Step 1: Identify Entities

Based on the provided information, the key entities in the system are:

Item: Represents the individual items put up for auction.

Seller: Represents the legal sellers who own the items.

Buyer: Represents the people who purchase the items at the auction.

Auction: Represents the auctions organized by the company.

Step 2: Define Entity Attributes

Determine the attributes for each entity:

Item: lot number, description, starting price, actual price, auction ID, seller ID.

Seller: ID, name, contact information.

Buyer: ID, name, contact information.

Auction: ID, date, time, location, specific details.

Step 3: Establish Relationships and Cardinality

Identify the relationships between the entities:

An item is associated with a seller, a buyer, and an auction.

A seller can have multiple items, but an item belongs to only one seller (1-to-many relationship).

A buyer can purchase multiple items, and an item can be purchased by only one buyer (1-to-many relationship).

An auction can have multiple items, and an item belongs to only one auction (1-to-many relationship).

Step 4: Design the Database Schema

Create tables for each entity and define the appropriate primary and foreign keys:

Item table: item ID (primary key), lot number, description, starting price, actual price, auction ID (foreign key), seller ID (foreign key), buyer ID (foreign key).

Seller table: seller ID (primary key), name, contact information.

Buyer table: buyer ID (primary key), name, contact information.

Auction table: auction ID (primary key), date, time, location, specific details.

Step 5: Implement the Database

Use a database management system (DBMS) such as MySQL, PostgreSQL, or Microsoft SQL Server to create and implement the database schema.

Create the necessary tables with the defined attributes and establish the relationships using primary and foreign keys.

Step 6: Populate the Database

Import or manually enter the existing data into the corresponding tables.

Populate the item table with information about each item, including the associated auction, seller, starting price, and description.

Populate the seller and buyer tables with their respective information.

Populate the auction table with information about each auction, including the date, time, location, and specific details.

Step 7: Perform Queries and Data Analysis

Utilize SQL (Structured Query Language) to query the database for various purposes, such as retrieving information about specific auctions, sellers, buyers, or items, calculating aggregate statistics, or generating reports

Business description:

The company operates as an auction house specializing in the sale of antiques and artwork. They facilitate the process of connecting legal sellers, who are the owners of the items, with buyers interested in purchasing these items. The company receives batches of items from the sellers and strategically determines the most profitable auction at which to present each item.

Before each auction, the company assigns a unique lot number to each item displayed. This lot number serves as an identifier for the item throughout the auction process, similar to a product code. It's important to note that different items sold at different auctions may have the same lot numbers, as each auction is treated independently.

The company meticulously records details about each auction they organize. This includes capturing information such as the date, place, and time of the auction. Additionally, specific details about the auction may be recorded, such as specialized categories like "oil paintings from before 1900."

To effectively manage the auction process, the company also maintains comprehensive information about each item sold. The key details recorded for each item include the auction to which it is assigned, the lot number, the seller's information, the starting price, and a brief verbal description of the item.

Sellers are allowed to display any number of items they wish to auction, and buyers have the freedom to purchase any number of items available. Furthermore, it is possible for the same person or firm to act as both a seller and a buyer, participating in the auction from both perspectives.

Following the conclusion of an auction, the employees of the auction house accurately record the actual price paid for each item and collect the buyer's data. This information helps in maintaining accurate records and provides insights into the success and profitability of each auction.

Overall, the company's primary goal is to facilitate the sale of antiques and artwork by creating a transparent and efficient marketplace for legal sellers and buyers. Their systematic approach includes assigning lot numbers, recording auction details, capturing item information, and documenting the transactional data to ensure a smooth and successful auction process.