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ICOM5016 - Introduction to Database Systems
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Term Project - Mobile App for an EBay-style Site
Phase II - Relational Mapping and Read Operations

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E-R Model Explanation

Entities

- **Product**: Representation of each individual product being sold on the store portal.
    - proxduct_ID: unique primary key
    - name: name for the product
    - instant_price: monetary value to buy the product instantly
    - description: detailed description of the product
    - model: specific product model
    - photo_filename: filename reference to the image file of the product
    - brand: specific product brand
    - dimensions: describes physical dimension of the product
- **Category**: Differentiating group for the products, each "product" can only have one "category" related to it. Each "category" has a "parent" role assigned to it in order to make categories into a tree hierarchy structure.
    - category_ID: unique primary key
    - name: name describing the category
- **Auction**: represents an auction for a single "product" entity
    - auction_ID: unique primary key
    - starting_bid: starting price for the auction set by the seller
    - current_bid: current price for an auction derived from buyer bids
    - start_date: date and time when the auction started
    - duration: time duration in minutes that the auction will last for from the starting time
    - end_date: date and time when the auction will end, based on the start_date and duration
- **Bid**: represents a single bid for a product auction
    - bid_ID: unique primary key
    - date: date and time when the bid was placed
    - price_offer: monetary value offered for the product
- **Order**: Represents an instance of an account's "shopping cart" when the user "checked out" and paid for the list of product on it at the time, it is the invoice for the related transaction.
    - order_ID: unique primary key
    - date: date and time when the order was placed and paid for
    - invoice_filename: filename for the invoice document that would be sent to the user
- **Payment Option**: Generalization for the payment options available for the user to pay for his products. It's specialized into the following entities:
    - credit_card
        - card_number: printed number for the specific credit card

        - holder_name: name for the credit card holder printed on the card
        - expiration_date: Date when the credit card will expire. Divided into month and year.
        - security_code: number used for credit card security reasons
    - bank_account
        - account_type: whether the account is a checking or savings account
        - routing_number: number that identifies the specific bank
        - account_number: specific account number within the bank
- **Address**: Represents a physical address and/or a billing address when it's related to a credit_card entity. Attributes are self explanatory.
    - address_ID: unique primary key
    - street_number
    - street_name
    - apt_number
    - city
    - state
    - zip_code
- **Cart**: Represents an instance of the list of products that the user wishes to buy. The list is contained within the "contains" relationship.
    - cart_ID: unique primary key
- **User**: Represents a single instance of a user browsing the site.
    - sessionID: unique primary key
- **Account**: Represents an account for a single user agent within the system.
    - account_ID: unique primary key
    - date: date and time when the user registered the account
    - first_name
    - middle_initial
    - last_name
    - photo_filename: Pathname in the file system that point to where the profile picture of the person is.
    - e-mail: e-mail address linked to the user account.
    - rating: seller rating derived from the products listed in a buyer order.
    - account_permissions: Determines the permission a user has over the management of the store system. Currently only determines whether an account is a regular user or an administrator.

Relationships

- **registered**: Represents a user agent currently using an account.
- **fills**: Links an unregistered user (not currently using an account) to their temporary shopping cart. Each user can have up to one shopping cart.
- **checkout**: Links a user account to their shopping cart. Once the user has checked out

and paid for their products, the shopping cart is instantiated into the order entity. Each account can have up to one shopping cart

- **contains**: Represents a list of the products in a specific shopping cart. Each shopping cart entity can have many products contained in it and vice versa.
- **offers**: Represents the relationship between a user account and the bids he or she has made on product auctions. The relationship is one to many since an account can have many bids but each bid can only be related to exactly one account.
- **submitted**: Links an auction with the many bids that have been offered to it. Relationship is many to one because each auction can have many bids but each bid has exactly one auction related to it.
- **auctioned**: Represents a one to one relationship between a product and an auction.
- **sells**: Lists all the products being sold by a single account. Relationship is one to many because each account can sell many products but each product can be sold by exactly one account.
- **buys**: Lists the orders related to a specific user account. Relationship is one to many because each order is related to exactly one account, the buyer.
- **sale**: Lists each “product” bought within an “order”. Relationship is many to many but each order must have at least one product.
    - quantity: amount of a specific product ordered
    - final_price: final price that the buyer paid for the product. Depends on whether the product was auctioned off or bought instantly.
    - sale_rating: rating the buyer gives the seller for that product
- **has_address**: Relates a physical address to a use a user account. Relationship is many to many since there can be multiple accounts attributed to any address and vice versa.
- **primary_addres**: Determines which of the addresses is the primary one used by the account. Relationship is one to one, an account can only have one primary address and that primary address can only be attributed to one account.
- **billing_address**: Represents an address used for credit card billing. If an address is in this relationships that it means that it is also a billing address. Relationship is one to many with each credit card having exactly one address related to it but the same address can be used for multiple credit cards.
- **has_payment**: Represents the payment options that the user account has attributed to it. It is many to many.
- **primary_payment**: Determines which of the payment option the account has listed as it’s primary for buying products. Relationship is one to one.
- **pays**: Links an “order with the specific payment option used to pay for the products. Relationship is one to many with each order having exactly one payment option.
- **belongs**: Represents the specific category attributed to each product. Relationship is many to one, each product has exactly one category but each category can have many products.
- **parent**: Role assigned to categories. This relationship works by representing categories as tree hierarchies, parent being the reference to a node’s parent node. Categories having no parent (null value) represent the root categories (the ones in the site’s category

browsing home).

Database Schema

Accounts(account_id : bigint, first_name : varchar(20), middle_initial : char(1), last_name : varchar(20), photo_filename : text, email : varchar(30), permission : boolean, registration_date : date, primary_address : bigint, primary_payment : bigint, username : varchar(12), password : varchar(30), description : text)

Addresses(address_id : bigserial, account_id : bigint, street_address : varchar(40), city : varchar(15), country varchar(30), state : character(2), zipcode : char(6))

Auctions(auction_id : bigserial, seller_id : bigint, product_id : bigint, current_bid : numeric(11,2), start_date : date, start_time : time, duration : time)

Bank Accounts(b_account_id : bigserial, payment_id : bigint, account_number : varchar(16), routing_number : varchar(16), b_account_type : varchar(20))

Categories(cid : bigserial, cname : char(20), cparent : bigint)

Credit Card(card_id : bigint, payment_id : bigint, card_number char(19), card_holder : varchar(30), exp_month : varchar(2), exp_year : char(4), security_code : varchar(4))

Orders(order_id : bigserial, buyer_id : bigint, purchase_date : date, payment_option : bigint)

Payment Options(payment_id : bigserial, account_id : bigint, billing_address : bigserial)

Bids(bidder_id : bigint, auction_id : bigint, bid_amount : numeric(11,2), date_placed : date)

Products(product_ID : bigint, name : varchar(60), instant_price : numeric(11,2), model : varchar(20), brand : varchar(15) : description : text, image_filename : text, cid : integer, dimensions : char[](3), seller_id : bigint, quantity : integer)

Sales(order_id : bigint, product_id : bigint, quantity : integer, sale_rating : smallint)