Final Exam Review
Motorcycle Registration Problem

Background Information

Millions of people ride motorcycles for a variety of reasons. While many enjoy the sense of freedom they can provide, a number of people use them because they are cheaper to operate than a car.

Problem Statement

In this assignment, students will explore statistics related to motorcycle registrations in the United Kingdom.

Instructions

IMPORTANT: This is not the actual Exam for your section. You will not receive any credit for completing this project.

IMPORTANT: This assignment requires the Windows version of Microsoft 365. macOS users can access a ready-to-use version through Windows Virtual Desktop by following the instructions at https://cs101.wvu.edu/wvd.

IMPORTANT: Complete the steps below in the order they are given. Completing the steps out of order may complicate the assignment or result in an incorrect result.

1. Download and extract the provided Data Files ZIP file. It contains the following files for use in this assignment:

   a. **registrationsbyengine.xml** – Information on United Kingdom motorcycle registrations by engine size [1].

Table: *RegistrationsByEngine*		
Field Name	**Type**	**Description**
DataYear	Number	Part of composite key. Year of the data.
EngineSize	Short Text	Part of composite key. Size of engine in cubic centimeters (CCs).
Registrations	Number	Number of newly registered motorcycles.

   b. **registrationsbytype.xml** – Information on United Kingdom motorcycle registrations by type [1].

Table: *RegistrationsByEngine*		
Field Name	**Type**	**Description**
DataYear	Number	Part of composite key. Year of the data.
TypeAbbrv	Short Text	Part of composite key. Abbreviation for the motorcycle type.
Registrations	Number	Number of newly registered motorcycles.

   c. **ninja.gif** – Image of a motorcycle for use in PowerPoint.

Microsoft Access Portion

2. Create a new Microsoft Access database named **finalexamreview_mrp_*lastname_firstname*.accdb**.

3. Import the following items into the database:

   a. **registrationsbyengine.xml** file – Import structure and data into a new table.

   b. **registrationsbytype.xml** file – Import structure and data into a new table.

4. We need to create a new table to store information about motorcycle types.

   a. Create a table named *Types* with the fields below. Use appropriate field types and designate a good primary key.

Table: *Types*	
Field Name	**Description**
TypeAbbrv	Abbreviation of the motorcycle type.
TypeName	Full name of the motorcycle type.

   b. Enter records for all types below.

   HINT: The *Types* table will contain 5 records.

TypeAbbrv	TypeName
CON	Custom On-Road
MOP	Moped
SON	Standard On-Road
TOF	Trail/Off-Road
OTH	Other

5. Create the appropriate relationships for the following tables. Do not enforce referential integrity.

   a. *Types* and *RegistrationsByType*

   b. *RegistrationsByType* and *RegistrationsByEngine*

6. Create separate queries to provide the information requested below. Name each query after the step in which it appears (e.g., name the query in Step 6a as *Query6A*).

   HINT: Run your queries to test them. Make sure that they display all and only the records that you would expect to appear.

   a. Create a query to summarize registrations for each year. List, for each year, the sum of registrations.

   Format the sum as a standard-type number with no decimal places. Sort by year in ascending order.

HINT: This query will show 7 records and 2 fields.

b. We wish to calculate the amount of registration revenue for each engine size assuming that registration costs $71. Create a query listing the year, engine size, and number of registrations. Also, include a field to calculate the registration revenue.

You can calculate the registration revenue using the formula:
$$[RegistrationsByEngine.Registrations] * 71$$

Only display records for the year 2012 and newer.

Format the calculated field as currency with 2 decimal places.

HINT: This query will show 20 records and 4 fields.

c. Create a query to calculate the average annual number of registrations for each on-road type. List, for each type name, the average of registrations.

Only display records for the Custom On-Road and Standard On-Road types.

Format the average as a standard-type number with no decimal places.

HINT: This query will show 2 records and 2 fields.

d. We would like to generate statistics on 2015 registrations. Copy-and-paste this SQL code into a new query:

```
SELECT RegistrationsByType.DataYear AS Year,
Sum(RegistrationsByType.Registrations) AS Registrations
FROM Types INNER JOIN RegistrationsByType ON Types.TypeAbbrv =
RegistrationsByType.TypeAbbrv
WHERE (((Types.TypeName)="Standard On-Road" Or
(Types.TypeName)="Custom On-Road"))
GROUP BY RegistrationsByType.DataYear
ORDER BY RegistrationsByType.DataYear;
```

IMPORTANT: Do not make any modifications to this query other than entering the above SQL code.

HINT: This query will show 7 records and 2 fields.

7. Using the Form Wizard, create a form with subform. The main form should display the full motorcycle type. The subform must display a datasheet with all *RegistrationsByType* table fields.

   Name the main form *MotorcycleTypesData* and the subform *MotorcycleTypesDataSubform*.

8. Using the Report Wizard, create a report to show the results of the *Query6B* query. Display all fields from the query.

   Group by year and sort by engine size in ascending order. Use a stepped layout and portrait page orientation. Name the report *EngineSizeSummary*.

   Ensure the full widths of all columns are visible on the report.

9. Run the Compact and Repair Database utility on your database. Ignore any errors you receive when running the utility.

Microsoft Excel Portion

10. Create a new Microsoft Excel workbook named **finalexamreview_mrp_*lastname_firstname*.xlsx**.

11. We must adjust the sheets in our workbook.

    a. Rename *Sheet1* to *Annual Registrations.*

12. Import the following item into the workbook:

    a. *Query6D* query from the Microsoft Access database – Import as a table starting in cell **A1** of the *Annual Registrations* sheet.

       NOTE: Microsoft Access must be closed before importing the query.

13. We wish to apply formatting to the *Annual Registrations* sheet.

    a. For the table, turn on the ***First Column*** option.

    b. Format the cells as indicated below:

       i. **B2** through **B8**: number with no decimal places, use 1000 separator

    c. Apply *Red-Yellow-Green* color scale conditional formatting to cells **B2** through **B8**.

14. We would like to create a chart to display information on annual motorcycle registrations.

    a. Create a new 2-D line chart based on cells **A1** through **B8** of the *Annual Registrations* sheet. Move the chart to a new sheet named *Annual Registrations Chart*.

Ensure the years are shown as labels for the horizontal (category) axis, not plotted as chart data. Specify appropriate chart and axis titles.

b. Add a trendline based on the motorcycle registrations. Use the trendline type that best fits the data and project values forward 5 periods (through 2020). Display the **R-squared** value on the chart.

NOTE: You cannot use the *Moving Average* type for your trendline.

15. To better understand our data, we wish to create a PivotTable.

a. Create a new PivotTable based on the data in cells **A1** through **B8** of the *Annual Registrations* sheet. Place the PivotTable on a new sheet named *Annual Registrations PivotTable*.

b. On the PivotTable, do the following:

i. Add the year as a **Rows** field.

ii. Add the registrations as a **Values** field.

c. We need to perform formatting on the PivotTable.

i. Group the years into sets of 2 starting at 2009.

ii. Summarize the registrations by averaging them.

iii. Format the cells as indicated below:

(1) **Average of Registrations** field: number with no decimal places, use 1000 separator

Microsoft PowerPoint Portion

16. Create a new Microsoft PowerPoint presentation named **finalexamreview_mrp_*lastname_firstname*.pptx**.

17. In the presentation, create the following slides:

a. *Title Slide*-type slide listing a title for the presentation, your full name, course section, and an automatically updating date.

b. *Title and Content*-type slide titled `Annual Registrations`. Add the chart from the *Annual Registrations Chart* sheet in your Microsoft Excel workbook to the content area of the slide.

c. *Title and Content*-type slide titled `Registrations Prediction`. In the content area of the slide, indicate which trendline type was used on *Annual Registrations Chart* and the projected registrations at the end of the forecasting period.

18. Create *Title and Content*-type slides to answer four of the five analysis questions below. Respond to one question per slide. Title each slide with the name of the question being answered (e.g., "Question A").

    a. Cars tend to cost more than motorcycles, yet there are many times more cars than motorcycles in many western countries. (In the U.S. in 2003, there were about 43 cars and trucks for every motorcycle.) Why do you think this is the case?

    b. Is there any noticeable trend in the number of registrations over the time period surveyed? If there is, what is the trend and what is a possible explanation?

    c. The overwhelming majority of motorcycles registered had engine sizes of less than 1.0 liter. A normal car engine is at least 1.8 liters. Even though motorcycle engines are much smaller than those found in cars, motorcycles are generally able to drive at least as fast as cars. How is this possible?

    d. According to the National Highway Traffic Safety Administration, motorcyclists are 39 times more likely to be killed in an accident than occupants of passenger cars. Why might this be the case?

    e. Is there any apparent relationship between registrations by motorcycle type and registrations by engine size? Explain your answer.

19. We wish to apply formatting to the presentation. Use your best judgment to create a professional-looking presentation.

    a. Apply one design theme of your choice to all slides.

    b. Apply an animation of your choice to the *Annual Registrations* chart.

    c. Apply slide transitions of your choice to all slides.

    d. Edit the parent (top-most) slide master to add the **ninja.gif** image to the top right corner of the slides. Size the image to be 1-inch high by 1.33-inches wide.

       NOTE: Depending on the design theme used, the image may not appear on title slides. This is acceptable as long as the image is correctly added to the slide master.

    e. Add your name, an automatically updating date, and the slide number to the footer of all slides except the title slide.

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Grading Rubric

This is a practice assignment and is worth no points. A comparable Exam would be worth 150 points and graded using this rubric, with partial credit awarded as appropriate:

Step 3	5 points	Step 12	5 points
Steps 4a-b	10 points total	Steps 13a-c	5 points total
Step 5	5 points	Steps 14a-b	15 points total
Steps 6a-d	7.5 points each	Steps 15a-c	15 points total
Step 7	5 points	Steps 17a-c	9 points total
Step 8	5 points	Steps 18a-e (pick 4 of 5)	7.5 points each
Step 11a	3 points	Steps 19a-e	8 points total

The analysis questions in Steps 18a-e can be evaluated using this rubric:

Standard	Meets Requirements (3.75 points)	Does Not Meet Requirements (0 points)
Answer is reasonable.	Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.	Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.
Answer is supported.	Logical rationale is provided to support the given answer.	Logical rationale is not provided to support the given answer.

References

[1] "Motorcycle Registration Statistics," *MotorCycle Industry Association*, 2016. Available: *http://www.mcia.co.uk/Press-and-Statistics/NewReg_Statistics.aspx*. Accessed: Jul. 06, 2016.