

- Examples and practice using Inner and **Outer** Joins
- Filtering joins with the WHERE clause
- An introduction to subqueries
- An introduction to views

# Load Recipes Table and Data

- Load and run the scripts RecipesStructureMy.SQL and RecipesDataMy.SQL from the Class 7 scripts folder in Moodle.
- Practice inner joins using examples on the Recipe tables found in Chapter 8 of the textbook.

Schema source: SQL Queries For Mere Mortals, 4<sup>th</sup> Ed., John Viescas, Pearson

## RECIPES

RecipeId NUMBER PK  
RecipeTitle VARCHAR2(255)  
RecipeClassID NUMBER FK  
Preparation VARCHAR2(4000)  
Notes VARCHAR2(4000)

## RECIPE\_INGREDIENTS

RecipeId NUMBER  
RecipeSeqNo NUMBER  
IngredientID NUMBER FK  
MeasureAmountID NUMBER FK  
Amount FLOAT

## INGREDIENTS

IngredientID NUMBER PK  
IngredientName VARCHAR2(255)  
IngredientClassID NUMBER FK  
MeasureAmountID NUMBER FK

## MEASUREMENTS

MeasureAmountID NUMBER PK  
MeasurementDescription  
VARCHAR2(255)

## RECIPE\_CLASSES

RecipeClassID NUMBER PK  
RecipeClassDescription  
VARCHAR2(255)

## INGREDIENT\_CLASSES

IngredientClassID NUMBER PK  
IngredientClassDescription  
VARCHAR2(255)



# Recipe title, preparation, and recipe class for all recipes

```
SELECT RecipeTitle,  
       Preparation,  
       RecipeClassDescription  
FROM Recipe_Classes  
INNER JOIN Recipes  
ON Recipe_Classes.RecipeClassID = Recipes.RecipeClassID
```

# Order by recipe class

```
SELECT RecipeTitle,  
       Preparation,  
       RecipeClassDescription  
FROM Recipe_Classes  
INNER JOIN Recipes  
ON Recipe_Classes.RecipeClassID = Recipes.RecipeClassID  
ORDER BY RecipeClassDescription
```

# Get only main course recipe class

```
SELECT RecipeTitle,  
       Preparation,  
       RecipeClassDescription  
FROM Recipe_Classes  
INNER JOIN Recipes  
ON Recipe_Classes.RecipeClassID = Recipes.RecipeClassID  
WHERE RecipeClassDescription = 'Main course'
```

Get all recipes having beef (IngredientID 1)  
and garlic (IngredientID 9) as ingredients

```
SELECT DISTINCT Recipes.RecipeTitle
FROM Recipes
INNER JOIN Recipe_Ingredients
    ON Recipes.RecipeID =
        Recipe_Ingredients.RecipeID
WHERE Recipe_Ingredients.IngredientID IN (1, 9)
```

Get all recipes having beef and garlic as ingredients (USING clause instead of ON)

```
SELECT DISTINCT Recipes.RecipeTitle
FROM Recipes
INNER JOIN Recipe_Ingredients
    USING (RecipeID)
WHERE Recipe_Ingredients.IngredientID IN (1, 9)
```



Get all recipes having beef (IngredientID 1)  
and garlic (IngredientID 9) as ingredients

```
SELECT DISTINCT Recipes.RecipeTitle
FROM Recipes
INNER JOIN Recipe_Ingredients
    USING (RecipeID)
WHERE Recipe_Ingredients.IngredientID IN (
    SELECT IngredientId FROM Ingredients
    WHERE IngredientName = 'Beef'
    OR IngredientName = 'Garlic'
)
```

The inner SELECT is a **Subquery**!

Use an **outer join** to get ingredients that are **not** used in any recipes

```
SELECT i.IngredientID,  
       i.IngredientName,  
       ri.RecipeID  
FROM Ingredients i  
LEFT OUTER JOIN Recipe_Ingredients ri  
    ON i.IngredientID = ri.IngredientID  
WHERE ri.RecipeID IS NULL
```

# List all the ingredients in Irish Stew

```
SELECT I.INGREDIENTNAME, I.INGREDIENTID
FROM INGREDIENTS I
JOIN RECIPE_INGREDIENTS RI
ON RI.INGREDIENTID = I.INGREDIENTID
WHERE RECIPEID = (
    SELECT RECIPEID FROM RECIPES WHERE
    RECIPETITLE='Irish Stew'
);
```

List all recipes that require at least 1 whole onion

Recipes that use an oven

Recipes that use dairy (milk products or eggs)

# Create a view for easier querying

```
CREATE VIEW Dairy_Recipes_View
AS
SELECT DISTINCT r.RecipeTitle FROM Recipes r
INNER JOIN Recipe_Ingredients ri
    ON r.RecipeID = ri.RecipeID
INNER JOIN Ingredients i
    ON ri.IngredientID = i.IngredientID
INNER JOIN Ingredient_Classes ic
    ON i.IngredientClassID = ic.IngredientClassID
WHERE ic.IngredientClassDescription = 'Dairy'
```

# Now we can just query the view!

- `SELECT RecipeTitle FROM Dairy_Recipes_View;`
- You can query a view like a table
- Views are stored as database objects
- Unlike tables, views do not hold data themselves