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Entity-Relation Model

The Entity-Relation (ER) diagram presented for this works consists of the following:

- The most significant entity is USER.
- A user can buy and sell multiple products, but a product can only be bought and sold by a single user.
- A product can be available for sale or for auction, depending on what the seller chooses it to be.
- A user can place multiple bids on a same item. When biding time is over, the user with the current highest bid will win the auction.
- A user places the items for sale it wants to buy in a shopping cart.
- An anonymous user (identified with a random ID) can keep desired items in a shopping cart but in order to pay for them, it must create an account.
- When a user checks out using its shopping cart, an invoice is generated.
- An invoice can be associated with multiple products but a product is associated with only one invoice.
- A product belongs to a category, which can be a subcategory of another category.
- A user is associated with 2 addresses (mailing and billing) and with one credit card.
- A user can rank another user after buying something from that user. This ranking system will give people an idea of how good of a seller is a user.

Relation	**Entities Associated**	**Description**
generates	invoice - shopping cart	When a *User* places an order, its corresponding *Shopping Cart* generates an *Invoice* which describes the placed order.
has	invoice - product	Every *Invoice* has a series of *Products* associated with it. An *Invoice* can have one or more *Products*
sells	user - product	A *User* can sell *Products.* It's important to note that we make a distinction between items for auction and items for sale.
buys	user - product	A *User* can buy *Products* which are sold by other *Users.*

places	user -bid	When a *User* wants to participate in an auction, she/he places a *Bid* on the *Product*. At the end of the auction, the *User* with the highest *Bid* amount will buy the *Product.*
belongs to	product - category	A *Product* has a category field which designates where it belongs. This values comes in the form of categories concatenated with a delimiter to establish the whole inheritance. This is due to the relation between categories since a category can have child categories.
is subcategory of	category - category	A *Category* can be child of itself. This means that a category can have a subcategory and that subcategory can have its own subcategories.
places items in	user - shopping cart	A registered *User* can place *Products* in a *Shopping Cart* and buy them when he or she is ready.
paid with	invoice - credit card	The *Invoice* is like a receipt from an order placed by a *User.* The total amount of money from an *Invoice* is paid by an *User* using its *Credit Card.*
creates	shopping cart - anonymous user	An *Anonymous* user can create a *Shopping Cart* by selecting items for sale. In order to make the purchase, the *Anonymous* user must first create an account to become a *User*.
pays with	user - credit card	A *User* is associated with a *Credit Card* which him or her uses to pay for bought and won items.
gives/gets	user - rank	A *User* can get or give a *Rank* when certain events occur. A *User* that buys a *Product* from another *User* can give that user a *Rank* based on how good was his or her experience with the bought *Product*.
is associated with	user - address	A *User* has a an *Address*. This *Address* can be either the billing or the shipping address. This distinction is established through a field in the *Address* entity.