# ST 659 Database Administration and Database Management Concepts

## Part 1: Design

## Project: Bosphorus Brewpub

Sardunya is an established industrial food service company in Turkey; headquarter in Istanbul. The company plans to start a new Brewpub/Microbrewery in the United States in the near future. The new venture will possibly be called Bosphorus Brewing serving European/Mediterranean food and brewing its own beer the brewpub also plans to sell other brewers' beers.

From the database management perspective, the company needs to keep track of the its own produced beer, as well as customers database. The Brewpub not only plan to collect and control beer and consumer information but also plan to collect distributor profiles and consumer purchase history and behaviors data. We will model the business entities and relationships using MySQL hosted in the Microsoft cloud.

The purpose of the new venture's database system is to facilitate the business decision making process by organizing and maintaining data is used and generated during normal operation of the Brewery.

### Beer Enthusiasts Requirements

The Bosphorus is a self-serving/web-based brewpub, instead of having to navigate aimlessly in the pub, it would be more efficient to use either website and/or in-store kiosks. We will provide more detailed/explained information regarding all of our production as well as the other brewers.

The store staff will be highly educated about beer and the locations of the beer in the store and equipped with hand-held devices to help the beer enthusiast if they need it.

### Business Rules

- A consumer may have zero or many orders.
- A consumer only one favorite type.
- A type may have zero or many beers.
- A type may be the favorite of zero or many consumers
- A purchase order is submitted by one consumer.
- A purchase order has only one consumer.
- A purchase order contains one or many beers.
- A beer is listed only once per purchase.
- A beer has only one brewery.
- A brewery may have zero or many beers.

- A distributor may distribute zero or many breweries

**Entities**

- **Consumer**

The consumers are the Brewpub's beer enthusiasts. This table contains information related to the Brewpub's consumers. It has the consumer's unique ID, contact information and favorite type of beer.

- **Beer**

We plan to provide information regarding individual beer details in this table.

- **Food**

This will be the second production step of the Brewpub. The company plans to provide information regarding individual food details in this table.

Recipes, ingredients, calorie counts etc.

- **Brewery**

There will be information regarding the other breweries in this table, such as the brewey ID, company name, location etc.

- **Preference**

The preference is all about beer style in details. This table stores the preference style, world region of origin and some other important details such best food combination etc.

- **Order**

This table maintains records of the orders. It stores the order ID, consumer ID, date of transaction and total order.

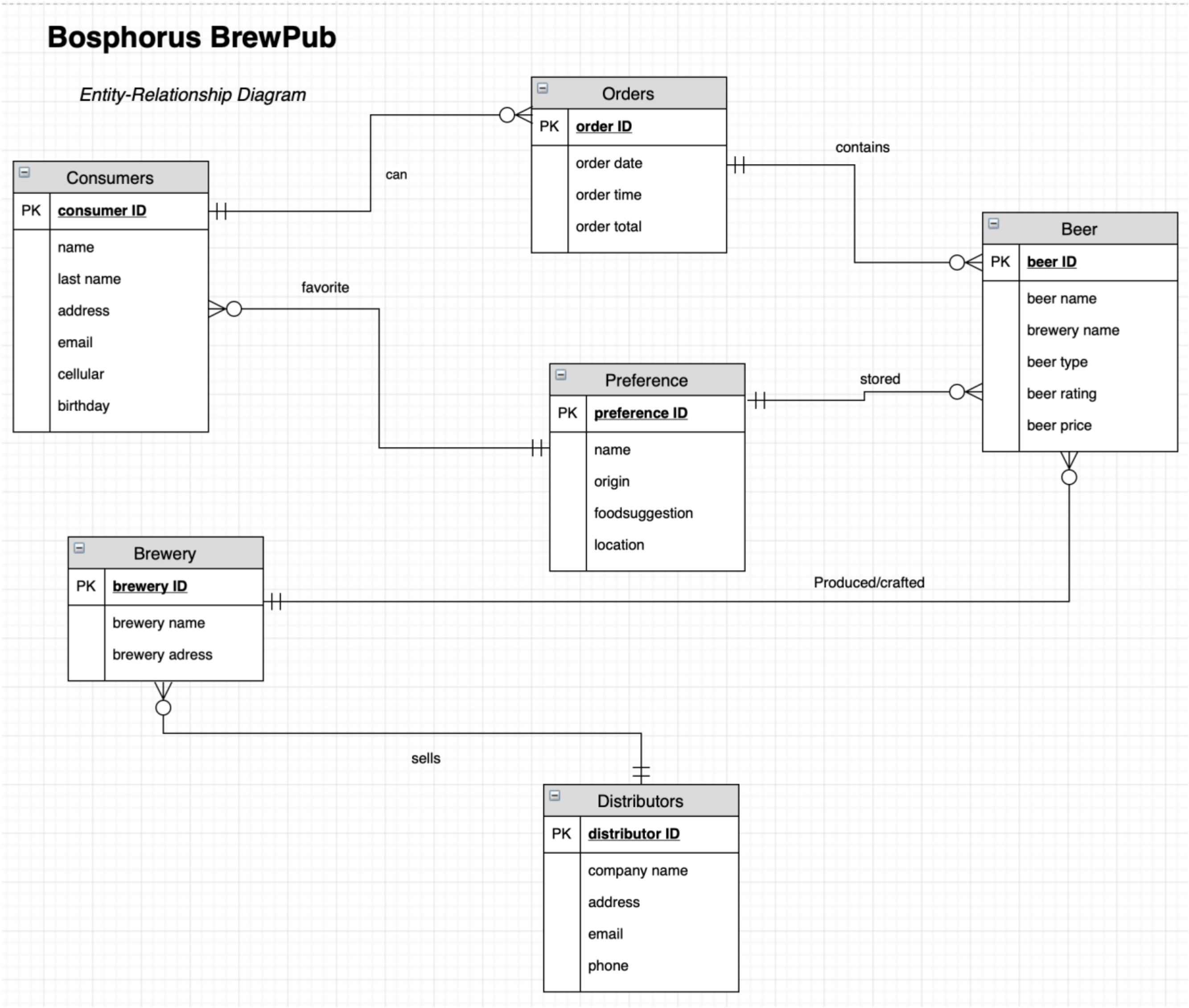
- **Distributor**

This table records information related to the distributors. It has distributor ID, location and contact information.

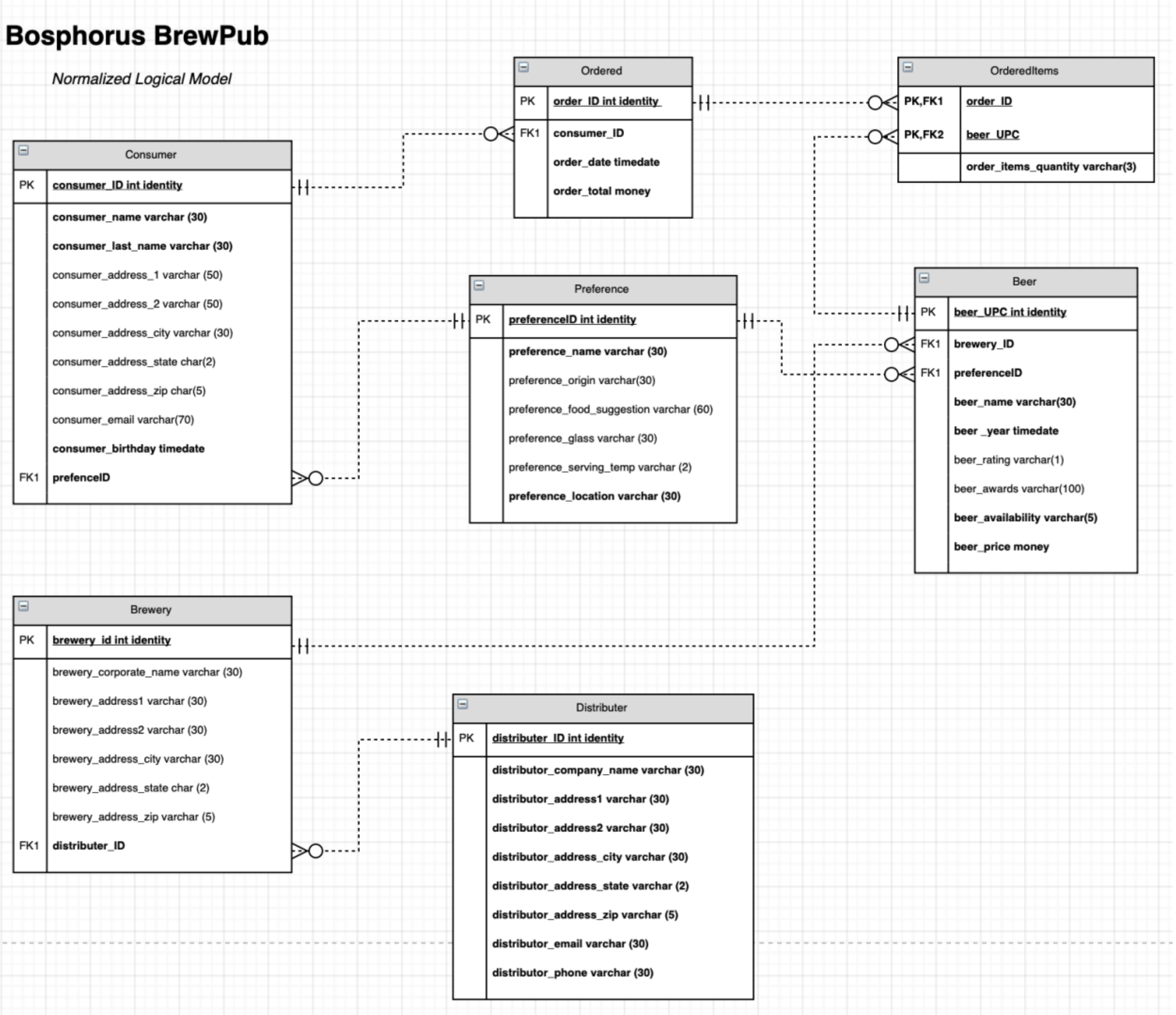
**Possible Queries:**

- How many customers liked ANHEUSER-BUSCH's "24 count 12 oz long necks Bud Lite 24 pkj 120z Long Neck"?
- Which distributers supply beer from California?
- How much beer is consumed yesterday/last week/last month?
- How many liters/ gallon/pint of beer drank at Oktoberfest?
- How many Holiday/Christmas seasonal beer does the Brewpub carry?
- Which are the 10 best-selling/ordered beers?
- Which New York breweries are in the menu?

## Conceptual Model

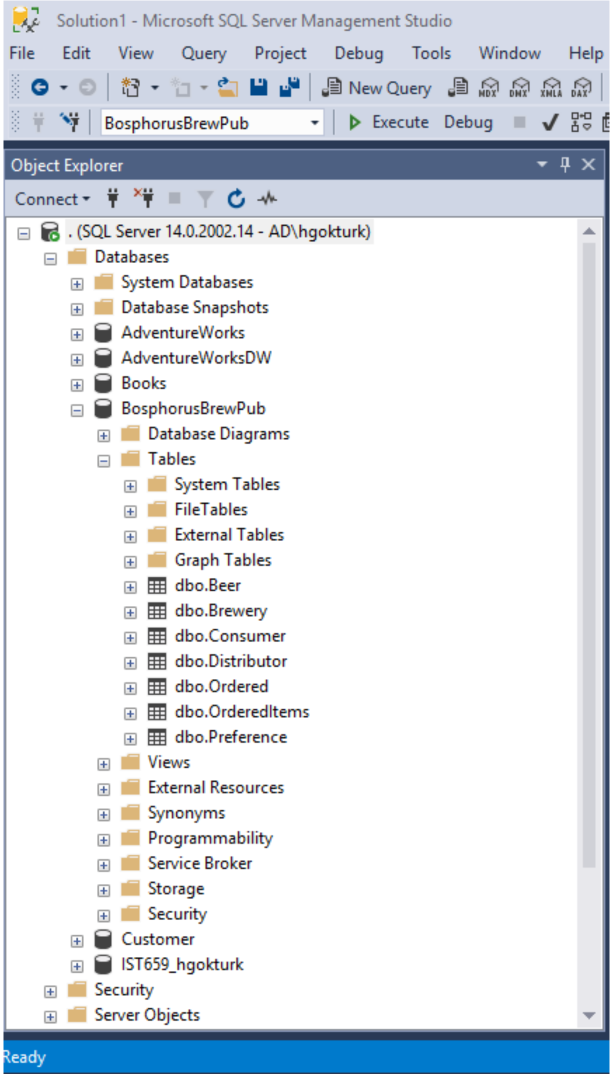


## Normalized Logical Model


Bosphorus BrewPub
Normalized Logical Model
Ordered
PK order_ID int identity
FK1 consumer_ID
order_date timedate
order_total money
OrderedItems
PK,FK1 order_ID
PK,FK2 beer_UPC
order_items_quantity varchar(3)
Consumer
PK consumer_ID int identity
consumer_name varchar (30)
consumer_last_name varchar (30)
consumer_address_1 varchar (50)
consumer_address_2 varchar (50)
consumer_address_city varchar (30)
consumer_address_state char(2)
consumer_address_zip char(5)
consumer_email varchar(70)
consumer_birthday timedate
FK1 prefencelD
Preference
PK preferenceID int identity
preference_name varchar (30)
preference_origin varchar(30)
preference_food_suggestion varchar (60)
preference_glass varchar (30)
preference_serving_temp varchar (2)
preference_location varchar (30)
Beer
PK beer_UPC int identity
FK1 brewery_ID
FK1 preferenceID
beer_name varchar(30)
beer _year timedate
beer_rating varchar(1)
beer_awards varchar(100)
beer_availability varchar(5)
beer_price money
Brewery
PK brewery_id int identity
brewery_corporate_name varchar (30)
brewery_address1 varchar (30)
brewery_address2 varchar (30)
brewery_address_city varchar (30)
brewery_address_state char (2)
brewery_address_zip varchar (5)
FK1 distributer_ID
Distributer
PK distributer_ID int identity
distributor_company_name varchar (30)
distributor_address1 varchar (30)
distributor_address2 varchar (30)
distributor_address_city varchar (30)
distributor_address_state varchar (2)
distributor_address_zip varchar (5)
distributor_email varchar (30)
distributor_phone varchar (30)

## Part 2: Implementation

## SQL DDL



**SQL DDL**

```
/*
SQL DDL Statements for Bosphorus Brew Pub
Author: Adil Gokturk
December 2018
IST659
*/

--Create a Data Base called Bosphorus Brew Pub
--CREATE DATABASE BosphorusBrewPub


--Drop table list
IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Preference')
BEGIN
	DROP TABLE Preference
END
GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Ordered')
BEGIN
```

```
	DROP TABLE Ordered
END
GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Consumer')
BEGIN
	DROP TABLE Consumer
END
GO


IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Distributor')
BEGIN
	DROP TABLE Distributor
END
GO


IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Brewery')
BEGIN
	DROP TABLE Brewery
END
GO


IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='Beer')
BEGIN
	DROP TABLE Beer
END
GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME='OrderedItems')
BEGIN
	DROP TABLE OrderedItems
END
GO


--Tables
CREATE TABLE Preference (
	preference_ID int IDENTITY PRIMARY KEY,
	preference_name varchar(30) NOT NULL,
	preference_origin varchar(30),
	preference_food_suggestion varchar(30),
	preference_glass varchar(30),
	preference_serving_temp varchar(2),
	preference_location varchar(30) NOT NULL,
)
GO


CREATE TABLE Consumer (
	consumer_ID int IDENTITY PRIMARY KEY,
	consumer_name varchar(30) NOT NULL,
	consumer_last_name varchar(30) NOT NULL,
	consumer_address_1 varchar(50),
	consumer_address_2 varchar(50),
	consumer_address_city varchar(30),
	consumer_address_state char(2),
    consumer_email varchar(70),
    consumer_birthday DATETIME NOT NULL,
    --preferenceID int FOREIGN KEY REFERENCES Preference(preference_ID)
)
GO

CREATE TABLE Ordered (
    order_ID int IDENTITY PRIMARY KEY,
    consumer_ID int FOREIGN KEY REFERENCES Consumer(consumer_ID),
    order_date DATETIME NOT NULL DEFAULT GETDATE(),
    order_total MONEY
)
GO

CREATE TABLE Distributor (
    distributor_ID int IDENTITY PRIMARY KEY,
    distributor_company_name varchar(50) NOT NULL,
    distributor_address_1 varchar(30) NOT NULL,
    distributor_address_2 varchar(30) NOT NULL,
    distributor_address_city varchar(30) NOT NULL,
    distributor_address_state char(2) NOT NULL,
    distributor_address_zip varchar(5) NOT NULL,
    distributor_email varchar(30) NOT NULL,
    distributor_phone varchar(30) NOT NULL
)
GO

CREATE TABLE Brewery (
    brewery_ID int IDENTITY PRIMARY KEY,
    brewery_address_1 varchar(30),
    brewery_address_2 varchar(30),
    brewery_address_city varchar(30),
    brewery_address_state char(2),
    brewery_address_zip varchar(5),
    distributer_ID int FOREIGN KEY REFERENCES Distributor(distributor_ID)
)
GO

CREATE TABLE Beer (
    beer_UPC int IDENTITY PRIMARY KEY,
    brewery_ID int FOREIGN KEY REFERENCES Brewery(brewery_ID) NOT NULL,
    preference_ID int FOREIGN KEY REFERENCES Preference(preference_ID) NOT NULL,
    beer_name varchar(30) NOT NULL,
    beer_year DATETIME NOT NULL,
    beer_rating varchar(1),
    beer_awards varchar(100),
    beer_availability varchar(5) NOT NULL,
    beer_price MONEY NOT NULL
)
GO

CREATE TABLE OrderedItems (
    order_ID int NOT NULL,
    beer_UPC int NOT NULL,
    order_items_quantity varchar(3) NOT NULL,
    PRIMARY KEY CLUSTERED (order_ID, beer_UPC),
    FOREIGN KEY (order_ID) REFERENCES Ordered(order_ID) ON UPDATE NO ACTION ON DELETE
CASCADE,
        FOREIGN KEY (beer_UPC) REFERENCES Beer(beer_UPC) ON UPDATE NO ACTION ON DELETE
CASCADE
)
GO
```

**Insert Statements**

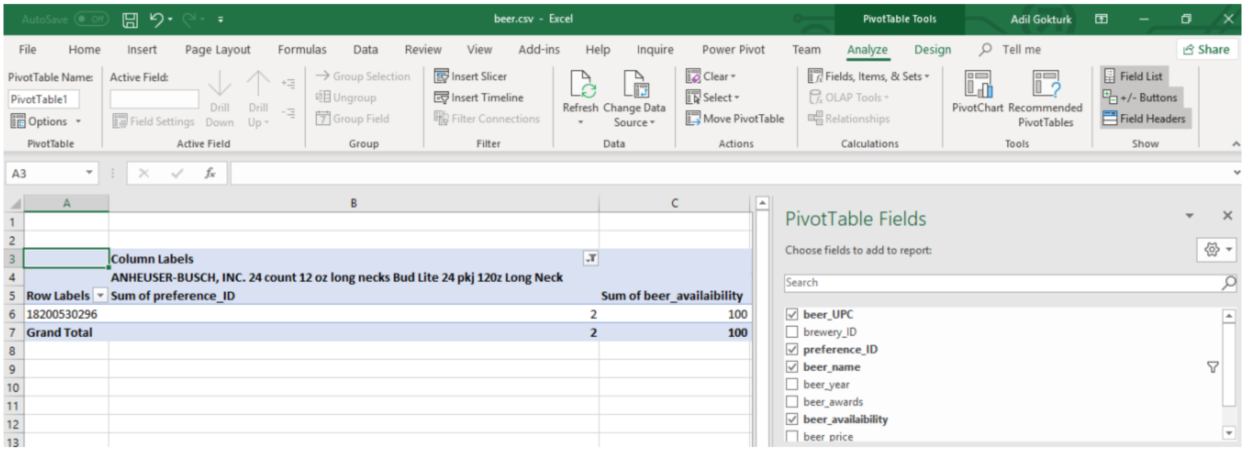
```
-- Insert Statements into Consumer table
INSERT INTO Consumer([consumer_ID]
       ,[consumer_name]
       ,[consumer_last_name]
       ,[consumer_address_1]
       ,[consumer_address_2]
       ,[consumer_address_city]
       ,[consumer_address_state]
       ,[consumer_email]
       ,[consumer_birthday]
          ,[preferenceID])
VALUES
       (1,'John','Doe','Highland Park', 'Zen Bulidings', 'Houston','TX',
'jd@stcsml.com','3/11/1988',1)
--Insert Statements into Beer table
INSERT INTO Beer ([brewery_ID]
       ,[brewery_address_1]
       ,[brewery_address_2]
       ,[brewery_address_city]
       ,[brewery_address_state]
       ,[brewery_address_zip]
       ,[distributer_ID]
VALUES
       (1, '1800 West', 'Loop S.', 'Houston', 'TX', '12345', 1
--Insert Statements into Brewery table
INSERT INTO Brewery ([brewery_ID]
       ,[brewery_address_1]
       ,[brewery_address_2]
       ,[brewery_address_city]
       ,[brewery_address_state]
       ,[brewery_address_zip]
       ,[distributer_ID]
VALUES
       (1, '777 east', 'Loop N.', 'Houston', 'TX', '24680', 1)

       --Insert Statements into Distributor table
INSERT INTO Distributor ([distributor_ID]
       ,[distributor_company_name]
       ,[distributor_address_1]
       ,[distributor_address_2]
       ,[distributor_address_city]
       ,[distributor_address_state]
       ,[distributor_address_zip]
       ,[distributor_email]
       ,[distributor_phone]
VALUES
       (1, 'XYX Corp', 'Loop N.','S. West', 'Houston', 'TX',
'25680','xyx@sdfr.com','17137134455')


--Insert Statements into Ordered table
INSERT INTO Ordered ([order_ID]
       ,[consumer_ID]
```

```
      ,[order_date]
      ,[order_total]
SELECT
        ([order_ID]
      ,[consumer_ID]
      ,[order_date]
      ,[order_total])

--Insert Statements into OrderedItems table
INSERT INTO OrderedItems  ([order_ID]
      ,[beer_UPC]
      ,[order_items_quantity])
SELECT
       ( [order_ID]
      ,[beer_UPC]
      ,[order_items_quantity])
```

**Answers to data Queries:**

```
--Sample Queries
--How many customers liked ANHEUSER-BUSCH’s “24 count 12 oz long necks Bud Lite 24 pkj
12Oz Long Neck”?
--Preference_ID = 2
SELECT COUNT(preference_ID) AS [Preference of ANHEUSER-BUSCH long necks Bud Lite]
FROM Consumer
WHERE (preference_ID=2)
GROUP BY preference_ID
ORDER BY 'Preference of ANHEUSER-BUSCH long necks Bud Lite' DESC
GO

--Which distributers supply beer from California?
SELECT Distributor.distributor_ID,
Distibutor.distributor_company_name,Distributor.ditributor.phone,
Brewery.brewery_address_state
FROM Distributor,Brewery
WHERE Brewery_address_state="CA"
AND Distributor.distributor_ID=Brewery.distributor_ID
ORDER BY brewery_address_state ASC
GO
```

```
--Sample Queries
--How many customers liked ANHEUSER-BUSCH’s “24 count 12 oz long necks Bud Lite 24 pkj
12Oz Long Neck”?
--Preference_ID = 2
SELECT COUNT(preference_ID) AS [Preference of ANHEUSER-BUSCH long necks Bud Lite]
FROM Consumer
WHERE (preference_ID=2)
GROUP BY preference_ID
ORDER BY 'Preference of ANHEUSER-BUSCH long necks Bud Lite' DESC
GO
```

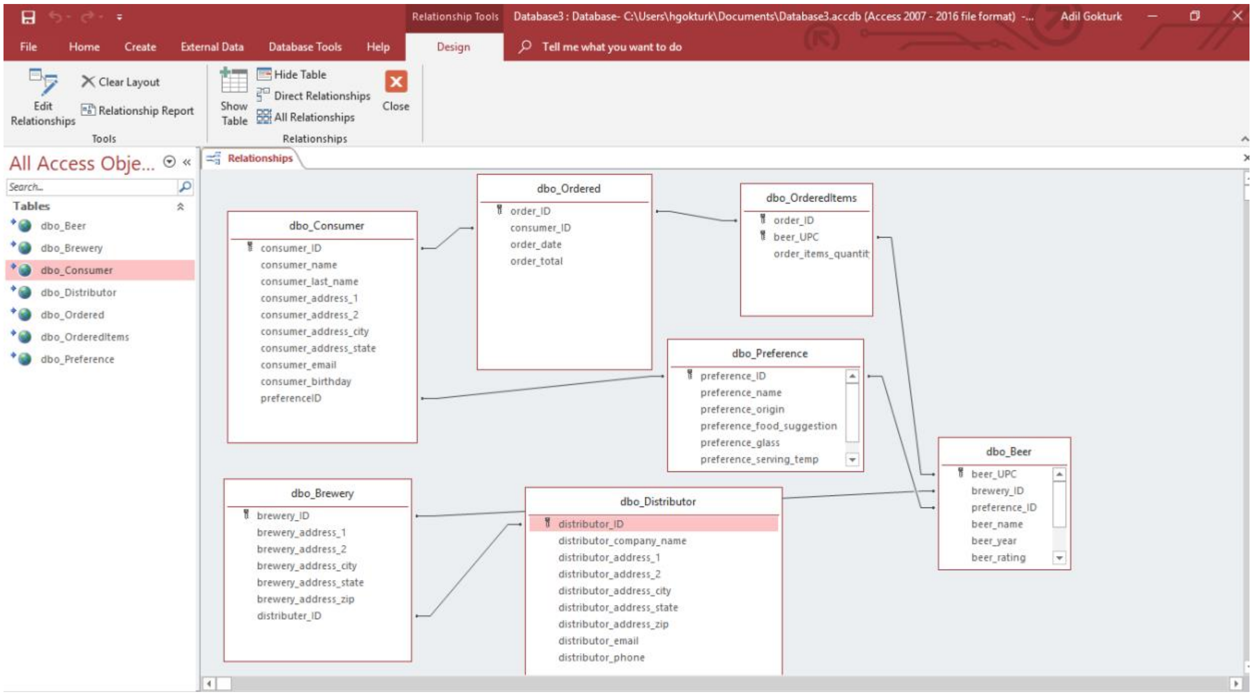


| | Column Labels | |
|---|---|---|
| | ANHEUSER-BUSCH, INC. 24 count 12 oz long necks Bud Lite 24 pkj 120z Long Neck | |
| Row Labels | Sum of preference_ID | Sum of beer_availaibility |
| 18200530296 | 2 | 100 |
| Grand Total | 2 | 100 |

☑ beer_UPC
□ brewery_ID
☑ preference_ID
☑ beer_name
□ beer_year
□ beer_awards
☑ beer_availaibility
□ beer_price

```
--Which distributers supply beer from California?
SELECT Distributor.distributor_ID,
Distibutor.distributor_company_name,Distributor.ditributor.phone,
Brewery.brewery_address_state
FROM Distributor,Brewery
WHERE Brewery_address_state="CA"
AND Distributor.distributor_ID=Brewery.distributor_ID
ORDER BY brewery_address_state ASC
GO

--Which New York breweries are in the menu?
SELECT brewery_ID
FROM Brewery
WHERE brewery_address_state="NY"
ORDER BY brewey_address_state ASC
GO

--How many Christmas seasonal beer does the Brewpub carry?
SELECT COUNT(beer_availability) AS [Number of beers AVAILABLE]
FROM Beer
WHERE (beer_availability="Christmas"
GROUP BY beer_availability
ORDER BY COUNT (beer_availability) DESC
GO
```

## GUI Prototype



dbo_Consumer
- consumer_ID
- consumer_name
- consumer_last_name
- consumer_address_1
- consumer_address_2
- consumer_address_city
- consumer_address_state
- consumer_email
- consumer_birthday
- preferenceID

dbo_Ordered
- order_ID
- consumer_ID
- order_date
- order_total

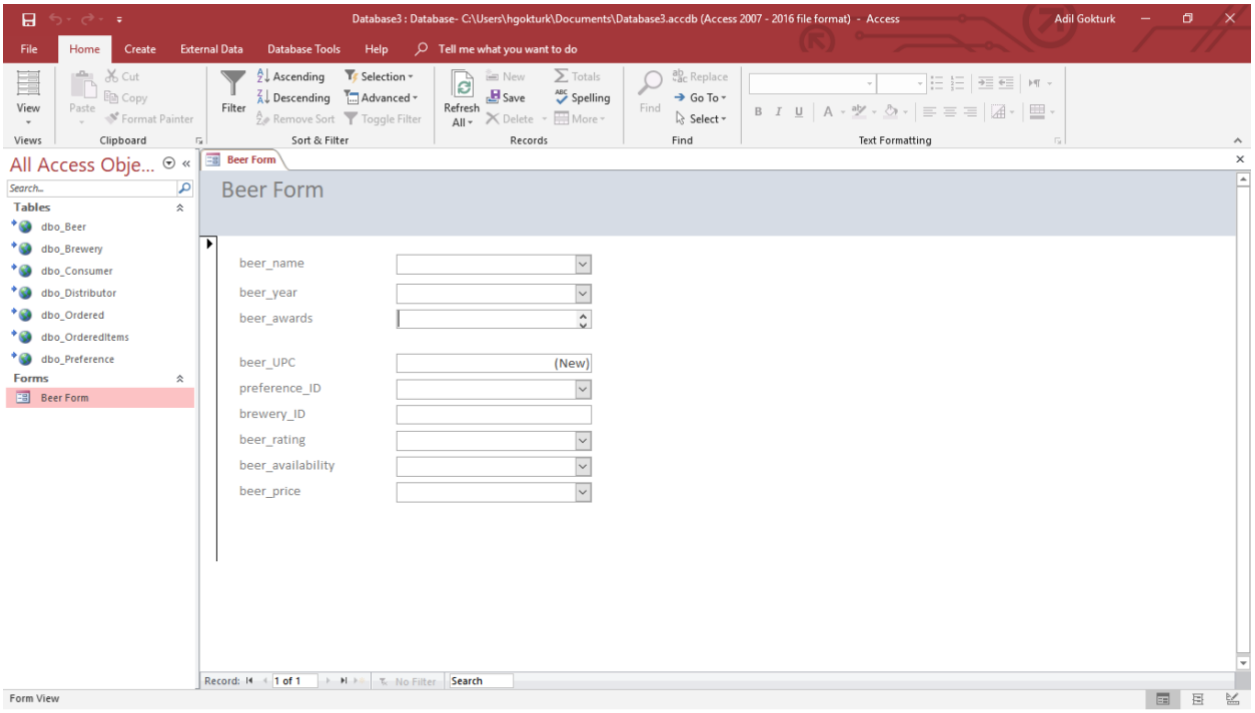
dbo_OrderedItems
- order_ID
- beer_UPC
- order_items_quantit

dbo_Preference
- preference_ID
- preference_name
- preference_origin
- preference_food_suggestion
- preference_glass
- preference_serving_temp

dbo_Beer
- beer_UPC
- brewery_ID
- preference_ID
- beer_name
- beer_year
- beer_rating

dbo_Brewery
- brewery_ID
- brewery_address_1
- brewery_address_2
- brewery_address_city
- brewery_address_state
- brewery_address_zip
- distributer_ID

dbo_Distributor
- distributor_ID
- distributor_company_name
- distributor_address_1
- distributor_address_2
- distributor_address_city
- distributor_address_state
- distributor_address_zip
- distributor_email
- distributor_phone



Beer Form

| | |
|---|---|
| beer_name | |
| beer_year | |
| beer_awards | |
| beer_UPC | (New) |
| preference_ID | |
| brewery_ID | |
| beer_rating | |
| beer_availability | |
| beer_price | |

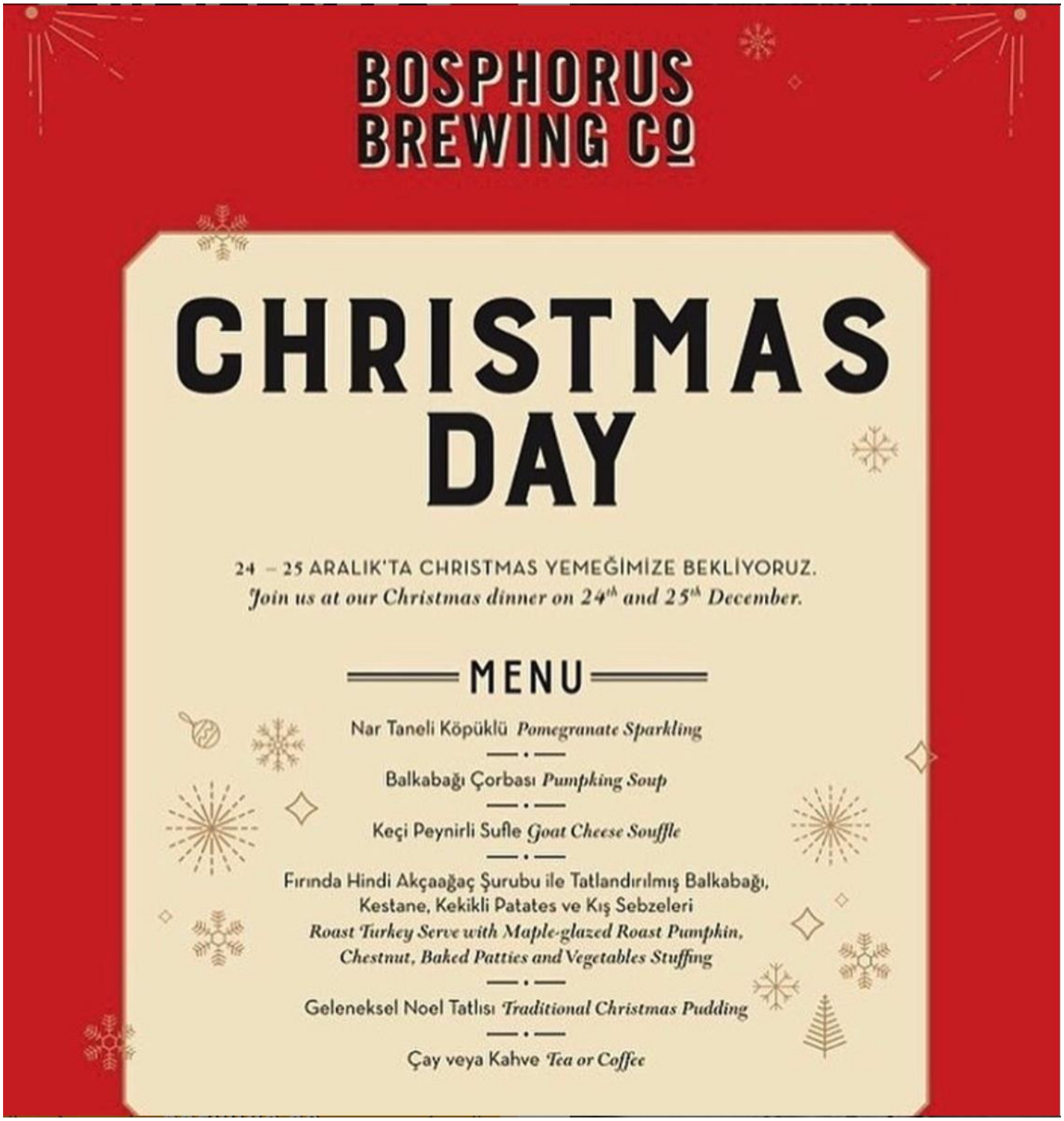
**Reflection**

The DBMS and the SQL server knowledge have just added an amazing tool in to my data science library. Despite the challenging relationship between MAC and Windows environments and several crash of my Mac's bootcamp and setups, it would be suffice to this is one of most awesome and challenging experiences I have ever had since I started the program. The Bosporus

Brew Pub project still needs to improve. It still has many glitches, but it was a good start to understand the IST 659 Database Administration Concepts and Database Management.

As an entrepreneur, despite the significant uncertainties on global economy and highly saturated brewpub demand in the US, I still believe that there are still enormous opportunities to invest breweries all around the country.

**The Flyer**



BOSPHORUS BREWING CO

CHRISTMAS DAY

24 – 25 ARALIK'TA CHRISTMAS YEMEĞİMİZE BEKLİYORUZ.
*Join us at our Christmas dinner on 24th and 25th December.*

MENU

Nar Taneli Köpüklü *Pomegranate Sparkling*

Balkabağı Çorbası *Pumpking Soup*

Keçi Peynirli Sufle *Goat Cheese Souffle*

Fırında Hindi Akçaağaç Şurubu ile Tatlandırılmış Balkabağı,
Kestane, Kekikli Patates ve Kış Sebzeleri
*Roast Turkey Serve with Maple-glazed Roast Pumpkin,*
*Chestnut, Baked Patties and Vegetables Stuffing*

Geleneksel Noel Tatlısı *Traditional Christmas Pudding*

Çay veya Kahve *Tea or Coffee*