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CS 564: Database Management Systems
PP 1: ER Modeling & Schema Design
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Relational Schema

```
-- This is a category table including all categories presented in the
-- given data. A category_id is associated with each category and is
-- used to link each item with its categories in ItemCategory table.
CREATE TABLE Category
(
 category_id   INT           NOT NULL UNIQUE,
 category_name VARCHAR(255)  NOT NULL UNIQUE,
 PRIMARY KEY (category_id)
);

-- This is a country table including all countries presented in the
-- given data. A country_id is associated with each country and is
-- used in the location table to link each location with its country
CREATE TABLE Country
(
 country_id   INT           NOT NULL UNIQUE,
 country_name VARCHAR(255)  NOT NULL UNIQUE,
 PRIMARY KEY (country_id)
);

-- This is a location table including all locations presented in the
-- given data. A location id is associated with each location as an
-- unique not null primary key. This table also links each location
-- with its corresponding country's id as a foreign key named
-- courtry_id referencing the country_id in the Country table.
CREATE TABLE Location
(
 location_id INT           NOT NULL UNIQUE,
 location    VARCHAR(255)  NOT NULL UNIQUE,
 country_id  INT,
 PRIMARY KEY (location_id),
 FOREIGN KEY (country_id) REFERENCES Country (country_id)
);
```

```sql
-- This is a user table including all buyers and bidders present in
-- the given data. A location_id is associated with each location in
-- the Location table
CREATE TABLE User
(
 user_id     VARCHAR(255) NOT NULL UNIQUE,
 rating      INT          NOT NULL,
 location_id INT,
 PRIMARY KEY (user_id),
 FOREIGN KEY (location_id) REFERENCES Location (location_id)
);

-- This is an item table including all items presented in the given
-- data. It records the name, current price, buy price, first bid,
-- number of bids, location, start and end dates, and the description
-- of the item. Each item also has a unique identifier item_id that
-- associate it with its bids, its sellers, and other information.
CREATE TABLE Item
(
 item_id         INT          NOT NULL UNIQUE,
 name            VARCHAR(255) NOT NULL,
 currently       DOUBLE,
 buy_price       DOUBLE,
 first_bid       DOUBLE,
 number_of_bids  INT          NOT NULL,
 location_id     INT          NOT NULL,
 started         datetime     NOT NULL,
 ends            datetime     NOT NULL,
 description     VARCHAR(255) NOT NULL,
 PRIMARY KEY (item_id),
 FOREIGN KEY (first_bid) REFERENCES Bid (bid_id),
 FOREIGN KEY (location_id) REFERENCES Location (location_id)
);
```

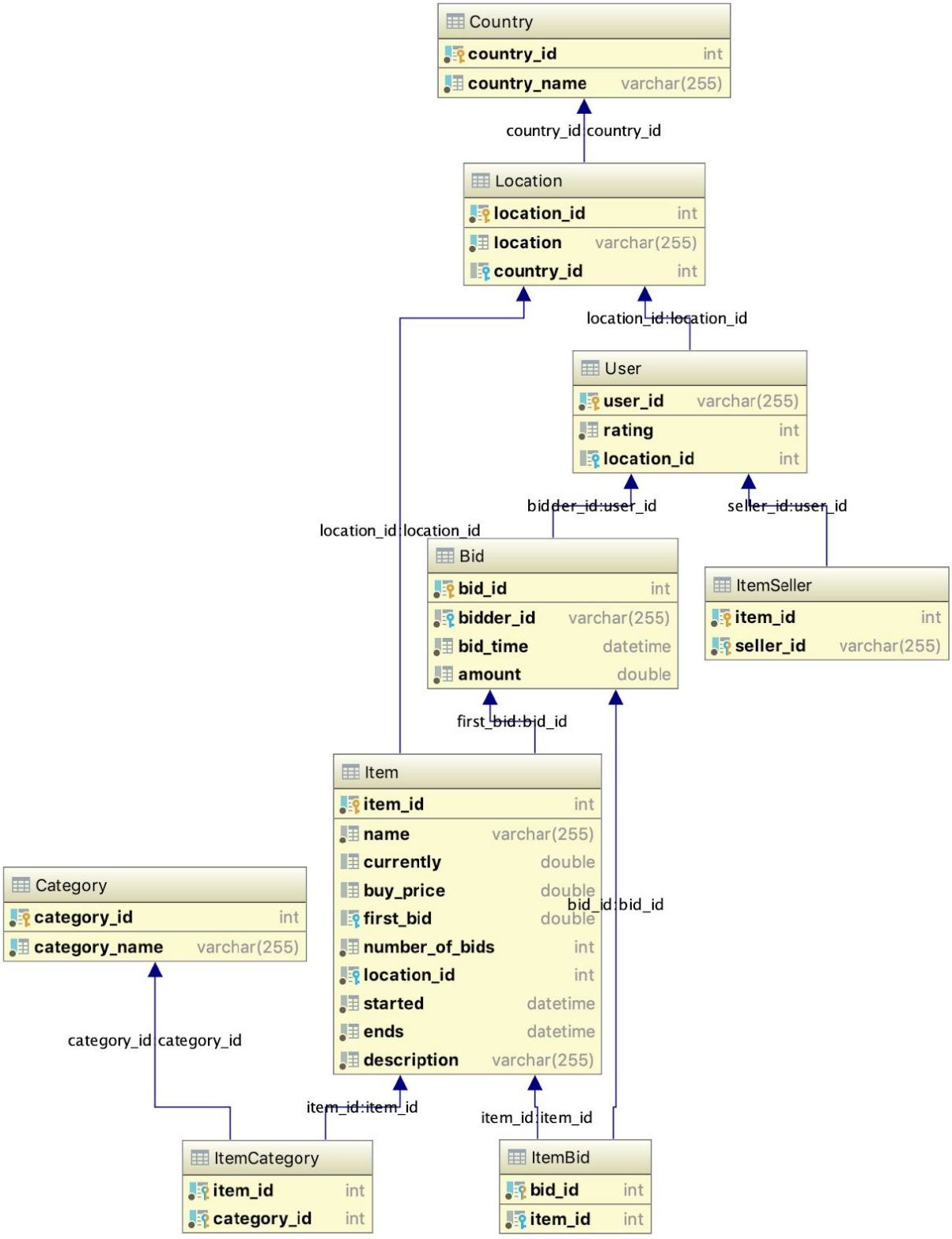
```sql
-- This is table to store the relation between each item and its
-- corresponding category. Neither item_id nor category_id is unique,
-- but their pairs are unique and used as primary key.
CREATE TABLE ItemCategory
(
 item_id     INT NOT NULL,
 category_id INT NOT NULL,
 PRIMARY KEY (item_id, category_id),
 FOREIGN KEY (item_id) REFERENCES Item (item_id),
 FOREIGN KEY (category_id) REFERENCES Category (category_id)
);

-- The ItemSeller table is a relation table that records the
-- relations between Items which are represented by their item_id and
-- Sellers which are users that represented by seller_id as a foreign
-- key referencing the user_id in the User table. The primary key is
-- established to be a super key of the pair (item_id, seller_id)
-- which means both item_id and seller_id are not the primary keys
-- independently but the pair forms a primary key
CREATE TABLE ItemSeller
(
 item_id   INT NOT NULL UNIQUE,
 seller_id VARCHAR(255) NOT NULL,
 PRIMARY KEY (item_id, seller_id),
 FOREIGN KEY (seller_id) REFERENCES USER (user_id)
);

-- This is a bid table including all bids presented in the given
-- data. Any bid is uniquely identifiable by the bid_id. The
-- bidder_id is a foreign key referencing the user_id from the User
-- table. Each bid also has a bid_time and an amount.
CREATE TABLE Bid
(
 bid_id    INT      NOT NULL UNIQUE,
 bidder_id VARCHAR(255)      NOT NULL,
 bid_time  datetime NOT NULL,
 amount    DOUBLE   NOT NULL,
 PRIMARY KEY (bid_id),
 FOREIGN KEY (bidder_id) REFERENCES USER (user_id)
);
```

```sql
-- This table associates each bid with the identifier of its
-- corresponding item. The identifier of each bid serves as the key to
-- this table since each bid can only associate with one item.
CREATE TABLE ItemBid
(
 item_id INT NOT NULL,
 bid_id  INT NOT NULL UNIQUE,
 PRIMARY KEY (bid_id),
 FOREIGN KEY (bid_id) REFERENCES Bid (bid_id),
 FOREIGN KEY (item_id) REFERENCES Item (item_id)
);
```

ER Diagram


Country
country_id int
country_name varchar(255)
country_id country_id
Location
location_id int
location varchar(255)
country_id int
location_id location_id
User
user_id varchar(255)
rating int
location_id int
bidder_id user_id
seller_id user_id
location_id location_id
Bid
bid_id int
bidder_id varchar(255)
bid_time datetime
amount double
ItemSeller
item_id int
seller_id varchar(255)
first_bid bid_id
Item
item_id int
name varchar(255)
currently double
buy_price double
first_bid double
number_of_bids int
location_id int
started datetime
ends datetime
description varchar(255)
bid_id bid_id
Category
category_id int
category_name varchar(255)
category_id category_id
item_id item_id
item_id item_id
ItemCategory
item_id int
category_id int
ItemBid
bid_id int
item_id int