Principles of Database Management Systems – Project Report

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DESCRIPTION –

In today's competitive selling environment, knowing which businesses to target and who to target is the difference between winning and losing. Wine Splash database provides the user with the complete set of tools to segment wineries and vineyards in a customizable fashion.

We are working on an online winery database management system that assists with managing the entire wine-selling process from grape to bottle to customer. The system manages placing the orders of wine, managing accounts of winery owners and customers, orders placed by customers, contents of an order, wines produced at wineries, wines stocked at inventories, charcuterie boards and takes note of the regions where the wineries are located.

Our web application on some dummy data and real data(web scraping) from Crackerbarrelcheese and MensJournal. We have a total of 10 entities and 9 relations in our database.

ENTITY SETS -

Number of entities = 10
Account = {ssn:int, name:string, username: string, dob: date, contact:varchar(24), password: password, email: email,name: string}
Customer = {cid:int, address: string, contact: varchar(24), name: string}
Order = {oid: int, odate: date, cost: int}
Charcuterie = {boardid: string,name: string}
Contents = {boardid: string, category: string, content: string}
Wine = {wineid: int, name: string, alcohol_percentage: int, age: int, type: string, price:int, popularity:int}
Inventory = {invid: num, type: string, bottlecount: int}
Owner = {owner_ssn: int, winery: string, license: string, contact: phone}
Winery = {wineryid: int, name: string, address: string, area: string, capacity: int}
Region = {regionid: int, country: string}

Number of relations = 9
RELATIONSHIP SETS -
Belong, place, consist, has, stocked, make, owns, situated, has.

BUSINESS RULES -

1. For our system we have 2 users - Customer and Owner (owns Winery). Every Customer who wants to order wine must have exactly one Account. No two customers have the same account.No 2 individuals have the same SSN hence SSN uniquely identifies account.

2. Since Owners can be customers too, hence all owners must have at most one account, it can be none as well for owners who are not customers. To differentiate the owner who is also a customer and a regular customer, the attribute 'license' to own a winery will be the distinguishing label.

3. A customer can place more than one order. It is not necessary for a customer to place an order too. An account can exist for dormant customers as well. No two orders have the same order id.

4. An Order must consist of at least one Wine. Along with that an Order may or may not consist of a Charcuterie Board. Similarly, wines must belong to at least one order. Each order has a unique order id. Each charcuterie board is uniquely identified by its board id. Similarly, no two wines have the same wine id.

5. A charcuterie board has at least one content. Every content which makes up the board is uniquely identified by a combination of board id, category and content. No two contents have the same combination of these values.

6. All wines must belong to at least 1 inventory to keep a track of the count. An inventory may have multiple wines or no wines at all. An inventory is uniquely identified by its inventory id.

7. A Winery makes multiple types of wines hence all wines belong to at least one Winery.

8. A winery is situated in a particular Region. All Wineries must be situated in at least one region. A region can have multiple wineries or no wineries at all. A region is uniquely identified by its region id.

9. An owner can own multiple Wineries. Each Winery is identified by a unique winery id.

KEY AND PARTICIPATION CONSTRAINTS –

1. In Relation “has” between Owner and Account, account entity set has both key and participation constraints. Owner entity set has only key constraint.
2. In Relation “belong” between Account and Customer, both Customer and Account have key and participation constraints as each customer has exactly one account and each account must belong to exactly one customer.
3. In Relation “place” between Order and Customer, Order entity set has only a participation constraint.
4. In Relation “consist” between Wine, Order and Charcuterie_Board, Order and Wine entity sets both have participation constraints on them since each Order must have at least a wine and each wine must belong to at least an order.
5. In Relation "has" between Charcuterie and Contents, Charcuterie has a participation constraint since a charcuterie must have at least one content.
6. In Relation “stocked” between Wine and Inventory, Wine has a participation constraint since all wines must belong to an inventory with same wine type.
7. In Relation “make” between Wine and Winery, Wine has a participation constraint since all wines must come from at least a winery.
8. In Relation “situated” between Winery and Region, Winery has a participation constraint since a winery must be in at least a region.
9. In Relation “own” between Winery and Owner, Winery has both key and participation constraintsince a winery can be owned by exactly one owner.

DATA ACQUISITION

We plan on acquiring data for wines, charcuterie board, wineries and region from web-sources mentioned below using web-scraping via Beautiful Soup and selenium in Python. This will create a JSON file which can then be loaded in MS Excel and cleaned so that correct data can be inserted into the tables. For the rest of the attributes, since the data is sensitive, it would be aggregated from already available datasets with similar attributes or will be fabricated.

Wine data - https://drizly.com/wine/c3

Charcuterie Board - https://www.crackerbarrelcheese.com/cheese-pairings?gclid=Cj0KCQjwlOmLBhCHARIsAGiJg7lxC54tJIK7fLocCirOH3Kbobdu9AybWAVEX4U4Md19VLuy9nZf5LgaAjpyEALw_wcB

Wineries and Region - https://www.mensjournal.com/food-drink/great-wine-beautiful-vineyards-the-11-best-wineries-in-the-united-states/

QUESTIONS THAT CAN BE ANSWERED –

From a client point of view, the questions that can be answered – What type of wine is there in which inventory? What regions have the maximum number of wineries? What is the count of owners who are also customers? Top 10 orders in terms of cost. What wine type is mostly ordered? And many more.

SCHEMA

```
drop table if exists inventory CASCADE;
drop table if exists wine CASCADE;
drop table if exists charcuterie CASCADE;
drop table if exists orders CASCADE;
drop table if exists region CASCADE;
drop table if exists owner CASCADE;
drop table if exists contents CASCADE;
drop table if exists stocked CASCADE;
drop table if exists consists CASCADE;
drop table if exists make CASCADE;
drop table if exists winery_owns CASCADE;
drop table if exists account_has CASCADE;
drop table if exists customer_belong CASCADE;
drop table if exists place CASCADE;


create table inventory (
invid varchar(8) primary key,
bottlecount integer not null,
type varchar(50) not null
);

create table wine (
wineid integer primary key,
name varchar(100) not null,
age integer not null,
type varchar(30) not null,
price integer not null,
alcohol_percentage integer not null,
popularity integer not null
);

create table charcuterie (
boardid varchar(8) primary key,
name varchar(50) unique not null
```

```
);

create table orders (
orderid varchar(8) primary key,
odate date not null,
cost integer not null
);

create table region (
regionid varchar(4) primary key,
country varchar(30) unique not null
);

create table owner(
owner_ssn varchar(16) not null,
winery varchar(100) not null,
license varchar(24),
contact bigint not null,
primary key (license)
);

create table contents(
boardid varchar(8),
content varchar(128),
category varchar(16),
primary key(boardid, content, category)
);

create table stocked (
wineid integer,
invid varchar(8),
primary key (wineid, invid),
foreign key (wineid) references wine(wineid),
foreign key (invid) references inventory(invid)
);

create table consists (
orderid varchar(8),
wineid integer,
boardid varchar(8),
primary key(wineid, boardid, orderid),
foreign key (wineid) references wine(wineid),
foreign key (boardid) references charcuterie(boardid),
foreign key (orderid) references orders(orderid)
);

create table winery_owns (
wineryid integer primary key,
name varchar(50) not null,
capacity integer not null,
area integer not null,
address varchar(124) not null,
license varchar(24),
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foreign key(license) references owner(license)
);

create table make(
wineid integer,
wineryid integer,
primary key(wineid, wineryid),
foreign key (wineid) references wine(wineid),
foreign key (wineryid) references winery_owns(wineryid)
);


create table account_has(
ssn varchar(16) primary key,
name varchar(24) not null,
username varchar(24) unique not null,
dob date not null,
contact bigint not null,
password varchar(100) not null,
email varchar(100) unique not null,
license varchar(24) unique,
foreign key(license) references owner(license)
);

create table customer_belong (
cid varchar(24) primary key,
name varchar(24) not null,
contact bigint not null,
address varchar(100) not null,
ssn varchar(16) not null,
foreign key(ssn) references account_has(ssn)
);

create table place (
orderid varchar(8),
cid varchar(24),
primary key(orderid, cid),
foreign key (orderid) references orders(orderid),
foreign key (cid) references customer_belong(cid)
);
```
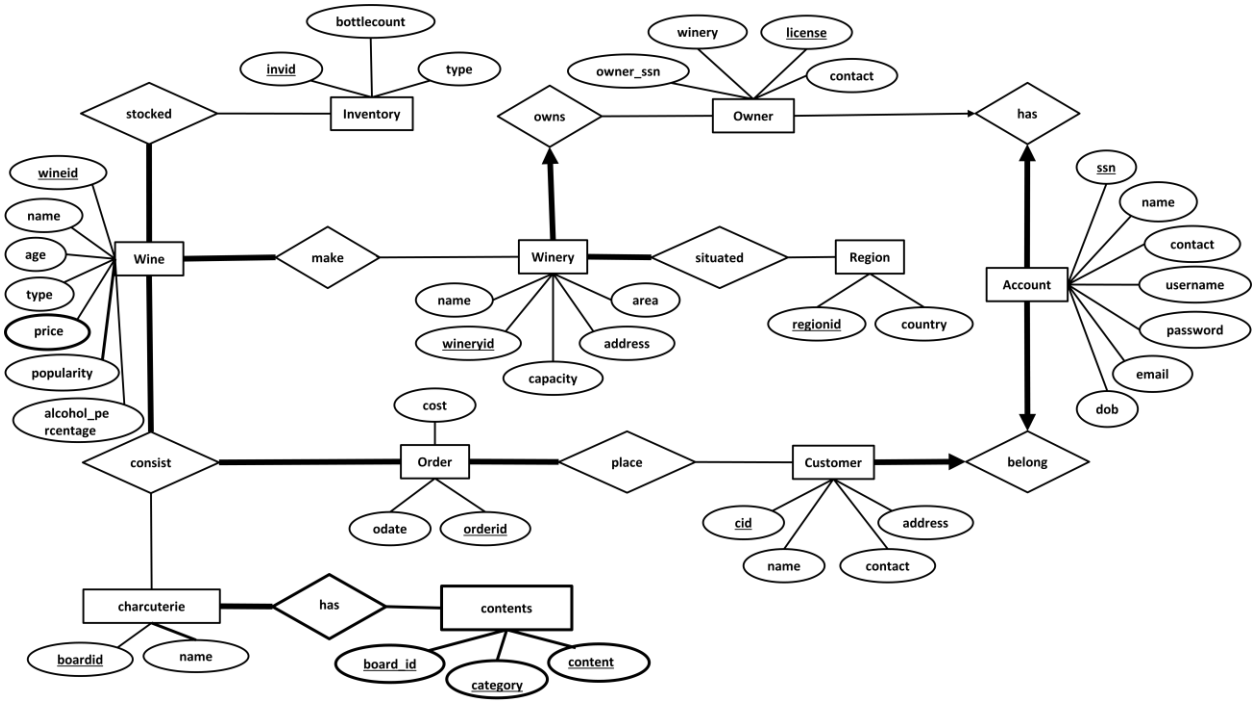

ER DIAGRAM


bottlecount
invid
type
Inventory
stocked
winery
license
owner_ssn
contact
Owner
owns
has
wineid
name
age
type
price
popularity
alcohol_percentage
Wine
make
Winery
situated
Region
name
area
wineryid
address
capacity
regionid
country
Account
ssn
name
contact
username
password
email
dob
cost
consist
Order
place
Customer
belong
odate
orderid
cid
address
name
contact
charcuterie
has
contents
boardid
name
board_id
category
content