Tops Groceries Database

Final Project

CMPT 308

Sec 902

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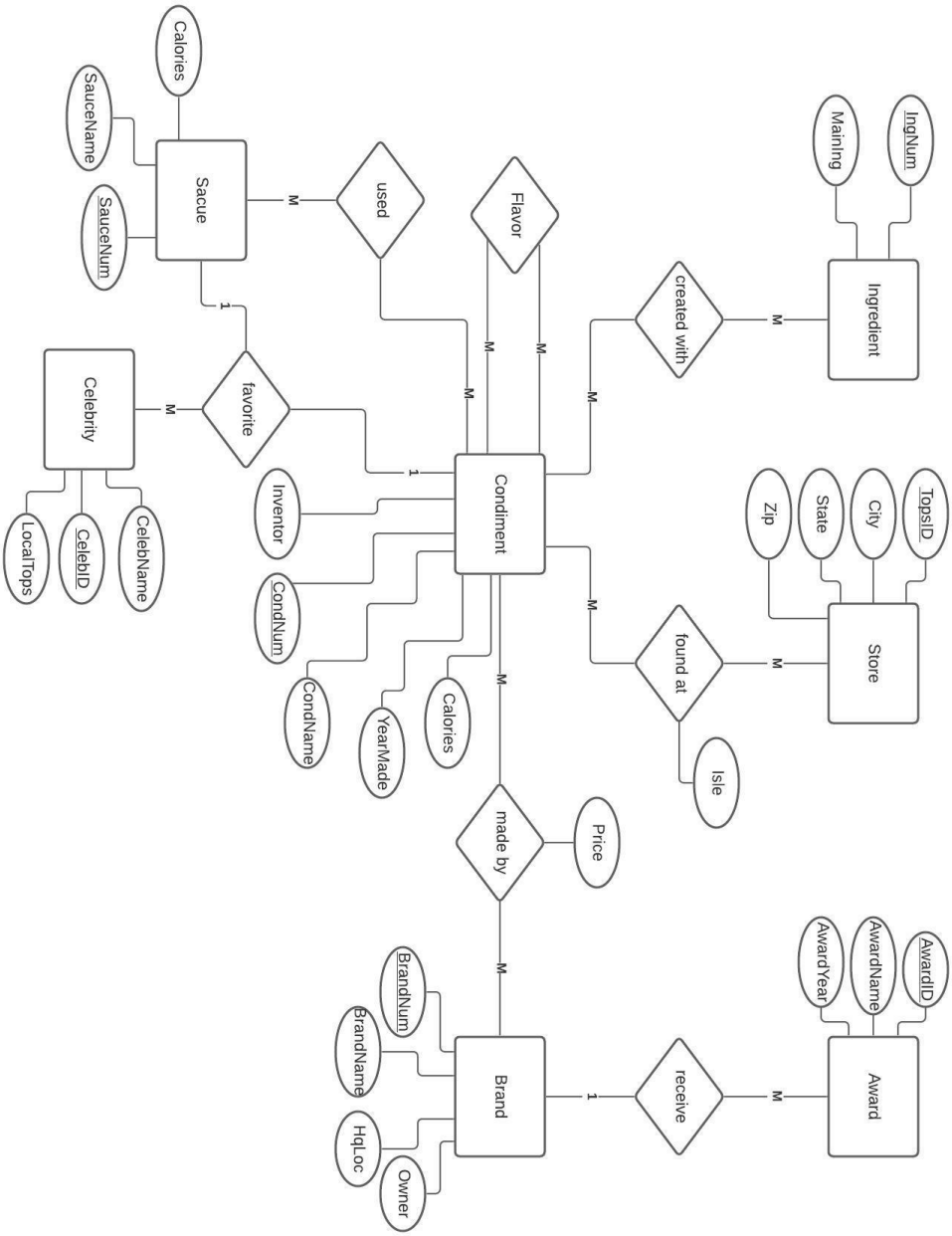
Description

A Tops Grocery store just opened in your local town. Unfortunately, with new employees, they seem to struggle to remember things about certain items. Especially condiments sold at the store. They are in need of a simple system that gives some hard and some fun facts about all the condiments they sell, and where it can be found in the stores around the country. The system must satisfy the following requirements:

1. There are tons of **condiments** on the shelves. Each condiment has a unique condiment number, along with name, the year it was discovered/made, inventors name, and calories per serving. Each condiment also:
    a. is **made by** many **brands** and has a price for the brand it is sold by..
    b. has one a **celebrity** it is favorited by the most.
    c. has many different condiment **flavors**
    d. can be **found at** many other top **store** locations and has an isle for the store it is sold in.
    e. can be **used** in many **sauces**
    f. are **created with** many **ingredients**.
2. The celebrities have a unique celebrity ID, along with their name, favorite condiment, favorite sauce, and the city of the local top's location they normally shop at.
3. Brands have unique brand numbers that identify them. They include their name, headquarters location, and owner. They also have one or more **awards** that they received.
4. Awards have a unique ID for each award, along with the name and year it was given out. Each award has only one brand that received that award, that specific year.

5. Tops stores are uniquely identified by their tops ID. Each Tops store has their city, state, and zip. There are many condiments that are sold at the store locations as well.
6. Sauces are identified by a sauce number. It also has the sauce names, and the calories of the sauce. There are many condiments used in a sauce.
7. Ingredients are identified by their unique ingredient numbers. The ingredients have various main ingredients that are used to make certain condiments. Each ingredient can also be used in one or more condiments.

Chen Entity Relationship Diagram



Tables

xAward

AwardID	AwardName	AwardYear	BrandNum

PK: {AwardID}

FK: {BrandNum} references xBrand

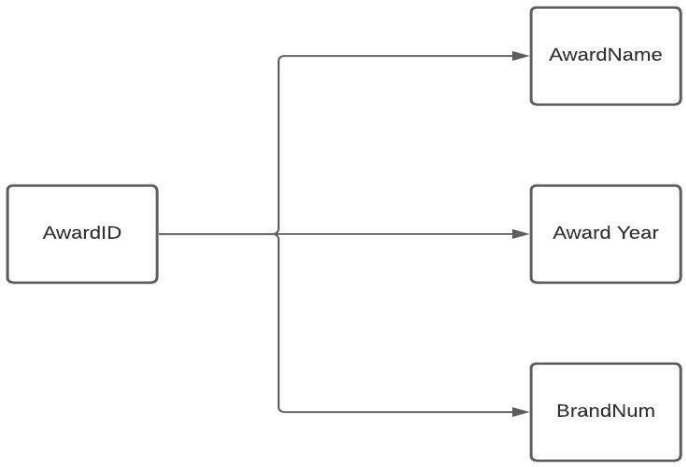
```
CREATE TABLE xAward (
        AwardID INT NOT NULL PRIMARY KEY,
        AwardName VARCHAR(45),
        AwardYear INT,
        BrandNum INT REFERENCES xBrand(BrandNum)
);
```

Description:

xAward table gives the award name, and year that a brand has won. It also gives future awards that brands haven't won yet. It uses BrandNum to link the two table together. There is no need for a bridge table because Brand to Award has a one to many relationship, and there is only one brand that can win that specific award

Third Normal Form:

xAward is in third normal from shown here because there are no repeating groups. As well as no partial and transitive dependencies. This table allows xBrand to be in third normal form by eliminating repeating brand with multiple awards.



xBrand

BrandNum	BrandName	HqLoc	Owner

PK: {BrandNum}

FK: N/A

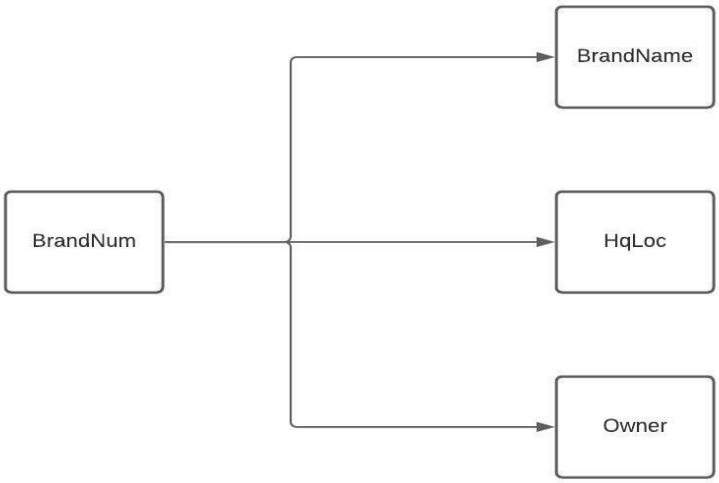
```
CREATE TABLE xBrand (
        BrandNum INT NOT NULL PRIMARY KEY,
        BrandName VARCHAR(45);
        HqLoc VARCHAR(45),
        Owner VARCHAR(45)
);
```

Description:

xBrand table provides the different brands condiments can have. Specifically giving the brand name, head quarter location, and owner. It is linked to xAward through its primary key, BrandNum. It is also linked to xCondiments with a the bridge table xMadeBy, also using BrandNum.

Third Normal Form:

xBrand is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies. It also allows for xCondiment to be in third normal form by eliminating repeating condiments made by different brands and both the dependencies.



xCelebrity

CelebID	CelebName	LocalTops	FavCond	FavSauce

PK: {CelebID}

FK: {FavCond} references {CondNum} in xCondiment

{FavSauce} references {SauceNum} in xSauce

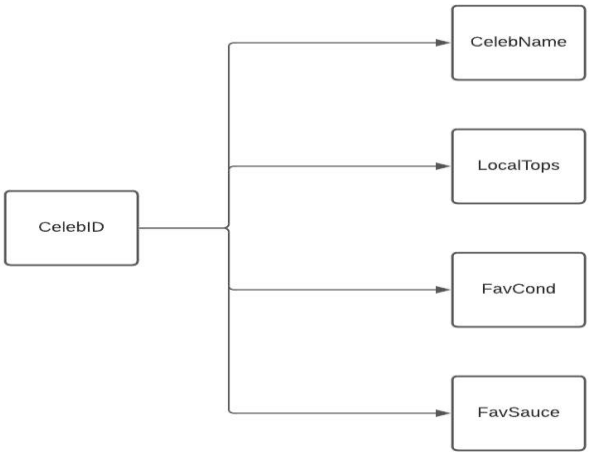
```
CREATE TABLE xCelebrity (
        CelebID INT NOT NULL PRIMARY KEY,
        CelebName VARCHAR(45),
        LocalTops VARCHAR(45),
        FavCond INT REFERENCES xCondiment(CondNum),
        FavSauce INT REFERENCES xSauce(SauceNum)
);
```

Description:

xCelebrity table provides information on famous celebrities. It specifically gives their name, local Tops they shop at, and their favorite condiment and sauce. It is linked to xCondiment and xSauce using FavCond and FavSauce as CondNum, and SauceNum. It also has a one-to-many relationships with them both.

Third Normal Form:

xCelebrity is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies. It also allows xCondiment to be in third normal for by eliminating repeating condiments favorites by the same celebrity.



xCondiment

CondNum	CondName	Inventor	YearMade	CalPerServ

PK: {CondNum}

FK: N/A

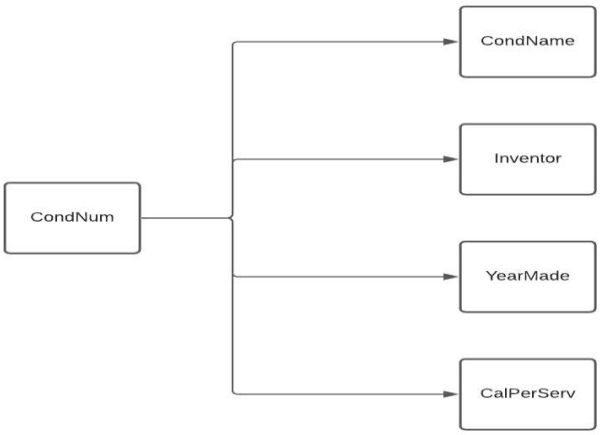
```
CREATE TABLE xCondiment (
        CondNum int NOT NULL PRIMARY KEY,
        CondName VARCHAR(45),
        Inventor VARCHAR(45),
        YearMade INT,
        CalPerServ INT
);
```

Decription:

xCondiment table provides information on common condiments. It specifically gives the condiment name, inventor, year it was made, and calories per serving. This table is also linked with xFlavor, xCelebrity, xSauce through xUsed, xIngredient through xCreatedWith, xStore through xFoundAt, and xBrand through xMadeBy.

Third Normal Form:

xCondiment is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies.



xCreatedWith

CondNum	IngNum

PK: {CondNum, IngNum}

FK: {CondNum} references xCondiment

{IngNum} references xIngredient

```
CREATE TABLE xCreatedWith (
        CondNum INT REFERENCES xCondiment(CondNum),
        IngNum INT REFERENCES xIngredient(IngNum)
);
```

Description:

xCreatedWith is a bridge table. It is used to link table xCondiment with xIngredient using CondNum and IngNum.

Third Normal Form:

This table is what allows xCondiment and xIngredient to be in third normal form by eliminating repeating groups and partial and transitive dependencies..

xFlavor

CondNum	FlavorNum

PK: {CondNum, FlavorNum}

FK: {CondNum} references xCondiment

{FlavorNum} references {CondNum} in xCondiment

```
CREATE TABLE xFlavor (
        CondNum INT REFERENCES xCondiment(CondNum),
        FlavorNum INT REFERENCES xCondiment(CondNum)
);
```

Description:

xFlavor is a bridge table. It is used to link tables condiments with its flavor. The condiment and flavor have a recursive relationship.

Third Normal Form:

xFlavor allows xCondiment to be in third normal form by eliminating repeating condiments with multiple different flavors.

xFoundAt

CondNum	TopsID	Isle

PK: {CondNum, TopsID}

FK: {CondNum} references xCondiment

{TopsID} references xStore

```
CREATE TABLE xFoundAt (
        CondNum INT REFERENCES xCondiment(CondNum),
        TopsID INT REFERENCES xStore(TopsID),
        Isle INT
);
```

Description:

xFoundAt is a bridge table. It is used to link xCondiment, and xStore using CondNum and TopsId. It also provides the isle certain condiments can be found at certain Tops locations.

Third Normal Form:

xFoundAt allows xCondiment and xStore to be in third normal form by eliminating repeating condiments sold on certain isles at different stores and partial and transitive dependencies.

xIngredient

IngNum	MainIng

PK: {IngNum}

FK: N/A

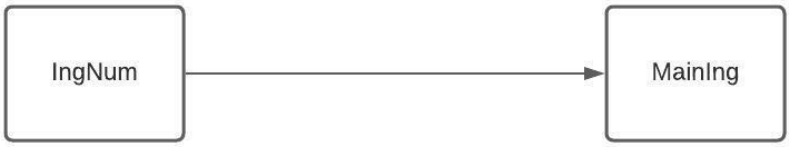
```
CREATE TABLE xIngredient (
        IngNum INT NOT NULL PRIMARY KEY,
        MainIng VARCHAR(45)
);
```

Description:

xIngredient table provides the main ingredients of each condiment. It uses xCreatedWith to link to xCondiment with IngNum because there can be many ingredients that are in many condiments.

Third Normal Form:

xIngredient is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies. It allows xCondiments to be in third normal form by eliminating repeating condiments with different ingredients.



xMabeBy

CondNum	BrandNum	Price

PK: {CondNum, BrandNum}

FK: {CondNum} references xCondiment

{BrandNum} references xBrand

```
CREATE TABLE xMadeBy (
        CondNum INT REFERENCES xCondiment(CondNum),
        BrandNum INT REFERENCES xBrand(BrandNum),
        Price DEC(3,2)
);
```

Description:

xMadeBy is a bridge table. It is used to link xCondiment and xBrand using CondNum and BrandNum.

Third Normal Form:

xMadeBy allows xCondiment and xBrand to be in third normal form by eliminating repeating condiments with different prices for each brand and partial and transitive dependencies.

xSauce

SauceNum	SauceName	Calories

PK: {SauceNum}

FK: N/A

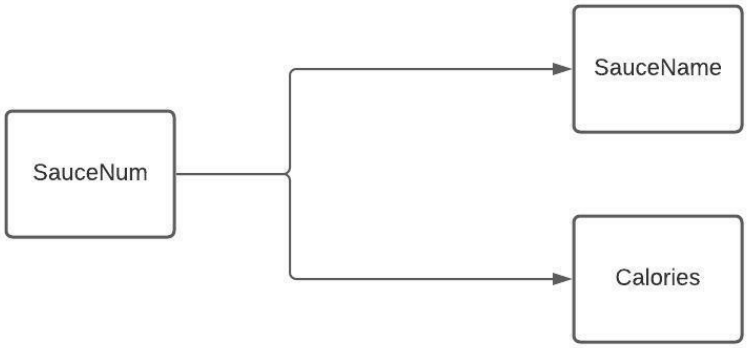
```
CREATE TABLE xSauce (
        SauceNum INT NOT NULL PRIMARY KEY,
        SauceName VARCHAR(45),
        Calories INT
);
```

Description:

xSauce table provides sauces that combinations of ingredients can make. It specifically gives the name and how many calories per serving it is and is linked to xCondiment through xUsed, and xCelebrity using SauceNum.

Third Normal Form:

xSauce is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies. It also allows xCondiment to be in third normal form by eliminating repeating condiments that make different sauces and partial and transitive dependencies.



xStore

TopsID	City	State	Zip

PK: {TopsID}

FK: N/A

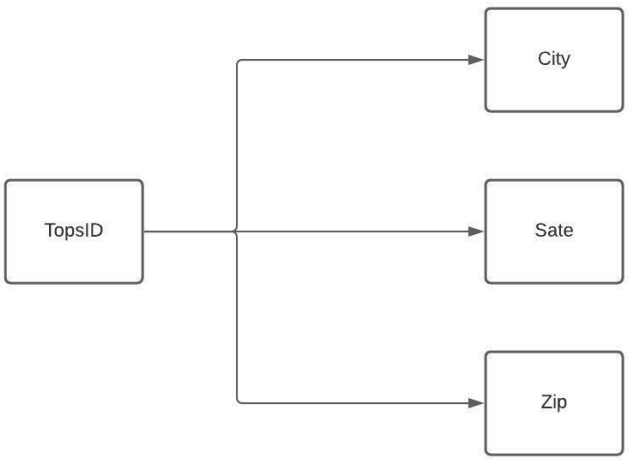
```
CREATE TABLE xStore (
        TopsID INT NOT NULL PRIMARY KEY,
        City VARCHAR(45),
        State VARCHAR(45),
        Zip INT
);
```

Description:

xStore table provides different Tops locations that certain condiments can be found at. It specifically gives the city, state and zip of each location, and is linked to xCondiment through xFoundAt using TopsID.

Third Normal Form:

xStore is in third normal form shown here because it has no repeating groups. As well as no partial or transitive dependencies. It also allows xCondiment to be in third normal form by eliminating repeating condiments with multiple stores and partial and transitive dependencies.



xUsed

CondNum	SauceNum

PK: {CondNum, SauceNum}

FK: {CondNum} references xCondiment

{SauceNum} references xSauce

```
CREATE TABLE xUsed (
        CondNum INT REFERENCES xCondiment(CondNum),
        SauceNum INT REFERENCES xSauce(SauceNum)
);
```

Description:

xUsed table is a bridge table. It is used to link xCondiment and xSauce using CondNum and SauceNum.

Third Normal Form:

xUsed allows xCondiment and xSauce to be in third normal form by eliminating repeating condiments that make multiple different sauces and partial and transitive dependencies.

Queries

FinalQuery1:

Get ingredients that appear in every condiment.

SQL:

```
SELECT ING.MAINING
FROM XINGREDIENT ING
WHERE NOT EXISTS
        (SELECT CON.*
        FROM XCONDIMENT CON
        WHERE NOT EXISTS
                (SELECT CW.*
                FROM XCREATEDWITH CW
                WHERE CW.CONDNUM = CON.CONDNUM
                AND CW.INGNUM = ING.INGNUM));
```

Table:

MAINING
Salt

Cardinality: 1

FinalQuery2:

Get brands that only ship wasabi.

SQL:

```
SELECT BR.BRANDNAME
FROM XBRAND BR
WHERE BR.BRANDNUM NOT IN
        (SELECT MB.BRANDNUM
        FROM XMADEBY MB
        WHERE MB.CONDNUM NOT IN
                (SELECT CON.CONDNUM
                FROM XCONDIMENT CON
                WHERE CON.CONDNAME = 'Wasabi'));
```

Table:

BRANDNAME
Kikkoman

Cardinality: 1

FinalQuery3:

Get brands that ship none of the condiments that are above 30 calories per serving.

SQL:

```
SELECT BR.BRANDNAME
FROM XBRAND BR
WHERE BR.BRANDNUM IN
        (SELECT MB.BRANDNUM
        FROM XMADEBY MB
        WHERE MB.CONDNUM NOT IN
                (SELECT CON.CONDNUM
                FROM xCONDIMENT CON
                WHERE CON.CALPERSERV > 30));
```

Table:

BRANDNAME
Heinz
Frenchs
Sweet Baby Rays
Kikkoman
Huy Fong Foods
Kraft
Goldens

Cardinality: 7

FinalQuery4:

Get condiments along with celebrities whose favorite condiment is that condiment if any. (Get condiment and celebrity name)

SQL:

```
SELECT CON.CONDNAME, CEL.CELEBNAME

FROM XCONDIMENT CON LEFT JOIN XCELEBRITY CEL ON CON.CONDNUM =
CEL.FAVCOND;
```

Table:

CONDNAME	CELEBNAME
Mayonaise	Jozef Gjidoda
Ketchup	Samuel Jackson
Yellow Mustard	Pres. Weinman
BBQ	Dr. Schwartz
Sweet Pickled Relish	Tom Cruise
Pesto	Mark Wahlberg
Wasabi	Jennifer Lawrence
Sriracha	Emma Stone
Ranch	Denzel Washington
Ranch	Tom Hanks
Caesar Dressing	Jennifer Aniston
Peanut Butter	
Resees Peanut Butter	Will Smith
White BBQ	
Garlic Siracha	Leonardo DiCaprio
Garlic Siracha	Pres. Murray
Sour Siracha	
Dijon Mustard	
Honey Mustard	Brad Pitt

Cardinality: 19

FinalQuery5:

Get sauces along with condiments who have the same calories per serving if any. (Get condiment and sauce name)

SQL:

```
SELECT CON.CONDNAME, SAU.SAUCENAME

FROM XCONDIMENT CON RIGHT JOIN XSAUCE SAU ON CON.CALPERSERV =
SAU.CALORIES;
```

Table:

CONDNAME	SAUCENAME
Pesto	Mayostard
White BBQ	Mayocue
Honey Mustard	Kranch
	Siranch
	Sweet and Spicy Mayo
	Mayochup
	BigMac Sauce
	Spicy Mayo
	Spicy Ranch
	All In One

Cardinality: 10

FinalQuery6:

Get brand along with awards they won if any and the rest of the awards. (Get brand name, and award name and year)

SQL:

```
SELECT BR.BRANDNAME, AW.AWARDNAME, AW.AWARDYEAR
FROM XBRAND BR FULL JOIN XAWARD AW ON BR.BRANDNUM = AW.BRANDNUM;
```

Table:

BRANDNAME	AWARDNAME
Heinz	ManuFacturing Innovation
Reeses	Top Innovation
Skippy	Innovation and Creativity
Sweet Baby Rays	Catalyst
Kikkoman	Naperville Rib Fest
Kikkoman	Naperville Rib Fest
Kikkoman	Best in The West Nugget Rib Cook Off
Huy Fong Foods	Great Taste
Kraft	Ingredients of the Year
Goldens	Ingredients of the Year
Barilla	Ingredients of the Year
Fridays	Blacksmith Applications
Heinz	Blacksmith Applications
Fridays	Blacksmith Applications
Fridays	Highest Food Hygiene
	ManuFacturing Innovation
	Top Innovation
	Innovation and Creativity
Frenchs	

Cardinality: 19

FinalQuery7:

Get condiments that are sold by a brand that has won an award, have another flavor and is a favorite of one of the celebrities.

SQL:

```
SELECT CON.CONDNAME
FROM XCONDIMENT CON
WHERE CON.CONDNUM IN
        (SELECT MB.CONDNUM
        FROM XMADEBY MB
        WHERE MB.BRANDNUM IN
                (SELECT BR.BRANDNUM
                FROM XBRAND BR
                WHERE BR.BRANDNUM IN
                        (SELECT AW.BRANDNUM
                        FROM XAWARD AW)))
AND CON.CONDNUM IN
        (SELECT FL.FLAVORNUM
        FROM XFLAVOR FL)
AND CON.CONDNUM IN
        (SELECT CEL.FAVCOND
        FROM XCELEBRITY CEL);
```

Table:

CONDNAME
Resees Peanut Butter
Garlic Siracha
Honey Mustard

Cardinality: 3

FinalQuery8:

Get celebrity, sauce and condiment names of celebs whose favorite condiment is in their favorite sauce.

SQL:

```
SELECT CEL.CELEBNAME, SAU.SAUCENAME, CON.CONDNAME
FROM XCELEBRITY CEL, XCONDIMENT CON, XSAUCE SAU, XUSED USE
WHERE CEL.FAVCOND = CON.CONDNUM
AND CEL.FAVSAUCE = SAU.SAUCENUM
AND CON.CONDNUM = USE.CONDNUM
AND USE.SAUCENUM = SAU.SAUCENUM;
```

Table:

CELEBNAME	SAUCENAME	CONDNAME
Emma Stone	Spicy Mayo	Sriracha
Denzel Washington	Kranch	Ranch
Leonardo DiCaprio	All In One	Garlic Siracha

Cardinality: 3

FinalQuery9:

Get condiments that are a celbrities favorite whose local tops is in Lagrangeville. Or can be found at a tops location in Lagrangeville.

SQL:

```
SELECT CON.CONDNAME
FROM XCONDIMENT CON
WHERE CON.CONDNUM IN
        (SELECT CEL.FAVCOND
        FROM XCELEBRITY CEL
        WHERE CEL.LOCALTOPS = 'Lagrangeville')
OR CON.CONDNUM IN
        (SELECT FA.CONDNUM
        FROM XFOUNDAT FA
        WHERE FA.TOPSID IN
                (SELECT ST.TOPSID
                FROM XSTORE ST
                WHERE ST.CITY = 'Lagrangeville'));
```

Table:

CONDNAME
Mayonaise
Ketchup
BBQ
Sweet Pickled Relish
Pesto
Peanut Butter

Cardinality: 6

FinalQuery10:

Name ingredients that are used in at least one condiment that can be found at a Tops location in Pennsylvania.

SQL:

```
SELECT ING.MAINING
FROM XINGREDIENT ING
WHERE ING.INGNUM IN
        (SELECT CW.INGNUM
        FROM XCREATEDWITH CW
        WHERE CW.CONDNUM IN
                (SELECT CON.CONDNUM
                FROM XCONDIMENT CON
                WHERE CON.CONDNUM IN
                        (SELECT FA.CONDNUM
                        FROM XFOUNDAT FA
                        WHERE FA.TOPSID IN
                                (SELECT ST.TOPSID
                                FROM XSTORE ST
                                WHERE ST.STATE = 'Pennsylvania'))));
```

Table:

MAINING
Egg
Tomato
Mustard seeds
Honey
Garlic
Wine vinegar
Worcestershire sauce
Lemon
Olive oil
Peanuts
Sugar
Salt

Cardinality: 12