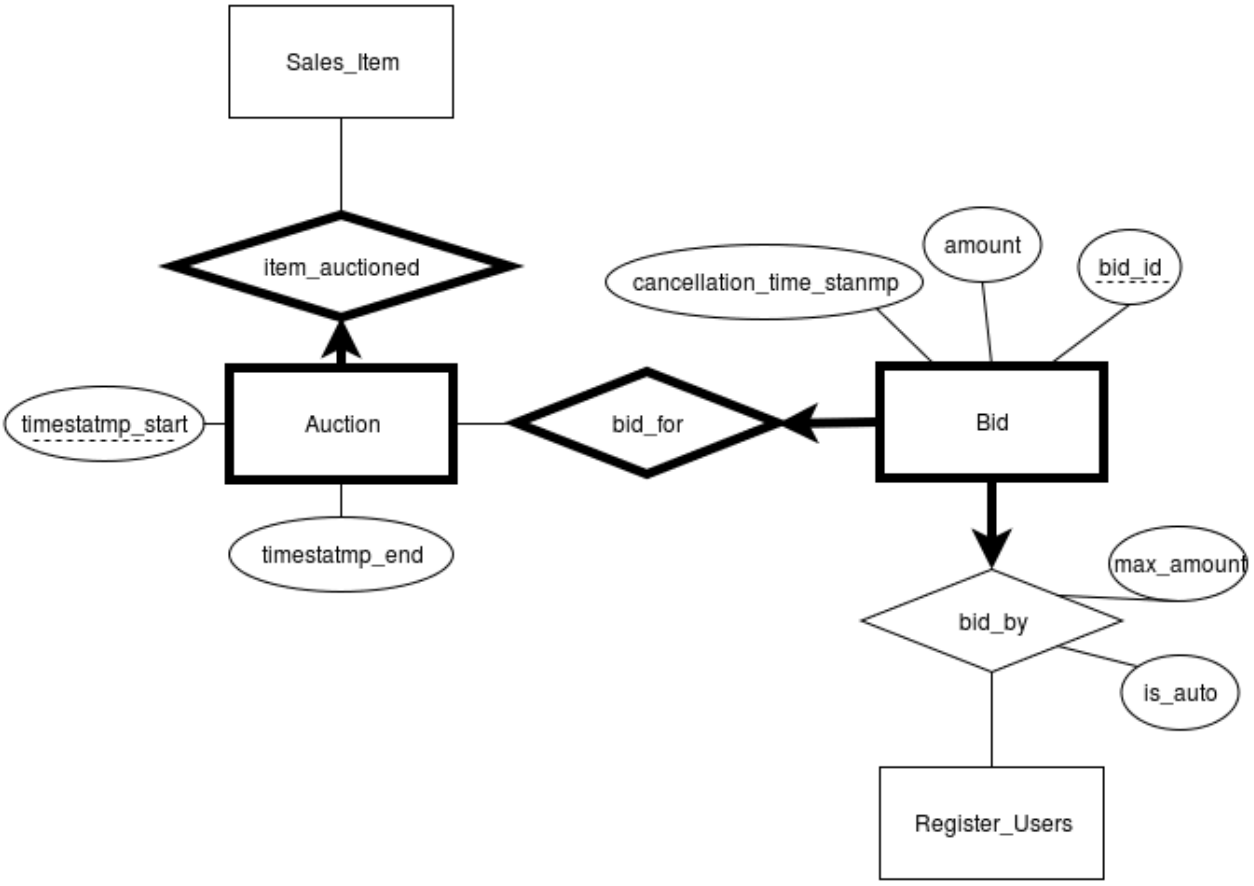


Figure 23 – Auction and Bid ER Diagram

```
mysql> CREATE TABLE Auction (
    ->   timestamp_start INTEGER,
    ->   timestamp_end INTEGER,
    ->   item_id INTEGER,
    ->   PRIMARY KEY (timestamp_start, item_id),
    ->   FOREIGN KEY (item_id) REFERENCES Sales_Item (item_id) ON DELETE CASCADE);
Query OK, 0 rows affected (0.03 sec)
```

Figure 24 – Auction SQL Table

```
mysql> CREATE TABLE Bid (
    ->   bid_id INTEGER,
    ->   amount DECIMAL(7,2),
    ->   cancellation_timestamp INTEGER,
    ->   item_id INTEGER NOT NULL,
    ->   auction_timestamp_start INTEGER,
    ->   username CHAR(40) NOT NULL,
    ->   is_auto BOOLEAN NOT NULL,
    ->   max_amount DECIMAL(7,2),
    ->   PRIMARY KEY (bid_id, item_id, auction_timestamp_start),
    ->   FOREIGN KEY (item_id, auction_timestamp_start) REFERENCES Auction (item_id, timestamp_start)
    ->   ON DELETE CASCADE,
    ->   FOREIGN KEY (username) REFERENCES Register_Users (username)
    -> );
Query OK, 0 rows affected (0.04 sec)
```

Figure 25 – Bid SQL Table

The table on the left was created for **Auctions** taking place, where it included timestamps for start and end. We referenced the *item_id* from the **Sales_Items** entity through the relationship of *item_auctioned*. Our partial key is *timestamp_start,* which is sourced from *item_id.* This could only be done using on delete cascade. *timestamp_end* refers to the time when the auction ends. Timestamps are recorded as integers based on the Unix machine time. This method is simpler than using traditional timestamps and yields the same performance.

For the **Bid** entity, we created a table called **Bid**, where we had *bid_id* as the primary key, *amount* as a decimal because it can not exceed more than 7-digit value max. *cancellation_timestamp* holds the time when the auction is over. u*sername* lets us know who is the bidder. *is_auto* is a Boolean value that determines if automatic bidding feature is turned on. *max_amount* determines the highest bid before automatic bidding ceases. Our foreign key was *item_id* and *auction_timestamp_start,* which are referenced through **Auction.** Again we had to use an on delete cascade if the they are removed.

2.11. Order and Sale Reports

With everything set up, it is important to consider how our system keeps track of all the orders that go through the system. We want to be able to generate a weekly report for each category that we are selling. This will not only inform us on how we are doing in terms of revenue but also help us monitor consumer behavior. By recording and analyzing reports of user activity, companies can improve their sites functionality.[9] Having this functionality in our application and design, we believe our marketing team will be able to take a full advantage of this report function and produce the most effective marketing strategy that will help to maximize company's profit.

Moving into the implementation of our report, each report will carry a specific report id that is relevant to the seller account detail and the time period for which the report is on. Our goal is to make our report as informative and dynamic as possible. We want to create an interface that allows our users to easily assess their data with a few clicks of a button.

Our design will include a bunch of useful keywords that relate to type of data that will be displayed such as total revenue, total cost, number of purchases, etc. In the backend of this functionality, we will use these keywords and put together a query that will access our database and pull up the request data and present them in a neat view.

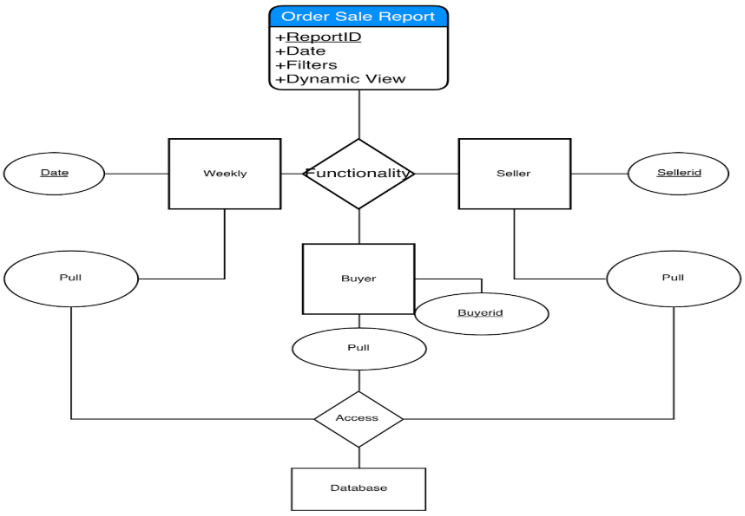


Figure 26 – Order Sale Report Process Diagram

2.12. Delivery

The other important thing that we are focusing on is our delivery system. We understand that it is our duty to fulfill our customers' orders with the best service possible. This is why we are taking extra steps to secure every single transaction amongst our users.

With our delivery system, we will generate a unique id (*shipping_id*) for every delivery that is only available for the buyer, seller, and our engineers. Nevertheless, this id will only be created after a confirmation of payment has been posted. This means there will be lower chance of error for shipping confirmation. Why compete in the shipping market when companies like UPS, FedEx, and DHL have proven themselves to be among the best in the industry. While companies like UPS help to provide their customers with useful developer API, we aim to utilize their API to create the best interface for our users without traversing to another website. [10] We want to provide the tracking number for the shipment to allow users to see the status of their shipment from our website. We hope that our efforts in providing a friendly user interface will keep our customers satisfied with our products and services.

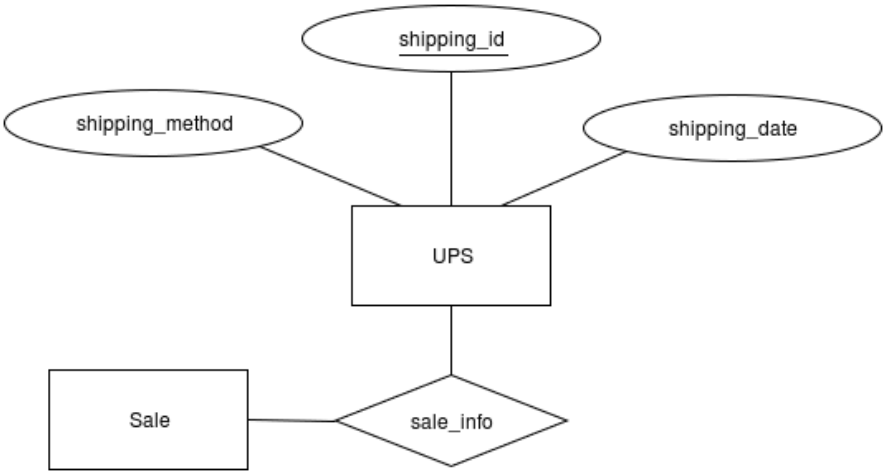


Figure 27- UPS ER Diagram

```
mysql> CREATE TABLE UPS
    -> (
    ->   shipping_id INTEGER,
    ->   shipping_date INTEGER,
    ->   shipping_method CHAR(20),
    ->   transaction_id INTEGER,
    ->   shipping_address_id INTEGER,
    ->   PRIMARY KEY (shipping_id),
    ->   FOREIGN KEY (transaction_id) REFERENCES Sale (transaction_id),
    ->   FOREIGN KEY (shipping_address_id) REFERENCES Address (address_id)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 28 – UPS SQL Table

For the entity in the ER diagram of **UPS,** created a table called **UPS**, created tuples of its attributes. Used *shipping_id* as the primary key. We have an attribute that stores the method of shipping (*shipping_method*). Another attribute is used to record the date of shipping (*shipping_date*). For the foreign key, we used *transaction_id* because once a sale has been made *sale_info* relationship is accessed, where it gives the transaction id to the **UPS** service. *address_id* keeps track on where the package is being shipped to.

2.13. Custom Shoes

Unlike most sites, our team decided to create a custom shoe feature. We researched Nike's custom shoe system for guidance. [6] First, the user will click on the custom shoe feature in the browser bar. Then, they can pick between a men's, women's, boys', or girls' shoe. After that, they can pick a particular category of shoe, such as athletic, casual, etc. and then pick a subcategory, such as running shoe or cleat. From there, the user has several features they can choose from a multiple choice list. These features include the size of the shoe, the width of the shoe, the side, back, and front image, tong style, the shoe sole style, and the coloring of the shoe.

The way the custom shoe information is stored is in the **Custom_Shoe** entity. This entity is a sub-entity of the sales items but it contains additional information for the customization process such as a side, back, and front image labels. In our database, we will store every possible combination of

custom shoes in the **Custom_Shoe** entity. Then, during the creation process, as the user selects new attributes, different images will be displayed on screen, based on the default and user selections.

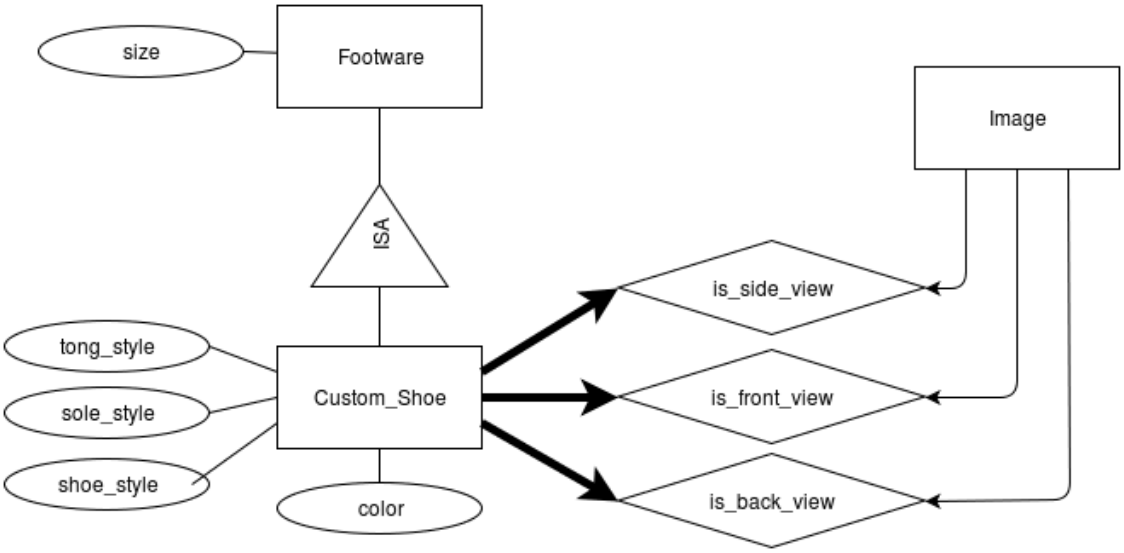


Figure 29 – Custom_Shoe ER Diagram

```
mysql> CREATE TABLE Custom_Shoe
    -> ( tong_style   CHAR(20),
    ->   sole_style   CHAR(20),
    ->   shoe_style   CHAR(20),
    ->   color        CHAR(20),
    ->   side_img_id  INTEGER NOT NULL,
    ->   front_img_id INTEGER NOT NULL,
    ->   back_img_id  INTEGER NOT NULL,
    ->   item_id      INTEGER,
    ->   PRIMARY KEY (item_id),
    ->   FOREIGN KEY (side_img_id) REFERENCES Image (img_id),
    ->   FOREIGN KEY (front_img_id) REFERENCES Image (img_id),
    ->   FOREIGN KEY (back_img_id) REFERENCES Image (img_id),
    ->   FOREIGN KEY (item_id) REFERENCES Footwear (item_id)
    ->   ON DELETE CASCADE);
Query OK, 0 rows affected (0.05 sec)
```

Figure 30 – Custom_Shoe SQL Table

We created a table based on the entity **Custom_Shoe**, each custom shoe you design will allow you to view the front, side, and back image. It will allow you to customize the tong, sole, shoe and color style, as shown in the ER diagram. Again the primary key is ***item_id*** because selecting a specific item allows you to customize it, where on delete cascade is used. The foreign keys include the relationships of *side_img_id, front_img_id,* and *back_img_id*, which reference the **Image** entity. We also have a foreign key of *item_id* which references **Footwear.**

2.14. Customer Service

We are providing users a way to contact us. This bonus feature allows us to connect us with the users. Users can email or call us. We also provide a FAQ page that helps users navigate better. This page also helps users get answers to common questions. Customer service options will be located at the bottom of every page. This feature also helps us get feedback about our services, which provides a scope for improvement.

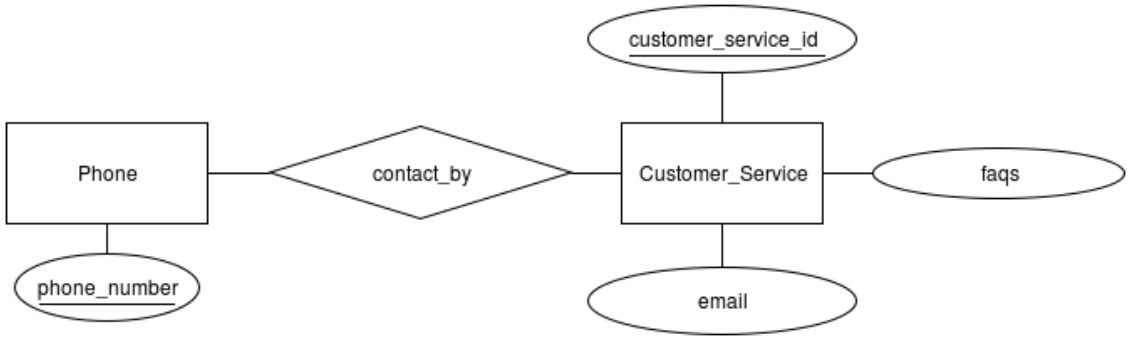


Figure 31 – Customer_Service ER Diagram

```
mysql> CREATE TABLE Customer_Service
    -> (
    ->  customer_service_id INTEGER,
    ->  email CHAR(40),
    ->  faqs CHAR(128),
    ->  phone_number INTEGER,
    ->  PRIMARY KEY (customer_service_id),
    ->  FOREIGN KEY (phone_number) REFERENCES Phone (phone_number)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

Figure 32 – Customer_Service SQL Table

We created the table **Customer_Service** as an extra feature. The primary key for it is *customer_service_id.* We created a tuple of *faqs* for customers to access frequent questions, we also included an *email*, and a *phone_number.* The foreign key for it is *phone_number*, where it is referenced from the entity **Phone**.

3. TECHNOLOGY SURVEY

3.1. MySQL

We selected MySQL as our database because it is a relational database, meaning that it is suited for storage and retrieval. The relational part of the database allows for an easier and wider range of access to data that will allow us to manipulate the data in our system to its full potential.

MySQL is easier for us to use, given our limited experiences in database language. Moreover, MySQL is also an open source software that is owned by Oracle, which means that our group will not have to spend any money to use it. Needless to say, MySQL is also very popular amongst programmers. There is a great online community that we can fall back on when we are in trouble.

We did take several limitations of MySQL into account including poor performance scaling, limited functionality, and lesser overall quality compared to other database languages.[11] We decided that poor performance scaling would not be a big issue due to the fact that we are not operating with a ton of data. Next, we are also not anticipating a great number of functionality to implement inside our database, as we will have backend codes that will do the job. Our intended use of the database should be straightforward – push and pull requests. Lastly, quality and stability is not something we are currently targeting for in our prototype phase. Our goal to set up the environment first and make everything work before we optimize to our environment.

Pro	Cons
Easy to use	Poor performance scaling
Open source	Limited functionality
Great online community	Inferior quality to top-tier databases
Suitable performance	Stability issues

Figure 33 – Pros and Cons of MySQL

3.2. Frontend

Since our team has the most experiences in JavaScript, we decided to design our front end in JavaScript, HTML 5, and CSS. We chose JavaScript because it remains one of today's most used languages in websites. It is easier to code than server-side languages, and it offers a great range of variety when it comes to dynamic views and displays for our users. Moreover, JavaScript is entirely a client side programming, meaning the computation is done on our users' computer rather than having data sent back to the server and back out to the user. We rely on this mechanism to make it easier for our servers, so we can reach up to more users.

HTML 5 and CSS will be used to make our website more visibly attractive to our users. We hope that our front-end code will be able to take a full advantage of our design to create the best user experiences possible. Nevertheless, these two languages are easy to learn and implement since they are ubiquitous in today's websites.

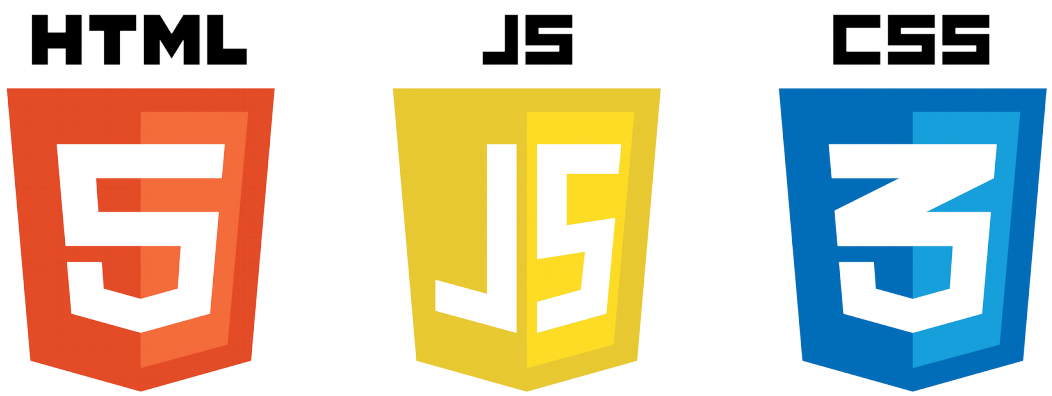


Figure 34 – Frontend Programming Languages

3.3. Backend

We want to link our frontend code to our database through a backend written in Java. Mainly because Java is still one of the most popular languages in the industry and many of us have experience

with it. Java offers a wide range of functionality and online communities to help us achieve what we want.

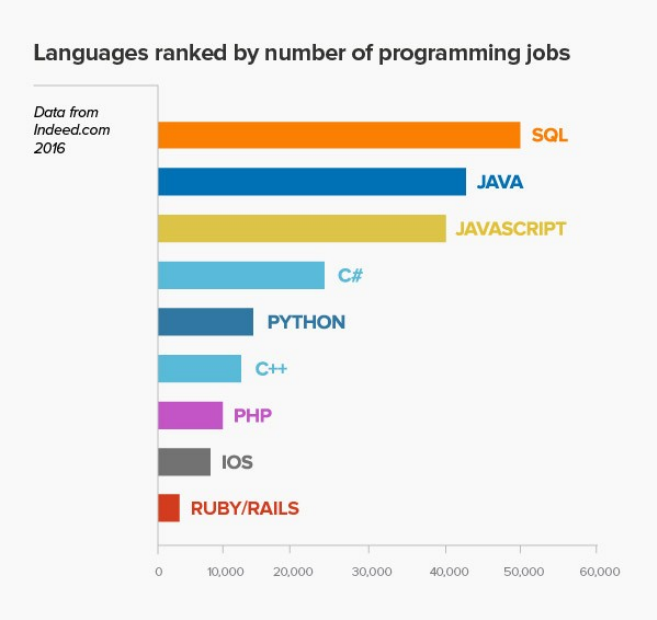


Figure 35 – Most Used Programming Languages

3.4. Other Technologies

Draw.io – We used Draw.io to do most of our Entity-Relationship diagrams. It is an easy to use online program that allows us to organize our diagrams neatly.

Asana – We use Asana to plan most of our daily activities and group goals. It offers a clear view of what our goals are and how to get there, if we put in the work to create it.

GitHub – GitHub is where our repository is located. We have access to our peers' work and to the progression of our big project. Moreover, it is very convenient for each of us to edit and make commentary about others work.

GroupMe – We use GroupMe to communicate with one another.

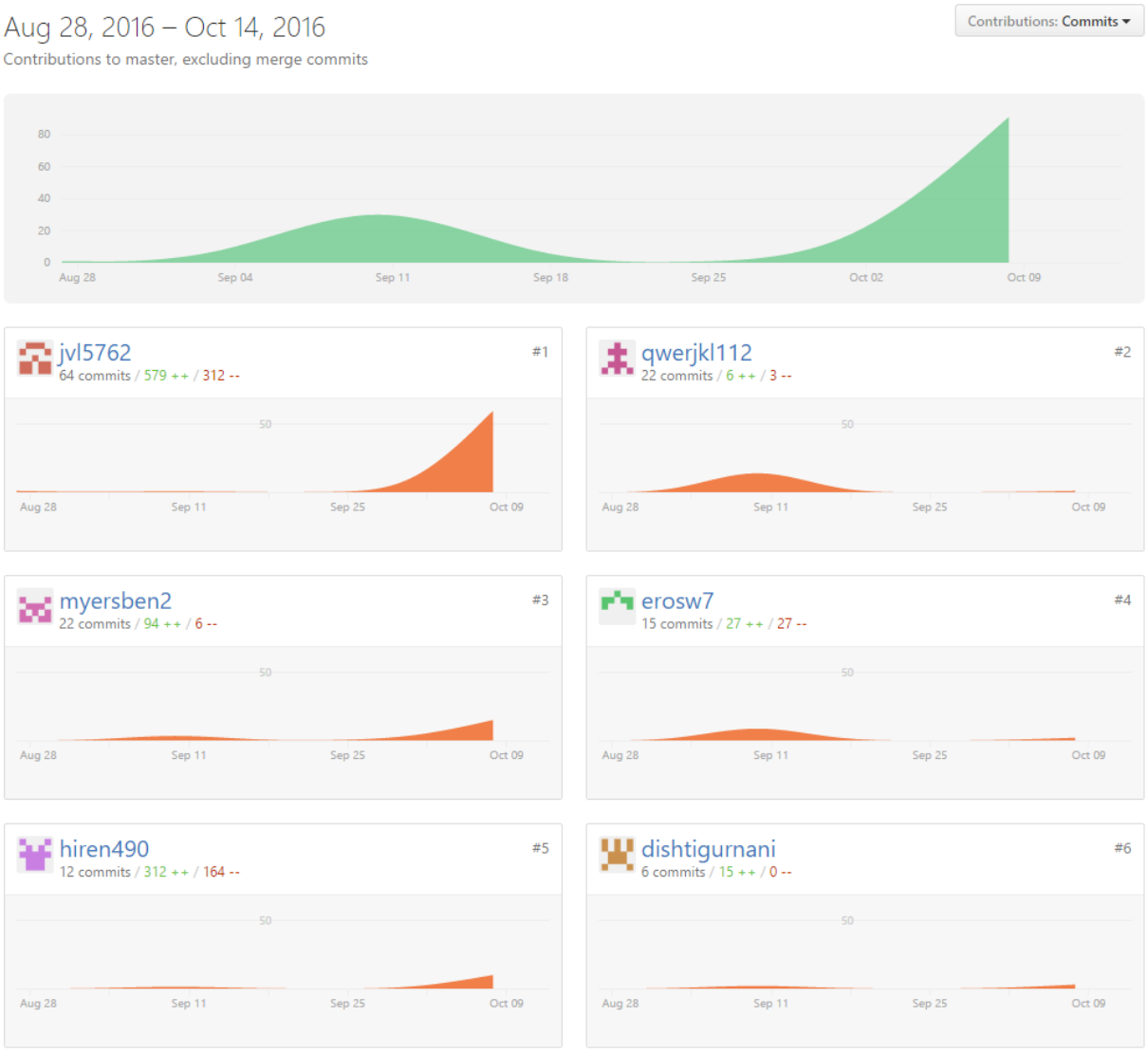
4. CONCLUSION

There were many options to choose from when selecting a database. After our first meeting we gathered ideas from everyone and ended with a shoe retailers' database. The shoe industry is enormous and there were many features that we wanted to talk about besides the given ones. Everyone did their research on ideas and how we would incorporate the given features. The bonus features we selected were custom shoes and customer service. We assigned each person separate features, where each would do research on their specific topic and write a rough draft for analysis, we discussed how each person should implement certain ideas pertaining to their feature.

Next, we broke up into 2 teams, we had 3 on editing, while the rest on presentation. The biggest challenge we faced was making sure the information lined up perfectly between each topic because some features are closely connected to each other. Our main goal was making sure we developed a database that was user-friendly, yet offered complex features. Overall, phase one was a success where we implemented the design specifications according to the criteria.

As we move forward with our design we will implement a website that represents our database in a consumer friendly manner. Our website will allow the user to quickly locate desired items and purchase safely within our database on a protected web server. To do this we will apply browsing and searching techniques using the Breadth-First Search algorithm. Another addition will be Order and Sales Report, where we will store the transaction information in our database for business purposes. Most importantly, the database will be ready for real-world use.

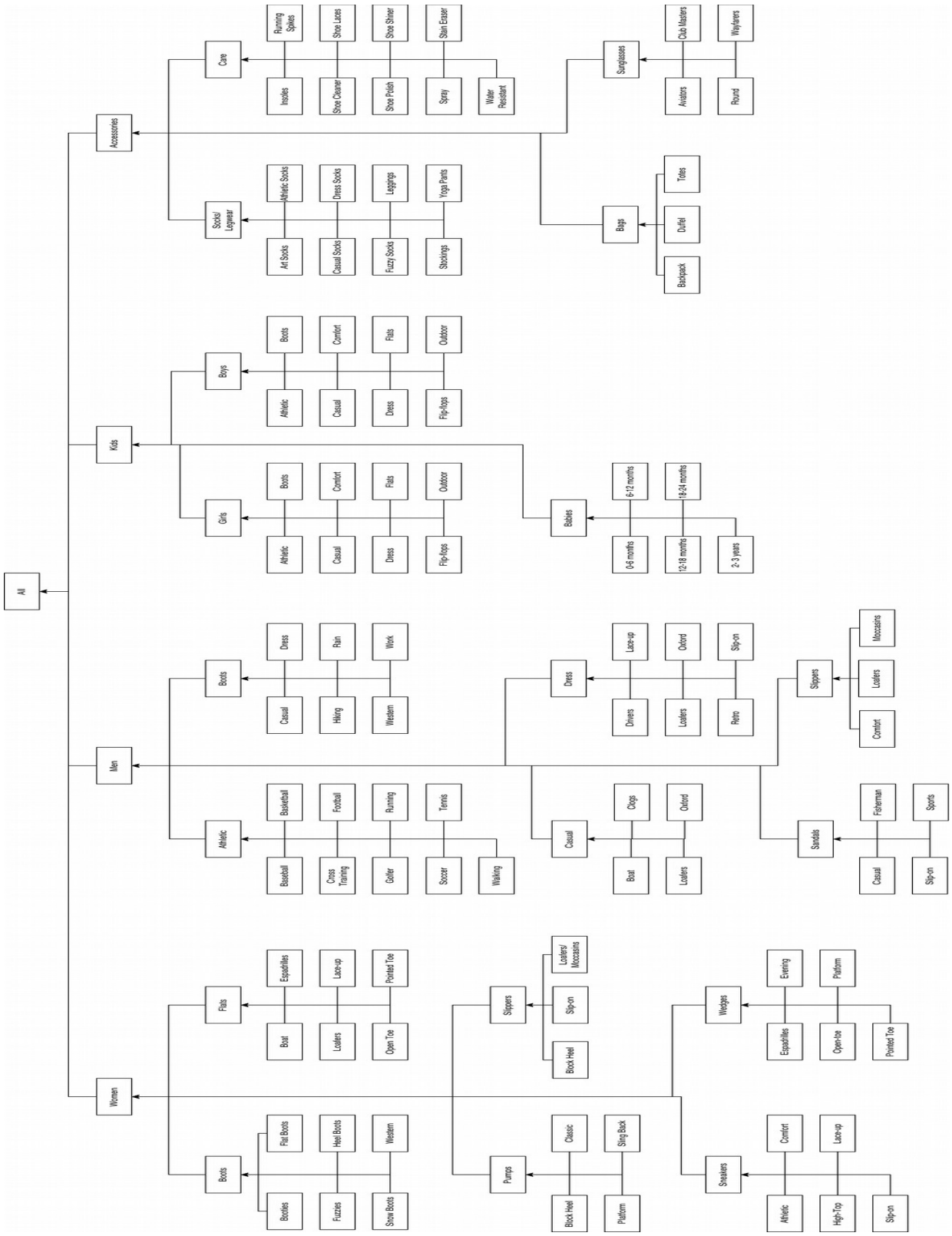
5. APPENDIX A – GITHUB GRAPHS



6. APPENDIX B – ASANA SUMMARY

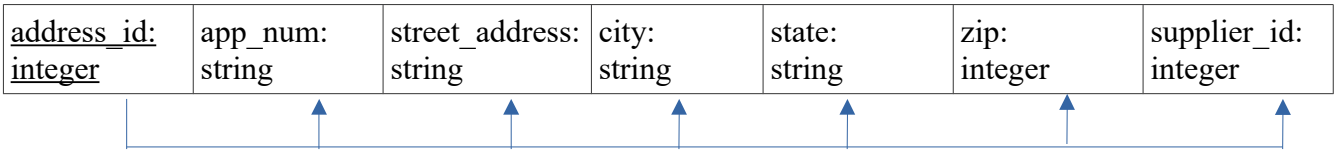
Task ID	Created At	Completed A	Last Modifie	Name	Assignee	Due Date
1.9285E+14	10/6/16	10/12/16	10/12/16	Second Meeting of Phase Two		
1.9036E+14	10/3/16	10/6/16	10/6/16	First Meeting Phase 2		10/3/16
1.9036E+14	10/3/16	10/12/16	10/12/16	Technology S	Frank Guo	10/10/16
1.9036E+14	10/3/16	10/11/16	10/11/16	Make the Rel	Benjamin My	10/6/16
1.9036E+14	10/3/16		10/3/16		Jeff Li	
1.9036E+14	10/3/16		10/3/16		Hiren Patel	
1.9036E+14	10/3/16		10/3/16		Frank Guo	
1.9036E+14	10/3/16	10/13/16	10/13/16	Create Phase	Frank Guo	10/13/16
1.9036E+14	10/3/16	10/12/16	10/12/16	Normalize/Fi	Benjamin My	10/10/16
1.9036E+14	10/3/16		10/3/16		Jeff Li	
1.9036E+14	10/3/16		10/3/16		Benjamin Myers	
1.9036E+14	10/3/16		10/3/16		Hiren Patel	
1.9036E+14	10/3/16	10/13/16	10/13/16	Fix Up Writin	Jeff Li	10/12/16
1.9036E+14	10/3/16		10/3/16		Frank Guo	
1.9036E+14	10/3/16		10/3/16		Hiren Patel	
1.9036E+14	10/3/16		10/3/16		Benjamin Myers	
1.9036E+14	10/3/16	10/12/16	10/12/16	Create Datab	Benjamin My	10/11/16
1.9036E+14	10/3/16	10/12/16	10/12/16	Find items to	Dishti Gurnar	10/12/16
1.9038E+14	10/3/16	10/12/16	10/12/16	Find items to	Eros Wang	10/12/16
1.9036E+14	10/3/16	10/12/16	10/12/16	Add items to	Benjamin My	10/12/16
1.9562E+14	10/12/16	10/13/16	10/13/16	Fix Up Writin	Hiren Patel	10/12/16
1.9562E+14	10/12/16	10/13/16	10/13/16	Create Image	Benjamin My	10/13/16
1.9639E+14	10/13/16	10/13/16	10/13/16			
1.9562E+14	10/12/16	10/12/16	10/12/16	Normalize/Fi	Hiren Patel	10/10/16
1.9562E+14	10/12/16	10/12/16	10/12/16	Normalize/Fi	Jeff Li	10/10/16
1.8211E+14	9/15/16	9/15/16	9/15/16	ER Diagram f	Dishti Gurnani	
1.8211E+14	9/15/16	9/15/16	9/15/16	Citations	Eros Wang	
1.8211E+14	9/15/16	10/3/16	10/3/16	Formatting	Benjamin Myers	
1.8212E+14	9/15/16	10/3/16	10/3/16	Final Review	Hiren Patel	
1.8212E+14	9/15/16	9/20/16	9/20/16	Final Review	Frank Guo	
1.8211E+14	9/15/16	9/15/16	9/15/16	Editing Team	Hiren Patel	9/14/16
1.8212E+14	9/15/16	9/15/16	9/15/16	Editing Team	Benjamin My	9/14/16
1.8212E+14	9/15/16	9/15/16	9/15/16	Editing Team	Dishti Gurnar	9/14/16
1.8096E+14	9/15/16	9/15/16	9/15/16	Google slides	Frank Guo	9/15/16
1.8093E+14	9/13/16	9/15/16	9/15/16	Fourth Team Meeting		
1.8093E+14	9/13/16	9/20/16	9/20/16	Google Docs	Frank Guo	9/15/16
1.7962E+14	9/10/16	9/14/16	9/14/16	Individual An	Benjamin My	9/13/16
1.7962E+14	9/10/16	9/15/16	9/15/16	Individual An	Dishti Gurnar	9/13/16
1.7962E+14	9/10/16	9/15/16	9/15/16	Individual An	Eros Wang	9/13/16
1.7962E+14	9/10/16	9/15/16	9/15/16	Individual An	Hiren Patel	9/13/16
1.7962E+14	9/10/16	9/15/16	9/15/16	Individual An	Frank Guo	9/13/16

7. APPENDIX C – CATEGORY TREE

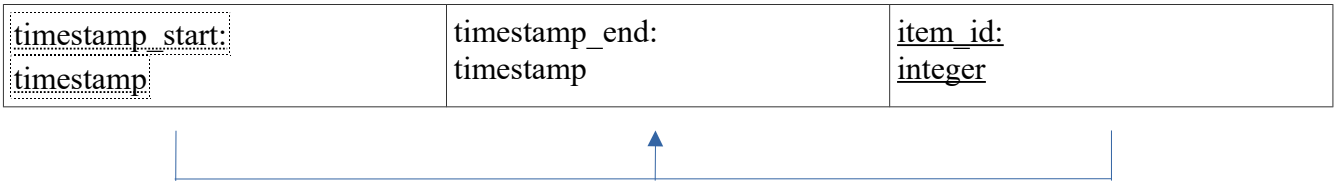


8. APPENDIX D – SCHEMAS IN THIRD NORMAL FORM

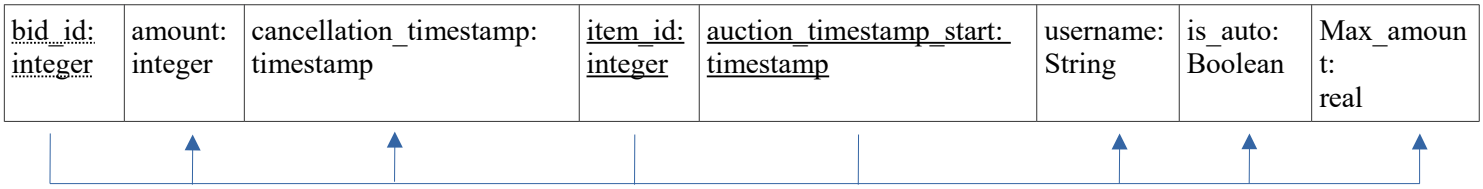
address



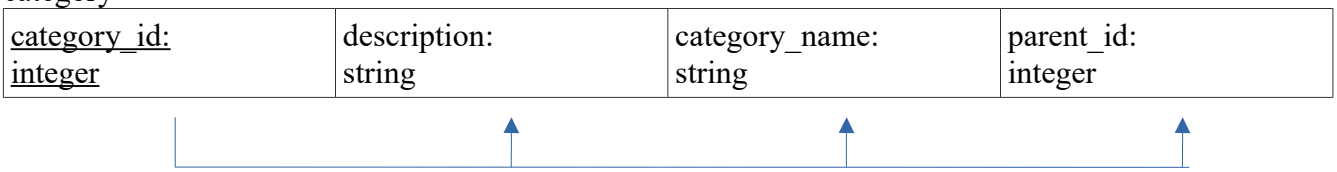
auction



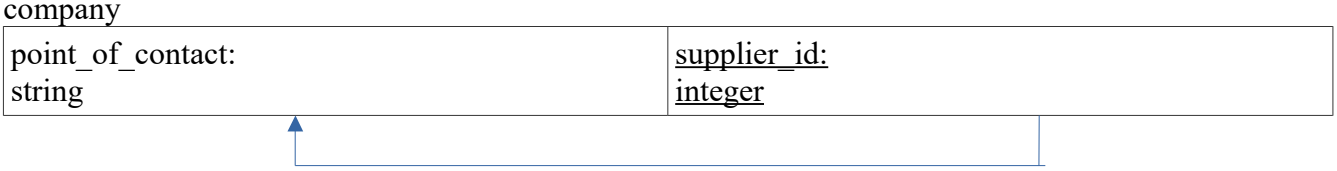
bid



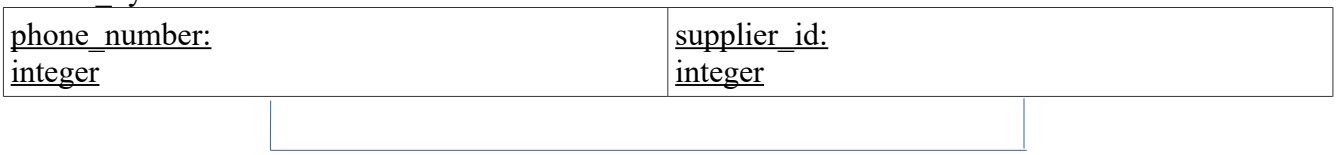
category



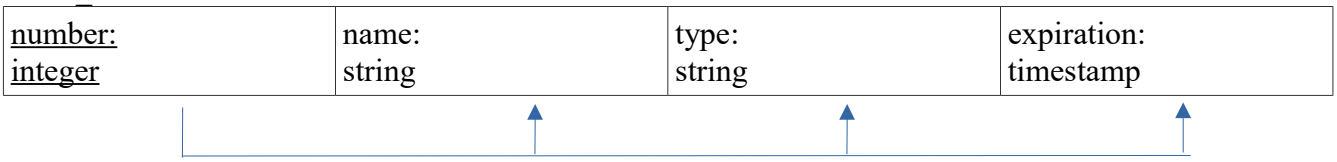
company



contact_by



credit_card



custom_shoe

tong_style: string	sole_style: string	shoe_style: string	color: string	side_img_id: integer	front_img_id: integer	back_img_id: integer	item_id: integer

customer_service

customer_service_id: integer	email: string	faqs: string	phone_number: integer

footwear

size: string	item_id: integer

has_visual

item_id: integer	img_id: integer	color: string

image

img_id: integer	image: blob

pays_with

username: string	number: integer	address_id: integer

phone

phone_number: integer

rating

rating_id: integer	explanation: string	value: real	username: string	supplier_id: integer

register_user

username: string	password: string	age: integer	gender: string	income: real	name: string	supplier_id: integer

sale

transaction_id: integer	price: real	date: timestamp	auction_or_sale: boolean	item_id: integer	username: string	credit_card_number: integer

sales_item

item_id: integer	count: integer	brand: string	list_price: real	state: string	description: string	name: string	reserved_price: real	category_id: integer	supplier_id: integer	address_id: integer

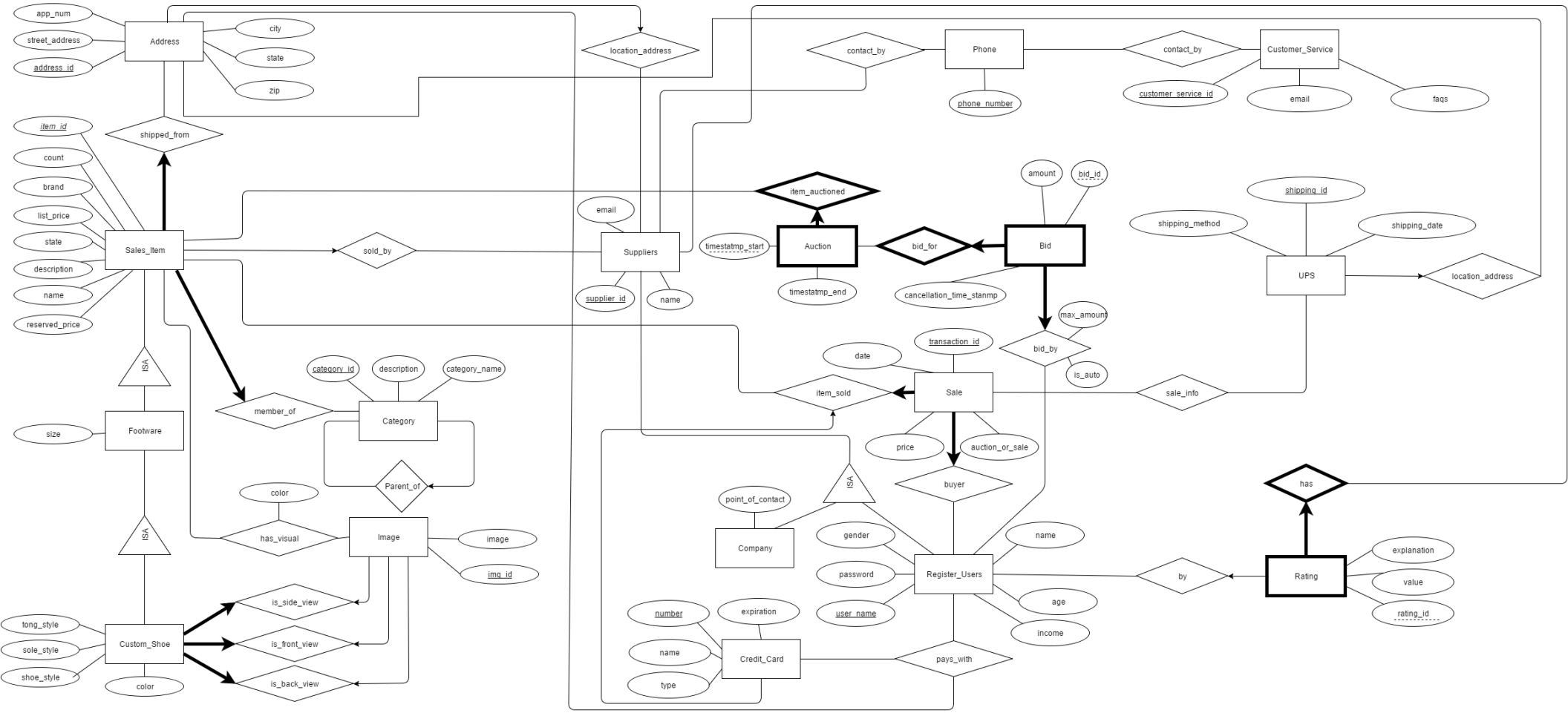
supplier

supplier_id: integer	email: string	name: string

ups

shipping_id: integer	shipping_date: timestamp	shipping_method: string	transaction_id: integer	shipping_address_id: integer

9. APPENDIX E: MASTER ER DIAGRAM


app_num
street_address
address_id
Address
city
state
zip
location_address
contact_by
Phone
phone_number
contact_by
Customer_Service
customer_service_id
email
faqs
item_id
shipped_from
count
brand
list_price
state
description
name
reserved_price
Sales_Item
sold_by
email
Suppliers
supplier_id
name
item_auctioned
timestatmp_start
Auction
timestatmp_end
bid_for
Bid
amount
bid_id
cancellation_time_stanmp
shipping_id
shipping_method
shipping_date
UPS
location_address
ISA
Footware
size
member_of
category_id
description
category_name
Category
Parent_of
color
has_visual
Image
image
img_id
is_side_view
is_front_view
is_back_view
tong_style
sole_style
shoe_style
Custom_Shoe
color
max_amount
transaction_id
bid_by
is_auto
date
item_sold
Sale
sale_info
price
auction_or_sale
buyer
ISA
point_of_contact
Company
gender
password
user_name
Register_Users
name
age
income
has
by
Rating
explanation
value
rating_id
number
expiration
name
type
Credit_Card
pays_with

10. **APPENDIX F – DATABASE STORAGE**

After completing our ER and schema designs for the important information we needed to store, we created our database and began filling it with sample data. Our goal was to fill out enough information to make the site feel like it was already up and running with real users. Below lists all the data stored in each table of our database, in alphabetical order. Note that some fields will be missing, due to difficulty of fitting all of the information on the page.

Table 1: Address Table

```
mysql> SELECT * FROM Address;
+------------+---------+-------------------------+---------------+-------+-------+-------------+
| address_id | app_num | street_address          | city          | state | zip   | supplier_id |
+------------+---------+-------------------------+---------------+-------+-------+-------------+
|          1 |         | 54 Franklin Ave.        | Manahawkin    | NJ    |  8050 |           1 |
|          2 |         | 14 Acacia Dr.           | Glendora      | CA    | 91740 |           2 |
|          3 |         | 8077 University St.     | Lakeville     | MN    | 55044 |           3 |
|          4 |         | 7976 West St.           | Grovetown     | GA    | 30813 |           4 |
|          5 |         | 1 SW. Buttonwood Avenue | Kalispell     | MT    | 59901 |           5 |
|          6 |         | 9714 Miles Lane         | Johnston      | RI    |  2919 |           6 |
|          7 |         | 255 Longbranch Lane     | Ellicott City | MD    | 21042 |           7 |
|          8 |         | 7444 W. County Lane     | Brentwood     | NY    | 11717 |           8 |
|          9 |         | 368 Garfield Lane       | Mount Airy    | MD    | 21771 |           9 |
|         10 |         | 8252 Country Drive      | Freeport      | NY    | 11520 |          10 |
|         11 |         | 112 Wild Rose Lane      | Barberton     | OH    | 44203 |          11 |
|         12 |         | 9954 East Thatcher Ave. | Muskegon      | MI    | 49441 |          12 |
|         13 |         | 38 Lake Street          | Marshfield    | WI    | 54449 |          13 |
|         14 |         | 371 W. Spring Street    | Pittsburgh    | PA    | 15206 |          14 |
|         15 |         | 8961 Oxford Lane        | Merrick       | NY    | 11566 |          15 |
|         16 |         | 215 E Madison St        | Hillsboro     | TX    | 76645 |          16 |
|         17 |         | 216 E Madison St        | Hillsboro     | TX    | 76645 |          17 |
|         18 |         | 217 E Madison St        | Hillsboro     | TX    | 76645 |          18 |
|         19 |         | 218 E Madison St        | Hillsboro     | TX    | 76645 |          19 |
|         20 |         | 219 E Madison St        | Hillsboro     | TX    | 76645 |          20 |
|         21 |         | 220 E Madison St        | Hillsboro     | TX    | 76645 |          21 |
|         22 |         | 221 E Madison St        | Hillsboro     | TX    | 76645 |          22 |
|         23 |         | 222 E Madison St        | Hillsboro     | TX    | 76645 |          23 |
|         24 |         | 223 E Madison St        | Hillsboro     | TX    | 76645 |          24 |
|         25 |         | 224 E Madison St        | Hillsboro     | TX    | 76645 |          25 |
|         26 |         | 225 E Madison St        | Hillsboro     | TX    | 76645 |          26 |
|         27 |         | 226 E Madison St        | Hillsboro     | TX    | 76645 |          27 |
|         28 |         | 227 E Madison St        | Hillsboro     | TX    | 76645 |          28 |
|         29 |         | 228 E Madison St        | Hillsboro     | TX    | 76645 |          29 |
|         30 |         | 229 E Madison St        | Hillsboro     | TX    | 76645 |          30 |
|         31 |         | 230 E Madison St        | Hillsboro     | TX    | 76645 |          31 |
|         32 |         | 231 E Madison St        | Hillsboro     | TX    | 76645 |          32 |
|         33 |         | 232 E Madison St        | Hillsboro     | TX    | 76645 |          33 |
|         34 |         | 233 E Madison St        | Hillsboro     | TX    | 76645 |          34 |
|         35 |         | 234 E Madison St        | Hillsboro     | TX    | 76645 |          35 |
|         36 |         | 235 E Madison St        | Hillsboro     | TX    | 76645 |          36 |
|         37 |         | 236 E Madison St        | Hillsboro     | TX    | 76645 |          37 |
|         38 |         | 237 E Madison St        | Hillsboro     | TX    | 76645 |          38 |
|         39 |         | 238 E Madison St        | Hillsboro     | TX    | 76645 |          39 |
|         40 |         | 239 E Madison St        | Hillsboro     | TX    | 76645 |          40 |
|         41 |         | 240 E Madison St        | Hillsboro     | TX    | 76645 |          41 |
|         42 |         | 241 E Madison St        | Hillsboro     | TX    | 76645 |          42 |
|         43 |         | 242 E Madison St        | Hillsboro     | TX    | 76645 |          43 |
|         44 |         | 243 E Madison St        | Hillsboro     | TX    | 76645 |          44 |
|         45 |         | 244 E Madison St        | Hillsboro     | TX    | 76645 |          45 |
+------------+---------+-------------------------+---------------+-------+-------+-------------+
45 rows in set (0.00 sec)
```

Table 2: Auction Table

```
mysql> SELECT * FROM Auction;
+-----------------+---------------+---------+
| timestamp_start | timestamp_end | item_id |
+-----------------+---------------+---------+
|      1475197317 |    1472580117 |      14 |
|      1475262117 |    1472666517 |       7 |
|      1475370117 |    1472752917 |       5 |
|      1475456517 |    1472839317 |       4 |
|      1475542917 |    1472925717 |      11 |
+-----------------+---------------+---------+
5 rows in set (0.00 sec)
```

Table 3: Bid Table

```
mysql> SELECT * FROM Bid;
+--------+---------+----------------------+---------+-----------------------+-----------+---------+------------+
| bid_id | amount  | cancellation_timestamp | item_id | auction_timestamp_start | username  | is_auto | max_amount |
+--------+---------+----------------------+---------+-----------------------+-----------+---------+------------+
|      1 |  500.00 |           1472580118 |      14 |            1475197317 | dishti4   |       1 |     700.00 |
|      2 |  800.00 |           1472580119 |      14 |            1475197317 | ben2      |       1 |    1000.00 |
|      3 |  950.00 |           1472580120 |      14 |            1475197317 | abby1     |       0 |       NULL |
|      4 |   20.00 |           1472666517 |       7 |            1475262117 | dishti4   |       1 |     220.00 |
|      5 |   60.00 |           1472666518 |       7 |            1475262117 | ben2      |       0 |       NULL |
|      6 |  100.00 |           1472752918 |       5 |            1475370117 | frank6    |       1 |     300.00 |
|      7 |  150.00 |           1472752919 |       5 |            1475370117 | hiren8    |       1 |     350.00 |
|      9 |  175.00 |           1472752920 |       5 |            1475370117 | frank6    |       0 |       NULL |
|     10 |  178.00 |           1472752921 |       5 |            1475370117 | mammoth12 |       1 |     378.00 |
|     11 |  200.00 |           1472752922 |       5 |            1475370117 | cathy3    |       0 |       NULL |
|     12 |  100.00 |           1472839318 |       4 |            1475456517 | hiren8    |       1 |     300.00 |
|     13 |  200.00 |           1472839319 |       4 |            1475456517 | dishti4   |       0 |       NULL |
|     14 | 2000.00 |           1472925717 |      11 |            1475542917 | eros5     |       1 |    2200.00 |
+--------+---------+----------------------+---------+-----------------------+-----------+---------+------------+
13 rows in set (0.00 sec)
```

Table 4: Category Table

```
mysql> SELECT * FROM Category;
+-------------+-------------------+-------------------------------------+-----------+
| category_id | description       | category_name                       | parent_id |
+-------------+-------------------+-------------------------------------+-----------+
|           1 | All               | all items                           |      NULL |
|         100 | women             | all women's shoes                   |         1 |
|         110 | boots             |  women's boots                      |       100 |
|         111 | booties           |  women's booties                    |       110 |
|         112 | flat_boots        |  women's flat boots                 |       110 |
|         113 | fuzzies           |  women's fuzzies boots              |       110 |
|         114 | heel_boots        |  women's heel boots                 |       110 |
|         115 | snow_boots        |  women's snow boots                 |       110 |
|         116 | western           |  women's western boots              |       110 |
|         120 | flats             |  women's flats                      |       100 |
|         121 | boats             |  women's boat flats                 |       120 |
|         122 | espadrilles       |  women's espadrilles flats          |       120 |
|         123 | loafers           |  women's loafers                    |       120 |
|         124 | lace_up           |  women's lace up flats              |       120 |
|         125 | open_toe          |  women's open toe flats             |       120 |
|         126 | pointed_toe       |  women's pointed toe flats          |       120 |
|         130 | pumps             |  women's pumps                      |       100 |
|         131 | block_heel        |  women's block heel pumps           |       130 |
|         132 | classic           |  women's classic pumps              |       130 |
|         133 | platform          |  women's platform pumps             |       130 |
|         134 | sling_back        |  women's sling back pumps           |       130 |
|         140 | slippers          |  women's slippers                   |       100 |
|         141 | block_heel        |  women's block heel slippers        |       140 |
|         142 | slip_on           |  women's slip-on slippers           |       140 |
|         143 | loafers/moccasins |  women's loafers/moccasins          |       140 |
|         150 | sneakers          |  women's sneakers                   |       100 |
|         151 | athletic          |  women's athletic sneakers          |       150 |
|         152 | comfort           |  women's comfort sneakers           |       150 |
|         153 | high_top          |  women's high-top sneakers          |       150 |
|         154 | lace_up           |  women's lace-up sneakers           |       150 |
|         155 | slip_on           |  women's slip-on sneakers           |       150 |
|         160 | wedges            |  women's wedges                     |       100 |
|         161 | espadrilles       |  women's espadrilles wedges         |       160 |
|         162 | evening           |  women's eveningwedges              |       160 |
|         163 | open_toe          |  women's open-toe wedges            |       160 |
|         164 | platform          |  women's platform wedges            |       160 |
|         165 | pointed_toe       |  women's pointed-toe wedges         |       160 |
|         200 | men               | all men's shoes                     |         1 |
|         210 | athletic          |  men's athletic shoes               |       200 |
|         211 | baseball          |  men's baseball shoes               |       210 |
|         212 | basketball        |  men's basketball shoes             |       210 |
|         213 | cross_training    |  men's cross training shoes         |       210 |
|         214 | football          |  men's football shoes               |       210 |
|         215 | golfer            |  men's golfer shoes                 |       210 |
|         216 | running           |  men's running shoes                |       210 |
|         217 | soccer            |  men's soccer shoes                 |       210 |
|         218 | tennis            |  men's tennis shoes                 |       210 |
|         219 | walking           |  men's walking shoes                |       210 |
|         220 | boots             |  men's boots                        |       200 |
|         221 | casual            |  men's casual boots                 |       220 |
|         222 | dress             |  men's dress boots                  |       220 |
|         223 | hiking            |  men's hiking boots                 |       220 |
|         224 | rain              |  men's rain boots                   |       220 |
|         225 | western           |  men's western boots                |       220 |
|         226 | work              |  men's work boots                   |       220 |
|         230 | casual            |  men's casual shoes                 |       200 |
|         231 | boats             |  men's boats                        |       230 |
|         232 | clogs             |  men's clogs                        |       230 |
|         233 | loafers           |  men's loafers                      |       230 |
|         234 | oxford            |  men's oxford                       |       230 |
|         240 | dress             |  men's dress shoes                  |       200 |
|         241 | drivers           |  men's drivers                      |       240 |
|         242 | lace_up           |  men's lace-up dress shoes          |       240 |
|         243 | loafers           |  men's loafer dress shoes           |       240 |
|         244 | oxford            |  men's oxford dress shoes           |       240 |
|         245 | retro             |  men's retro dress shoes            |       240 |
|         246 | slip_on           |  men's slip-on dress shoes          |       240 |
|         250 | sandals           |  men's sandals                      |       200 |
|         251 | casual            |  men's casual sandals               |       250 |
|         252 | fisherman         |  men's fisherman sandals            |       250 |
|         253 | slip_on           |  men's slip-on sandals              |       250 |
|         254 | sports            |  men's sports sandals               |       250 |
|         260 | slippers          |  men's slippers                     |       200 |
|         261 | comfort           |  men's comfort slippers             |       260 |
|         262 | loafers           |  men's loafer slippers              |       260 |
|         263 | moccasins         |  men's moccasins slippers           |       260 |
|         300 | kids              | all kids' shoes                     |         1 |
|         310 | girls             | all girls' shoes                    |       300 |
|         311 | athletic          |  girls' athletic shoes              |       310 |
|         312 | boots             |  girls' boots                       |       310 |
|         313 | casual            |  girls' casual shoes                |       310 |
|         314 | comfort           |  girls' comfort shoes               |       310 |
|         315 | dress             |  girls' dress shoes                 |       310 |
|         316 | flats             |  girls' flats                       |       310 |
|         317 | flip_flop         |  girls' flip-flops                  |       310 |
|         318 | outdoor           |  girls' outdoor shoes               |       310 |
|         320 | boys              | all boys' shoes                     |       300 |
|         321 | athletic          |  boys' athletic shoes               |       320 |
|         322 | boots             |  boys' boots                        |       320 |
|         323 | casual            |  boys' casual shoes                 |       320 |
|         324 | comfort           |  boys' comfort shoes                |       320 |
|         325 | dress             |  boys' dress shoes                  |       320 |
|         326 | flats             |  boys' flats                        |       320 |
|         327 | flip_flop         |  boys' flip-flops                   |       320 |
|         328 | outdoor           |  boys' outdoor shoes                |       320 |
|         330 | babies            | all babies' shoes                   |       300 |
|         331 | 0_6_months        |  babies' shoes for 0-6 months babies |       330 |
|         332 | 6_12_months       |  babies' shoes for 6-12 months babies |       330 |
|         333 | 12_18_months      |  babies' shoes for 12-18 months babies |       330 |
|         334 | 18_24_months      |  babies' shoes for 18-24 months babies |       330 |
|         335 | 2_3_years         |  babies' shoes for 2-3 years old kids |       330 |
|         400 | accessories       | all shoe related accessories        |         1 |
|         410 | socks/legwear     | all socks and legwear               |       400 |
|         411 | art               | art socks                           |       410 |
```

412	athletic	athletic socks	410
413	casual	casual socks	410
414	dress	dress socks	410
415	fuzzy	fuzzy socks	410
416	leggings	leggings	410
417	stickings	stickings	410
418	yoga_pants	yoga pants	410
420	care	all shoe care products	400
421	insoles	insoles	420
422	running_spikes	running spikes	420
423	shoe_cleaner	shoe cleaner	420
424	shoe_laces	shoe laces	420
425	shoe_polish	shoe polish	420
426	shoe_shiner	shoe shiner	420
427	spray	spray	420
428	stain_eraser	stain eraser	420
429	water_resistant	water resistant products	420
430	bags	all bags	400
431	backpack	backpack	430
432	duffel	duffel	430
433	totes	totes	430
440	sunglasses	all sunglasses	400
441	aviators	aviators sunglasses	440
442	club_masters	clubmasters sunglasses	440
443	round	round sunglasses	440
444	wayfarers	wayfarers sunglasses	440

130 rows in set (0.01 sec)

Table 5: Company_Data Table

```
mysql> SELECT * FROM Company;
+---------------------+-------------+
| point_of_contact    | supplier_id |
+---------------------+-------------+
| Craig B. McDonough  |          16 |
| Emmaline Sidhu      |          17 |
| Yelena Mckibben     |          18 |
| Margeret Dejean     |          19 |
| Byron Loftin        |          20 |
| Twanna Brin         |          21 |
| Lyn Laroque         |          22 |
| Angelika Polinsky   |          23 |
| Madaline Bolanos    |          24 |
| Melonie Krebbs      |          25 |
| Queen Treacy        |          26 |
| Damien Aguon        |          27 |
| Sanjuana Strackbein |          28 |
| Hanh Tai            |          29 |
| Jacki Stinger       |          30 |
| Jeannine Ricken     |          31 |
| Candra Mire         |          32 |
| Dotty Perrigo       |          33 |
| Adriene Kirsh       |          34 |
| Agnus Shiflett      |          35 |
| Davis Rybak         |          36 |
| Margherita Rodriguz |          37 |
| Milford Neilsen     |          38 |
| Carey Rone          |          39 |
| Lionel Haapala      |          40 |
| Charissa Winkleman  |          41 |
| Trina Styles        |          42 |
| Virgie Beale        |          43 |
| Roosevelt Marcantel |          44 |
| Cordell Vanhooser   |          45 |
+---------------------+-------------+
30 rows in set (0.00 sec)
```

Table 6: Contact_By Table

```
mysql> SELECT * FROM contact_by;
+--------------+-------------+
| phone_number | supplier_id |
+--------------+-------------+
|   8144417999 |           1 |
|   2135732879 |           2 |
|   9178893204 |           3 |
|   8142738930 |           4 |
|   2138940007 |           5 |
+--------------+-------------+
5 rows in set (0.00 sec)
```

Table 7: Credit_Card Table

```
mysql> SELECT * FROM Credit_Card;
+-----------------+--------------------+--------+------------+
| number          | name               | type   | expiration |
+-----------------+--------------------+--------+------------+
|  379580062526777 | Gabe Moran         | credit | 2021-09-01 |
|  379580062565888 | Eros Castillo      | credit | 2020-03-01 |
|  379580062576538 | Oliver Gibbs       | credit | 2021-02-01 |
|  379580062576998 | Abby Jackson       | credit | 2020-09-01 |
|  379580062590111 | Neal Dean          | credit | 2019-08-01 |
|  379580062598383 | Jeff Casey         | credit | 2020-05-01 |
| 4430400082342452 | Frank Figueroa     | debit  | 2021-08-01 |
| 4430400082724253 | Kelly Quinn        | debit  | 2021-04-01 |
| 4430400082732378 | Cathy Ho           | debit  | 2019-03-01 |
| 4430400082735352 | Noel Ramirez       | debit  | 2020-03-01 |
| 6011003807822317 | Rodolfo    Richardson | credit | 2020-01-01 |
| 6011003807832773 | Dishti Foster      | credit | 2021-05-01 |
| 6011003807838232 | Hiren Norris       | credit | 2019-05-01 |
| 6011003807839287 | Benjamin Smith     | credit | 2020-02-01 |
| 6011003807839972 | Linda Rivera       | credit | 2020-12-01 |
+-----------------+--------------------+--------+------------+
15 rows in set (0.00 sec)
```

Table 8: Custom_Shoe Table

```
mysql> SELECT * FROM Custom_shoe;
+--------------+--------------+------------+-------+-------------+--------------+-------------+----------+
| tong_style   | sole_style   | shoe_style | color | side_img_id | front_img_id | back_img_id | item_id |
+--------------+--------------+------------+-------+-------------+--------------+-------------+----------+
| Graphic Mesh | Rubber       | Athletic   | Green |         101 |          102 |         103 |     101 |
| Mesh         | Rubber       | Athletic   | Blue  |         104 |          105 |         106 |     102 |
| Suede        | Cork Nitrile | Casual     | Grey  |         107 |          108 |         109 |     103 |
| Suede        | Leather      | Boots      | Black |         110 |          111 |         112 |     104 |
| Leather      | Cork Nitrile | Work       | Brown |         113 |          114 |         115 |     105 |
+--------------+--------------+------------+-------+-------------+--------------+-------------+----------+
5 rows in set (0.01 sec)
```

Table 9: Customer_Service Table

```
mysql> SELECT * FROM Customer_Service;
+--------------------+-------------------+-----------------------------------------------------------------------------------------------------------------+-------------+
| customer_service_id | email             | faqs                                                                                                            | phone_number |
+--------------------+-------------------+-----------------------------------------------------------------------------------------------------------------+-------------+
|                  1 | abby1@techfam.com | Q: Can I chooes different shipping methods? A:Yes,we offer UPS ground shipping and priority shipping.           |  8144417999 |
|                  2 | ben2@techfam.com  | Q: Can I return? A: 30 days for direct sale items and no returns for auction items.                             |  2135732879 |
|                  3 | cathy3@techfam.com | Q: Can I bid twice for one item. A:Yes.                                                                         |  9178893204 |
|                  4 | dishti4@techfam.com | Q: Can I work at your company? A: No we aren't hiring.                                                        |  8142738930 |
|                  5 | eros5@techfam.com | Q: What if I really want to work at your company? A: Thanks for you interest, but I said we weren't hiring.     |  2138940007 |
+--------------------+-------------------+-----------------------------------------------------------------------------------------------------------------+-------------+
5 rows in set (0.00 sec)
```

Table 10: Footwear Table

```
mysql> SELECT * FROM Footwear;
+---------------------------------+---------+
| size                            | item_id |
+---------------------------------+---------+
| 5-9.5                           |       1 |
| 5-9.5                           |       2 |
| 5-10                            |       3 |
| 5-10                            |       4 |
| 5.5-7.5                         |       5 |
| 5-10                            |       6 |
| 5-11                            |       7 |
| 5-9.5                           |       8 |
| 5-10                            |       9 |
| 5-9.5                           |      10 |
| 5-9.5                           |      11 |
| 5-9.5                           |      12 |
| 7-10                            |      13 |
| 8-12                            |      14 |
| 8-11                            |      15 |
| 7-12                            |      16 |
| 8-12                            |      17 |
| 8-12                            |      18 |
| 10-12                           |      19 |
| 7-12                            |      20 |
| 7-12                            |      21 |
| 7-12                            |      22 |
| 7-12                            |      23 |
| 7-12                            |      24 |
| 7-12                            |      25 |
| 7-12                            |      26 |
| 7-12                            |      27 |
| 7-12                            |      28 |
| 1-13 kids                       |      29 |
| 1-13 kids                       |      30 |
| 1-13 kids                       |      31 |
| 1-13 kids                       |      32 |
| 1-13 kids                       |      33 |
| 18-24 months                    |      34 |
| 1-13 kids                       |      35 |
| 1-13 kids                       |      36 |
| 1-13 kids                       |      37 |
| 12-18 months                    |      38 |
| 6-12 months                     |      39 |
| 6-12 months                     |      40 |
| 7-10                            |      41 |
| 7-9                             |      42 |
| 7-9                             |      43 |
| 7-9                             |      44 |
| 7-9                             |      45 |
| 7-9                             |      46 |
| 7-9                             |      47 |
| 7-9                             |      48 |
| 7-9                             |      49 |
| 7-9                             |      50 |
```

5-11	51
5-11	52
5-11	53
5-11	54
5-11	55
5-10	56
5-10	57
5-11	58
5.5-10	59
6-8	60
5-11	61
5-11	62
S-XL	63
5-11	64
5-11	65
5-11	66
5-11	67
5-11	68
5-11	69
5-11	70
7-10	71
5-6	72
5-10	73
5-10	74
8-13	75
8-13	76
7.5-14	77
8-13	78
8-13	79
8-13	80
7-13	81
7-13	82
7-13	83
7-16	84
7-13	85
7-13	86
S-XXL	87
8-13	88
7-13	89
1-4	90
3-7	91
3-7	92
3-7	93
3.5-7	94
3-7	95
"0-6 months, 6-12 months"	96
"0-6 months, 6-12 months"	97
18-24 months	98
"0-6, 6-12, 12-18, 18-24 Months"	99
"6-12, 12-18, 18-24 Months"	100
7	101
7	102
8	103
9	104

7	105

105 rows in set (0.01 sec)

Table 11: Has_Visual Table

```
mysql> SELECT * FROM has_visual;
+---------+--------+---------------------+
| item_id | img_id | color               |
+---------+--------+---------------------+
|       1 |      1 | black               |
|       2 |      2 | black               |
|       3 |      3 | Sughero             |
|       4 |      4 | Nude                |
|       5 |      5 | Black/Ouro          |
|       6 |      6 | Ivory               |
|       7 |      7 | Black/Ivory         |
|       8 |      8 | Silver/Silver       |
|       9 |      9 | Burgundy            |
|      10 |     10 | Black               |
|      11 |     11 | Black               |
|      12 |     12 | Silver              |
|      13 |     13 | Carnival            |
|      14 |     14 | Black               |
|      15 |     15 | Black               |
|      16 |     16 | Black               |
|      17 |     17 | Camel/Camel         |
|      18 |     18 | Blue                |
|      19 |     19 | Black               |
|      20 |     20 | Black               |
|      21 |     21 | Blue Marine         |
|      22 |     22 | Black               |
|      23 |     23 | White               |
|      24 |     24 | Blue                |
|      25 |     25 | Blue                |
|      26 |     26 | Blue                |
|      27 |     27 | Black               |
|      28 |     28 | Black               |
|      29 |     29 | quail grey          |
|      30 |     30 | Blue Tint           |
|      31 |     31 | Suede Blush         |
|      32 |     32 | Platinum            |
|      33 |     33 | Silver              |
|      34 |     34 | Chestnut            |
|      35 |     35 | Black Denim         |
|      36 |     36 | Blue                |
|      37 |     37 | Black               |
|      38 |     38 | Suede               |
|      39 |     39 | Red                 |
|      40 |     40 | Blue                |
|      41 |     41 | Black               |
|      42 |     42 | Bordeaux/Dark Brown |
|      43 |     43 | Fantasy Silver      |
|      44 |     44 |  Nero/Oro           |
|      45 |     45 | Gold                |
|      46 |     46 | Ivory               |
|      47 |     47 | Black               |
|      48 |     48 | White               |
|      49 |     49 | Cognac              |
|      50 |     50 | Black               |
|      51 |     51 | "Black Saffiano     |
|      52 |     52 | "Dark Stone         |
|      53 |     53 | "Black Leather      |
|      54 |     54 | "Brown              |
|      55 |     55 | "Brown              |
|      56 |     56 | "Black              |
|      57 |     57 | "Natural            |
|      58 |     58 | "Black              |
|      59 |     59 | "Glazed Ginger      |
|      60 |     60 | "Black              |
|      61 |     61 | "Rasberry           |
|      62 |     62 | "Black              |
|      63 |     63 | "Cream              |
|      64 |     64 | "Black              |
|      65 |     65 | "Garnet             |
|      66 |     66 | "Black              |
|      67 |     67 | Black               |
|      68 |     68 | "Black              |
|      69 |     69 | "Black              |
|      70 |     70 | "Platino            |
|      71 |     71 | "Silver             |
|      72 |     72 | Electric Blue       |
|      73 |     73 | White/Black         |
|      74 |     74 | "Pearl Grey         |
|      75 |     75 | "Black              |
|      76 |     76 | Orange              |
|      77 |     77 | Black               |
|      78 |     78 | Dark Brown          |
|      79 |     79 | Black/Brown         |
|      80 |     80 | Brown               |
|      81 |     81 | "Canteen            |
|      82 |     82 | "Black              |
|      83 |     83 | "Black              |
|      84 |     84 | "Black              |
|      85 |     85 | Black               |
|      86 |     86 | Cognac              |
|      87 |     87 | "Stone              |
|      88 |     88 | Brown               |
|      89 |     89 | Brown               |
|      90 |     90 | Brown               |
|      91 |     91 | Black               |
|      92 |     92 | Navy                |
|      93 |     93 | Black               |
|      94 |     94 | Magenta/Navy        |
|      95 |     95 | Onix/Sun Glow/Grey  |
|      96 |     96 | Grey                |
|      97 |     97 | Pink                |
|      98 |     98 | White               |
|      99 |     99 | Grey                |
|     100 |    100 | Grey                |
+---------+--------+---------------------+
100 rows in set (0.00 sec)
```

Table 12: Image Table

```
mysql> SELECT img_id FROM Image;
+--------+
| img_id |
+--------+
|      1 |
|      2 |
|      3 |
|      4 |
|      5 |
|      6 |
|      7 |
|      8 |
|      9 |
|     10 |
|     11 |
|     12 |
|     13 |
|     14 |
|     15 |
|     16 |
|     17 |
|     18 |
|     19 |
|     20 |
|     21 |
|     22 |
|     23 |
|     24 |
|     25 |
|     26 |
|     27 |
|     28 |
|     29 |
|     30 |
|     31 |
|     32 |
|     33 |
|     34 |
|     35 |
|     36 |
|     37 |
|     38 |
|     39 |
|     40 |
|     41 |
|     42 |
|     43 |
|     44 |
|     45 |
|     46 |
|     47 |
|     48 |
|     49 |
|     50 |
```

Note that this table also has a column of images, but this could not be printed out due to the size of the data. Also note that the real table goes all the way up to Image_ID 115.

Table 13: Pays_With Table

```
mysql> SELECT * FROM pays_with;
+----------+-----------------+------------+
| username | number          | address_id |
+----------+-----------------+------------+
| abby1    |  379580062576998 |          1 |
| ben2     | 6011003807839287 |          2 |
| cathy3   | 4430400082732378 |          3 |
| dishti4  | 6011003807832773 |          4 |
| eros5    |  379580062565888 |          5 |
| jeff9    |  379580062598383 |          9 |
+----------+-----------------+------------+
6 rows in set (0.00 sec)
```

Table 14: Phone Table

```
mysql> SELECT * FROM Phone;
+--------------+
| phone_number |
+--------------+
|   2134567389 |
|   2135732879 |
|   2137849380 |
|   2137892635 |
|   2138940007 |
|   8142738930 |
|   8144413490 |
|   8144417880 |
|   8144417930 |
|   8144417991 |
|   8144417999 |
|   9176352937 |
|   9176538290 |
|   9178269309 |
|   9178893204 |
+--------------+
15 rows in set (0.01 sec)
```

Table 15: Rating Table

```
mysql> SELECT * FROM Rating;
+-----------+---------------------------------------+-------+----------+-------------+
| rating_id | explanation                           | value | username | supplier_id |
+-----------+---------------------------------------+-------+----------+-------------+
|         4 | very good!                            |     5 | dishti4  |           1 |
|         1 | excellent!                            |     4 | abby1    |           3 |
|         5 | good!                                 |     5 | eros5    |           4 |
|         2 | satified purchase!                    |     5 | ben2     |           7 |
|         3 | good stuff but I don't like the color |     4 | cathy3   |          13 |
+-----------+---------------------------------------+-------+----------+-------------+
5 rows in set (0.01 sec)
```

Table 16: Register_Users Table

```
mysql> SELECT * FROM Register_Users;
+-------------+------------------------------------------+------+--------+--------+-------------+
| username    | password                                 | age  | gender | income | supplier_id |
+-------------+------------------------------------------+------+--------+--------+-------------+
| abby1       | 7c4a8d09ca3762af61e59520943dc26494f8941b |   20 | Female |    100 |           1 |
| ben2        | 3d4f2bf07dc1be38b20cd6e46949a1071f9d0e3d |   22 | Male   |   2000 |           2 |
| cathy3      | 5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8 |   35 | Female |    200 |           3 |
| dishti4     | 0c3310ae5f5ac0e5c164912108328111ce443619 |   20 | Female |   2300 |           4 |
| eros5       | 7c4a8d09ca3762af61e59520943dc26494f8941b |   22 | Male   |   2500 |           5 |
| frank6      | 7c4a8d09ca3762af61e59520943dc26494f8941b |   21 | Male   |   3000 |           6 |
| gabe7       | 0c3310ae5f5ac0e5c164912108328111ce443619 |   28 | Female |    300 |           7 |
| hiren8      | 5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8 |   20 | Male   |   5000 |           8 |
| jeff9       | 3d4f2bf07dc1be38b20cd6e46949a1071f9d0e3d |   22 | Male   |  10000 |           9 |
| kelly10     | 7c4a8d09ca3762af61e59520943dc26494f8941b |   29 | Female |    400 |          10 |
| linda11     | 0c3310ae5f5ac0e5c164912108328111ce443619 |   32 | Female |   1200 |          11 |
| mammoth12   | 5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8 |   60 | Female |   3000 |          12 |
| noho13      | 0c3310ae5f5ac0e5c164912108328111ce443619 |   33 | Male   |    500 |          13 |
| olly14      | 3d4f2bf07dc1be38b20cd6e46949a1071f9d0e3d |   17 | Male   |    400 |          14 |
| polarbear15 | 5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8 |   34 | Male   |    800 |          15 |
+-------------+------------------------------------------+------+--------+--------+-------------+
15 rows in set (0.00 sec)
```

Table 17: Sale Table

```
mysql> SELECT * FROM Sale;
+----------------+---------+------------+-----------------+---------+----------+--------------------+
| transaction_id | price   | date       | auction_or_sale | item_id | username | credit_card_number |
+----------------+---------+------------+-----------------+---------+----------+--------------------+
|              1 |  950.00 | 1472580117 |               1 |      14 | abby1    |    379580062576998 |
|              2 |   50.00 | 1472666517 |               1 |       7 | ben2     |   6011003807839287 |
|              3 |  200.00 | 1472752917 |               1 |       5 | cathy3   |   4430400082732378 |
|              4 |  200.00 | 1472839317 |               1 |       4 | dishti4  |   6011003807832773 |
|              5 | 2250.00 | 1472925717 |               1 |      11 | eros5    |    379580062565888 |
|              6 |  195.00 | 1478385345 |               0 |      70 | jeff9    |   4430400082724253 |
+----------------+---------+------------+-----------------+---------+----------+--------------------+
6 rows in set (0.00 sec)
```

Table 18: Sales_Item Table

```
mysql> SELECT item_id, count, brand, list_price, state, name, reserved_price, category_id, supplier_id, address_id FROM Sales_Item;
```

item_id	count	brand	list_price	state	name	reserved_price	category_id	supplier_id	address_id
1	44	Hilfiger Collection	680.00	new	Rock-n-Roll Demi	650.00	132	8	8
2	46	Giuseppe Zanotti	695.00	new	Moon Boots	650.00	112	10	10
3	91	KENDALL + KYLIE	225.00	new	Ayla Thigh High Boots	200.00	114	14	14
4	58	Badgley Mischka	225.00	new	Diego Ankle Strap Pumps	200.00	133	1	1
5	78	Schutz	220.00	new	Myrna Sandals	200.00	132	13	13
6	33	Soludos	75.00	new	Tulip Lace Smoking Slipper Espadrilles	70.00	122	12	12
7	79	Kate Spade New York	68.00	new	Berry Slippers	50.00	142	7	7
8	61	Giuseppe Zanotti	1225.00	new	Leather Wing Sneakers	1200.00	154	13	13
9	63	Sigerson Morrison	275.00	new	Wynne Lace Up Wedge Pumps	250.00	165	1	1
10	72	Sarah Flint	1195.00	new	Cortina Boots	1150.00	115	9	9
11	81	Marc Jacobs	2295.00	new	Dede Platform Button Boots	2250.00	114	4	4
12	42	Sergio Rossi	1895.00	new	Mermaid Cage Booties	1850.00	111	11	11
13	59	Stuart Weitzman	785.00	new	Go Fur It Booties	750.00	113	4	4
14	12	Calvin Klein Collection	995.00	new	Bob Zip Boots	950.00	221	3	3
15	34	To Boot New York	395.00	new	Berman Formal Lace Up Oxfords	350.00	242	4	4
16	26	Salvatore Ferragamo	740.00	new	Fedele Plain Toe Lace Up Shoes	700.00	242	8	8
17	91	Calvin Klein Collection	895.00	new	Urban High Top Sneakers	850.00	219	10	10
18	13	Marni	720.00	new	Sandals	700.00	251	11	11
19	43	Eytys	380.00	new	Jojo Sandals	350.00	253	3	3
20	81	Salvatore Ferragamo	780.00	new	Destin Apron Toe Bit Loafers	750.00	243	9	9
21	73	Salvatore Ferragamo	640.00	new	Mason Bit Suede Loafers	600.00	262	13	13
22	63	Nike	130.00	new	Nike Free RN Flyknit	100.00	216	6	6
23	45	NIke	65.00	new	Nike Court Lite	50.00	218	8	8
24	55	Nike	140.00	new	Nike Golf FI Impact 2	100.00	215	12	12
25	23	NIke	100.00	new	Nike Zoom Train Action	90.00	213	7	7
26	21	Under Armour	75.00	new	Under Armour UA Jet Mid	70.00	212	3	3
27	49	Mizuno	36.00	new	Mizuno 9-Spike? Advanced Franchise 8 Low	35.00	211	15	15
28	5	Adidas	36.00	new	adidas Filthyquick 3.0 Mid Football	35.00	214	4	4
29	34	The North Face	65.00	new	The North Face Kids Amore (Little Kid/Big Kid)	60.00	312	14	14
30	31	Vans	42.00	new	Vans Kids Classic Slip-On (Little Kid/Big Kid)	40.00	313	4	4
31	97	Elephantito	73.00	new	Elephantito Mary Jane (Toddler/Little Kid)	70.00	316	14	14
32	53	Jack Rogers	69.00	new	Jack Rogers Miss Hamptons II (Toddler/Little Kid/Big Kid)	60.00	317	13	13
33	17	Freshly Picked	60.00	new	Freshly Picked Soft Sole Moccasins (Infant/Toddler)	50.00	314	4	4
34	18	EMU	50.00	new	EMU Australia Kids Toddle (Infant)	45.00	334	3	3
35	42	TOMS	42.00	new	TOMS Kids Bimini Espadrille (Little Kid/Big Kid)	40.00	323	5	5
36	20	Keen	50.00	new	Keen Kids Newport H2 (Little Kid/Big Kid)	45.00	323	12	12
37	45	Kenneth Cole	56.00	new	Kenneth Cole Reaction Kids T-Flex Sr (Little Kid/Big Kid)	50.00	325	4	4
38	18	Elephantito	73.00	new	Elephantito Sabrina (Toddler/Little Kid)	70.00	333	13	13
39	57	Converse	35.00	new	Converse Kids Chuck Taylor? All Star? Street Mid (Infant/Toddler)	30.00	332	14	14
40	100	Reef	48.00	new	Reef Kids Ahi (Little Kid/Big Kid)	40.00	327	1	1
41	57	Giuseppe Zanotti	1395.00	new	Fur Boots	1360.00	113	12	12
42	77	Maison Margiela	1295.00	new	Loafer Wedges	1250.00	164	10	10
43	50	Charlotte Olympia	1225.00	new	Leandra Sandals	1220.00	164	14	14
44	3	Versace	1040.00	new	Wedge Sandals	1000.00	164	4	4
45	84	Giuseppe Zanotti	995.00	new	Leather Sneakers	950.00	152	11	11
46	26	Sarah Flint	995.00	new	Luisa Flats	950.00	126	14	14
47	36	R13	995.00	new	Platform Combat Boots	950.00	112	14	14
48	16	Giuseppe Zanotti	995.00	new	Studded Slip On Sneakers	950.00	155	9	9
49	54	Aquazzura	950.00	new	Tiger Lily Flat Booties	900.00	111	2	2
50	54	Aquazzura	950.00	new	Eva Booties	900.00	111	4	4
51	62	Michael Kors	99.00	new	MICHAEL Michael Kors Fulton Moc Flats	NULL	120	16	16
51	62	Michael Kors	99.00	new	MICHAEL Michael Kors Fulton Moc Flats	NULL	120	16	16
52	37	Lucky Brand	139.00	new	Women's Perforated Basel Booties	NULL	111	17	17
53	51	Michael Kors	99.00	new	MICHAEL Michael Kors MK Flex Mid Pointed-Toe Pumps	NULL	130	16	16
54	65	GUESS	89.00	new	G by GUESS Hailee Riding Boots	NULL	112	18	18
55	56	Style& Co.	79.50	new	Style& Co. Jamila Zip Booties	NULL	111	19	19
56	91	Converse	54.99	new	Converse Women's Chuck Taylor Ox Casual Sneakers from Finish Line	NULL	152	20	20
57	47	American Rag	85.50	new	Dawnn Western Boots	NULL	116	20	20
58	24	Carlos by Carlos Santana	179.00	new	Ace Western Boots	NULL	116	21	21
59	67	Timberland	140.00	new	Women's Kensington Cold-Weather Boots	NULL	115	22	22
60	88	Nautica	45.00	new	Women's Pinecrest Boat Shoes	NULL	121	23	23
61	27	Michael Kors	89.00	new	MICHAEL Michael Kors Dana Espadrille Flats	NULL	122	16	16
62	66	Steve Madden	89.00	new	Women's Sunshine Lace-Up Pointed Flats	NULL	124	38	38
63	59	Isotoner Signature	24.00	new	Isotoner Satin Ballerina Slipper	NULL	140	24	24
64	29	BCBGeneration	69.00	new	Parade Platform Pumps	NULL	133	25	25
65	79	Calvin Klein	129.00	new	Casilla Mary Jane Pumps	NULL	131	26	26
66	80	Calvin Klein	99.00	new	Women's Gayle Pointed-Toe Pumps	NULL	132	26	26
67	59	Anne Klein	100.00	new	Ideona Slingback Pumps	NULL	134	27	27
68	87	Bandolino	69.00	new	Yara Pointed Toe Demi Wedges	NULL	165	28	28
69	69	American Rag	59.50	new	Audria Two-Piece Platform Wedges	NULL	164	29	29
70	81	Badgley Mischka	195.00	new	Awake Evening Wedge Pumps	NULL	162	30	30
71	56	Marc Fisher	89.00	new	Maiseey Espadrille Wedge Sandals	NULL	161	31	31
72	50	Michael Kors	195.00	new	MICHAEL Michael Kors Nikko High-Top Sneakers	NULL	153	16	16
73	86	Adidas	80.00	new	Women's Superstar Casual Sneakers from Finish Line	NULL	154	32	32
74	76	Michael Kors	130.00	new	MICHAEL Michael Kors Kyle Perforated Slip-On Sneakers	NULL	155	16	16
75	73	Reebok	55.00	new	Men's Trainfusion 5.0 L MT TRaining Sneakers from Finish Line	NULL	210	33	33
76	72	Nike	100.00	new	Men's Free Run Running Sneakers from Finish Line	NULL	216	34	34
77	46	Nike	75.00	new	Men's Air Versatile Basketball Sneakers from Finish Line	NULL	212	34	34
78	61	Polo Ralph Lauren	350.00	new	Polo Ralph Lauren Men's Mersey Pull-On Boots	NULL	226	35	35
79	3	Timberland	170.00	new	"Men's Earthkeeper Original 6"" Boot"	NULL	226	22	22
80	59	North Face	110.00	new	Men's Chilkat II Waterproof Lace-Up Boots	NULL	224	36	36
81	98	Timberland	190.00	new	"Men's 6"" Premium Waterproof Boots"	NULL	224	22	22
82	50	Polo Ralph Lauren	195.00	new	Polo Ralph Lauren Men's Nickson Wingtip Boots	NULL	222	35	35
83	95	Clarks	80.00	new	Men's Cotrell Step Bike Toe Casual Slip-Ons	NULL	230	37	37
84	6	Calvin Klein	110.00	new	Calvin Klein Men's Brodie Leather Oxfords	NULL	244	26	26
85	76	Steve Madden	60.00	new	Men's Trace Loafers	NULL	243	38	38
86	60	Steve Madden	60.00	new	Men's Need Drivers	NULL	241	38	38
87	51	Club Room	44.00	new	Men's Slippers, Paul Suede Slip-On Loafers	NULL	262	39	39
88	51	Timberland	80.00	new	Men's Altamont 2.0 Fisherman Sandals	NULL	252	22	22
89	51	Alfani	60.00	new	Men's Surf Slingback Sandals	NULL	253	40	40
90	39	Tommy Hilfiger	30.00	new	Baby Boys' Lil' Aiden Booties	NULL	322	41	41
91	56	Tommy Hilfiger	39.00	new	Boys' or Little Boys' Robbie Lace-Up Dress Shoes	NULL	325	41	41
92	45	Stride Rite	44.00	new	Little Girls' or Toddler Girls' Simone Mary-Janes	NULL	313	42	42
93	31	Hush Puppies	50.00	new	Girls' or Little Girls' Kenzie Flats	NULL	316	43	43
94	93	Crocs	15.00	new	Girls' or Little Girls' Hawaii Stripe Flip-Flops	NULL	317	44	44
95	14	Adidas	65.00	new	Little Girls' Hyperhiker Outdoor Sneakers from Finish Line	NULL	318	32	32
96	35	Robeez	30.00	new	Baby Boys' Morgan Booties	NULL	331	45	45
97	60	Robeez	38.00	new	Baby Girls' Classic Booties	NULL	331	45	45
98	72	Robeez	25.00	new	Baby Girls' Special Occasion Shoes	NULL	334	45	45
99	23	Robeez	26.00	new	Stylish Steve Shoes, Baby Boys	NULL	333	45	45
100	65	Robeez	26.00	new	Baby Girls' Cool Water Mary-Jane Layette Shoes	NULL	334	45	45
101	NULL	NULL	200.00	NULL	NULL	NULL	150	0	45
102	NULL	NULL	200.00	NULL	NULL	NULL	150	0	45
103	NULL	NULL	200.00	NULL	NULL	NULL	230	0	45
104	NULL	NULL	200.00	NULL	NULL	NULL	110	0	45
102	NULL	NULL	200.00	NULL	NULL	NULL	150	0	45
103	NULL	NULL	200.00	NULL	NULL	NULL	230	0	45
104	NULL	NULL	200.00	NULL	NULL	NULL	110	0	45
105	NULL	NULL	200.00	NULL	NULL	NULL	130	0	45

```
105 rows in set (0.00 sec)
```

Note that this table also has a description column, but due to the size of the data, it could not be fit

Table 19: Suppliers Table

```
mysql> SELECT * FROM Suppliers;
+-------------+-------------------------+--------------------------+
| supplier_id | email                   | name                     |
+-------------+-------------------------+--------------------------+
|           0 | us@techfam.com          | TechFam                  |
|           1 | abby1@techfam.com       | Abby Jackson             |
|           2 | ben2@techfam.com        | Benjamin Smith           |
|           3 | cathy3@techfam.com      | Cathy Ho                 |
|           4 | dishti4@techfam.com     | Dishti Foster            |
|           5 | eros5@techfam.com       | Eros Castillo            |
|           6 | frank6@techfam.com      | Frank Figueroa           |
|           7 | gabe7@techfam.com       | Gabe Moran               |
|           8 | hiren8@techfam.com      | Hiren Norris             |
|           9 | jeff9@techfam.com       | Jeff Casey               |
|          10 | kelly10@techfam.com     | Kelly Quinn              |
|          11 | linda11@techfam.com     | Linda Rivera             |
|          12 | mammoth12@techfam.com   | Neal Dean                |
|          13 | noho13@techfam.com      | Noel Ramirez             |
|          14 | olly14@techfam.com      | Oliver Gibbs             |
|          15 | polarbear15@techfam.com | Rodolfo       Richardson       |
|          16 | a16@techfam.com         | Michael Kors             |
|          17 | a17@techfam.com         | Lucky Brand              |
|          18 | a18@techfam.com         | GUESS                    |
|          19 | a19@techfam.com         | Style& Co.               |
|          20 | a20@techfam.com         | Converse                 |
|          21 | a21@techfam.com         | Carlos by Carlos Santana |
|          22 | a22@techfam.com         | Timberland               |
|          23 | a23@techfam.com         | Nautica                  |
|          24 | a24@techfam.com         | Isotoner Signature       |
|          25 | a25@techfam.com         | BCBGeneration            |
|          26 | a26@techfam.com         | Calvin Klein             |
|          27 | a27@techfam.com         | Anne Klein               |
|          28 | a28@techfam.com         | Bandolino                |
|          29 | a29@techfam.com         | American Rag             |
|          30 | a30@techfam.com         | Badgley Mischka          |
|          31 | a31@techfam.com         | Marc Fisher              |
|          32 | a32@techfam.com         | Adidas                   |
|          33 | a33@techfam.com         | Reebok                   |
|          34 | a34@techfam.com         | Nike                     |
|          35 | a35@techfam.com         | Polo Ralph Lauren        |
|          36 | a36@techfam.com         | North Face               |
|          37 | a37@techfam.com         | Clarks                   |
|          38 | a38@techfam.com         | Steve Madden             |
|          39 | a39@techfam.com         | Club Room                |
|          40 | a40@techfam.com         | Alfani                   |
|          41 | a41@techfam.com         | Tommy Hilfiger           |
|          42 | a42@techfam.com         | Stride Rite              |
|          43 | a43@techfam.com         | Hush Puppies             |
|          44 | a44@techfam.com         | Crocs                    |
|          45 | a45@techfam.com         | Robeez                   |
+-------------+-------------------------+--------------------------+
46 rows in set (0.00 sec)
```

Table 20: UPS Table

```
mysql> SELECT * FROM UPS;
+-------------+---------------+-----------------+----------------+---------------------+
| shipping_id | shipping_date | shipping_method | transaction_id | shipping_address_id |
+-------------+---------------+-----------------+----------------+---------------------+
|           1 |    1472666517 | ground          |              1 |                   1 |
|           2 |    1472752917 | ground          |              2 |                   2 |
|           3 |    1472839317 | priority        |              3 |                   3 |
|           4 |    1472925717 | ground          |              4 |                   4 |
|           5 |    1473012117 | ground          |              5 |                   5 |
|           6 |    1478471745 | ground          |              6 |                   9 |
+-------------+---------------+-----------------+----------------+---------------------+
6 rows in set (0.00 sec)
```

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