

# Principles of Database Management Systems – Project Part 1

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## DESCRIPTION –

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.

## ENTITY SETS -

Number of entities = 9

**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 Board** = {name: string, cheese: string, crackers: string, wineid: int, berries: string, dryfruits: string, olives: string, meat: string}

**Wine** = {wineid: int, name: string, %alcohol: int, age: int, type: string}

**Inventory** = {invid: num, type: string, bottlecount: int}

**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 = 8

## RELATIONSHIP SETS -

Belong, place, consist, 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 along with SSN 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 customers have the same customer 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 name. Similarly, no two wines have the same wine id.
5. 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.
6. A Winery makes multiple types of wines hence all wines belong to at least one Winery.

7. 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.
8. 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 “stocked” between Wine and Inventory, Wine has a participation constraint since all wines must belong to an inventory with same wine type.
6. In Relation “make” between Wine and Winery, Wine has a participation constraint since all wines must come from at least a winery.
7. In Relation “situated” between Winery and Region, Winery has a participation constraint since a winery must be in at least a region.
8. In Relation “own” between Winery and Owner, Winery has both key and participation constraint since 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 BeautifulSoup 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=Cj0KCQjwLOmLBhCHARIsAGiJg7lxC54tJIK7fLocCirOH3Kbobdu9AybWAVEX4U4Md19VLuy9nZf5LgaAipyEALw\\_wcB](https://www.crackerbarrelcheese.com/cheese-pairings?gclid=Cj0KCQjwLOmLBhCHARIsAGiJg7lxC54tJIK7fLocCirOH3Kbobdu9AybWAVEX4U4Md19VLuy9nZf5LgaAipyEALw_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

```
create table Inventory (  
  invid integer primary key,  
  bottlecount integer not null,  
  type varchar(24)  
);
```

```
create table Wine (  
  wineid integer primary key,  
  name varchar(24) not null,  
  age integer,  
  type varchar(24) not null,  
  alcohol% integer not null  
);
```

```
create table stocked(  
  wineid integer,  
  invid integer,  
  primary key (wineid, invid),  
  foreign key (wineid) references Wine(wineid),  
  foreign key (invid) references Inventory(invid)  
);
```

```
create table Charcuterie_Board (  
  name varchar(24) primary key,  
  wineid integer,  
  cheese varchar(24),  
  crackers varchar(24),  
  meat varchar(24),  
  berries varchar(24),  
  dryfruits varchar(24),  
  olives varchar(24),  
);
```

```
create table Order (  
  orderid integer primary key,  
  odate date not null,  
  cost not null  
);
```

```
create table consist (  
  wineid integer,  
  name varchar(24),  
  orderid integer,  
  primary key(wineid, name, orderid),  
  foreign key (wineid) references Wine(wineid),  
  foreign key (name) references Charcuterie_Board(name),  
  foreign key (orderid) references Order(orderid)  
);
```

```
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 Winery_owns (  
wineryid integer primary key,  
name varchar(24),  
capacity integer,  
address varchar(124),  
area integer,  
license integer unique,  
foreign key(license) references Owner(license)  
);
```

```
create table Region (  
regionid integer primary key,  
country varchar(24)  
);
```

```
create table situated (  
wineryid integer,  
regionid integer,  
primary key (wineryid, regionid),  
foreign key (wineryid) references Winery_owns(wineryid),  
foreign key (regionid) references Region(regionid)  
);
```

```
create table Owner(  
ssn integer,  
winery varchar(24),  
license varchar(24) primary key,  
contact integer,  
);
```

```
create table Account_has(  
ssn integer primary key,  
name varchar(24),  
contact integer,  
username varchar(24),  
password varchar(24),  
email varchar(24),  
dob date,  
license varchar(24) not null,  
foreign key (license) references Owner(license)  
);
```

```
create table customer_belong (  
cid integer primary key,  
name varchar(24),  
contact integer,  
address varchar(24),
```

```
ssn integer unique not null,  
foreign key(ssn) references Account_has(ssn)  
);
```

```
create table place (  
orderid integer,  
cid integer,  
primary key(orderid, cid),  
foreign key (orderid) references Order(orderid),  
foreign key (cid) references customer_belong(cid)  
);
```

# ER DIAGRAM

