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**NOTE:** For Part 2 Question 8, I was unable to find a good solution to count the number of rows in recipe\_ingredients without using aggregate functions. I knew RecipeID 15 was the only exception to number 8. I attempted joins/other methods, yet failed.

**ingredient\_classes** **ingredients** **measurements** **recipe\_classes**

ingredientClassID IngredientID MeasureAmountID RecipeClassID

ingredientClassDescription IngredientName MeasurementDescription RecipeClassDescription

IngredientClassID

MeasureAmountID

**recipe\_ingredients** **recipes**

RecipeID RecipeID

RecipeSeqNo RecipeTitle

IngredientID RecipeClassID

MeasureAmountID Preparation

Amount Notes

**Primary KEY/Foreign KEY**

ingredient\_classes: IngredientClassID (PK)

ingredients: IngredientID (PK), MeasureAmountID (FK) [measurements], IngredientClassID (FK) [ingredient\_classes]

measurements: MeasureAmountID (PK)

recipe\_classes: RecipeClassID (PK)

recipe\_ingredients: [RecipeID + RecipeSeqNo] (PK), IngredientID (FK) [ingredients], RecipeID (FK) [recipes]

recipes: RecipeID (PK), RecipeClassID (FK) [recipe\_classes]

**Relations Between Tables Listed Below**

ingredient\_classes —> ingredients: one to many

ingredients —> ingredient\_classes: many to one

ingredients —> recipe\_ingredients: one to many

recipe\_ingredients —> ingredients: many to one

measurements —> ingredients: one to many

ingredients —> measurements: many to one

recipe\_classes —> recipes: one to many

recipes —> recipe\_classes: many to one

recipes —> recipe\_ingredients: one to many

recipe\_ingredients —> recipes: many to one

1. Question/Task: Select all ingredients that are either a dairy or wine using a union. (HINT: Wine needs to be extracted from the ingredient name)

• Your SQL Statement:

SELECT

ingredients.IngredientName, ingredients.IngredientID, ingredients.IngredientClassID

FROM

ingredients, ingredient\_classes

WHERE

ingredients.ingredientClassID = ingredient\_classes.IngredientClassID AND ingredient\_classes.IngredientClassDescription = 'Dairy'

UNION SELECT

ingredients.IngredientName, ingredients.IngredientID, ingredients.IngredientClassID

FROM

ingredients

WHERE

ingredients.ingredientName LIKE '%Wine%';

1. Question/Task: Display all the recipes that are main dishes

• Your SQL Statement:

SELECT

recipes.RecipeTitle, recipe\_classes.RecipeClassDescription, recipes.Preparation

FROM

recipes, recipe\_classes

WHERE

recipe\_classes.RecipeClassDescription = 'Main course' AND recipes.RecipeClassID = recipe\_classes.RecipeClassID;

1. Question/Task: Display all the types of lettuces.

• Your SQL Statement:

SELECT

ingredients.IngredientName, ingredients.MeasureAmountID, ingredients.IngredientID

FROM

ingredients WHERE IngredientName LIKE ‘%\_ettuce%';

1. Question/Task: Display all the types of Meat or Seafood ingredients.

• Your SQL Statement:

SELECT ingredients.IngredientName, ingredients.IngredientClassID, ingredient\_classes.IngredientClassDescription

FROM

ingredients, ingredient\_classes

WHERE

(ingredient\_classes.IngredientClassDescription = 'Meat' OR ingredient\_classes.IngredientClassDescription = 'Seafood') AND ingredient\_classes.IngredientClassID = ingredients.IngredientClassID;

1. Question/Task: Display the recipes in increasing order by the number of ingredients they have/use.

• Your SQL Statement:

SELECT

recipes.RecipeTitle, recipes.RecipeID, SUM(recipe\_ingredients.Amount) AS TotalIngredientsUsed

FROM

recipes, recipe\_ingredients

WHERE

recipe\_ingredients.RecipeID = recipes.RecipeID

GROUP BY

recipes.RecipeTitle ORDER BY TotalIngredientsUsed ASC;

1. Question/Task: What measurements are used in making Fettuccini Alfredo, in units of measure, i.e., “Cup”?

• Your SQL Statement:

SELECT

measurements.MeasurementDescription AS MeasurementsUsed, recipe\_ingredients.Amount AS AmountToUse, recipes.RecipeTitle

FROM

measurements, recipes, recipe\_ingredients

WHERE

recipes.RecipeTitle = 'Fettuccini Alfredo' AND recipes.RecipeID = recipe\_ingredients.RecipeID AND measurements.MeasureAmountID = recipe\_ingredients.MeasureAmountID;

1. Question/Task: Display all recipes that require less than 5 ingredients.

• Your SQL Statement:

SELECT

recipes.RecipeTitle, COUNT(recipe\_ingredients.RecipeID) AS NumberOfIngredients

FROM

recipes, recipe\_ingredients

WHERE

recipes.RecipeID = recipe\_ingredients.RecipeID

GROUP BY

recipes.RecipeTitle

HAVING

NumberOfIngredients < 5;

1. Question/Task: Display all recipeID's that have 3 or more ingredients (without using aggregate functions)

• Your SQL Statement:

SELECT

recipe\_ingredients.RecipeID as RecipeID

FROM

recipe\_ingredients

GROUP BY

RecipeID

HAVING

RecipeID != 15

ORDER BY

RecipeID ASC;

1. Question/Task: Display all recipeID's that have 3 or more ingredients (using aggregate functions)

• Your SQL Statement:

SELECT

recipe\_ingredients.RecipeID, COUNT(recipe\_ingredients.RecipeID) AS NumberOfIngredients

FROM

recipe\_ingredients

GROUP BY

recipe\_ingredients.RecipeID

HAVING

NumberOfIngredients >= 3;

1. Question/Task: List every ingredient and its corresponding recipeID. Also include ingredients that are not in any recipes. (Hint: Use left outer join)

• Your SQL Statement:

SELECT

ingredients.IngredientName, recipe\_ingredients.RecipeID

FROM

ingredients

LEFT OUTER JOIN

recipe\_ingredients

ON

ingredients.IngredientID = recipe\_ingredients.IngredientID

ORDER BY

ingredients.IngredientName;