BELGIUM CAMPUS iTversity It's the way we're wired	**Memorandum:**	**Data Analytics 371**
	Date:	2023-05-15
	Total:	80 Marks
	Duration:	150 Minutes

Assessor: D. Sundire
Moderator: G. Mudare

Instructions. If any of the instructions are disobeyed, candidates shall expose themselves to disqualification from future assessments.

General: Submit your assessment answers electronically within the stipulated time. The system will not accept any submissions after the cut-off time.
General: No instructions or directives of the invigilator shall be disregarded; if any of the instructions are disobeyed, candidates shall expose themselves to disqualification from future assessments.
General: This is an individual assessment. All work must be done on your own.
General: Candidates are expected to maintain academic integrity. Any form of plagiarism or cheating will be taken seriously and may result in disciplinary action including disqualification from future assessments.
General: No explanation of the assessment questions may be asked or shall be given.
General: Late submissions will not be accepted without proof.
General: Candidates shall not communicate or attempt to communicate with anyone, and candidates shall not conduct themselves in an improper or unseemly manner.
General: Should any work need to be uploaded, ensure naming conventions are followed as instructed.
Practical: Calculators may not be used during this assessment.
Technical: Any technical issues must be reported to the invigilator immediately.

Section B: Practical

Question 4 **Subtotal:** **[55]**

Complete the tasks in this section using Power BI. It is your responsibility to ensure that your work is saved periodically. No extra time will be given due to loss of your work.

1. Open Power BI Desktop and connect the Comma Separated Values (CSV) file called "*VAT Rates.csv*" [3]
   - Display a preview of the data.
   - Check if column headings and datatypes have been recognised.
   - If the column headings and data types are not recognized, you will need to make the necessary transformations to prepare your data for analysis.
   - Change the data type of *CategoryID* to Whole Number and field *VAT* to Percentage as shown below.

	CategoryID	Classification	VAT
1	1	Consumer Products	10.00%
2	2	Luxury Goods	15.00%
3	3	Consumer Products	10.00%
4	4	Basic Commodities	0.00%
5	5	Basic Commodities	0.00%
6	6	Consumer Products	10.00%
7	7	Basic Commodities	0.00%
8	8	Consumer Products	10.00%

- Click **Close and Apply**.

2. Connect to the Excel file named "*Employee Expenses.xlsx*" [4]
   - Select the table named *Expenses_Table*.
   - Check if column headings and datatypes have been recognised.
   - If the column headings and data types are not recognized, you will need to make the necessary transformations to prepare your data for analysis.
   - Change the data type of *Amount* to Fixed Decimal Number.
   - Rename the query to *Expenses*.
3. Launch **SQL Server Management Studio (SSMS)** and connect to your SQL Server instance. [3]
   - Open the file named "*NorthwindScript.sql"* located in your test folder and execute the script. The script creates the Northwind database and all underlying objects.
   - After the script has executed successfully, you may close SSMS, but take note of the server name containing your database.
4. While in Power BI Desktop, connect to your SQL server instance. [5]
   - Enter the server instance name but leave the database name blank
   - Choose the **Import** option on Data Connectivity mode.
   - Click on the **Advanced options** button and make sure that that **Navigate using Full Hierarchy** is checked.
   - Use your credentials to connect (for Windows operating system it is usually the current credentials, that is Windows Authentication)
   - Click **OK** to dismiss the message dialog that appears.
   - Select the following four (4) views in the database.
     - DimProducts
     - DimEmployees
     - DimCustomers
     - FactOrders
   - In *FactOrders* change the data type of *AmountPaid* to Fixed Decimal Number.
   - Click **Close and Apply**.
   - In Model tab, check if all relationships have been detected correctly.
     - The **Expenses_Table** should automatically link to the **DimEmployees** query using the *EmployeeID,* and
     - The **VAT Rates** query should automatically link to **DimProducts** query using CategoryID*.*
5. In the Model tab, click on **New Table** to use a DAX formula to create a dynamic date table. [10]
   - Enter the following DAX formula to create a Date dimension table:

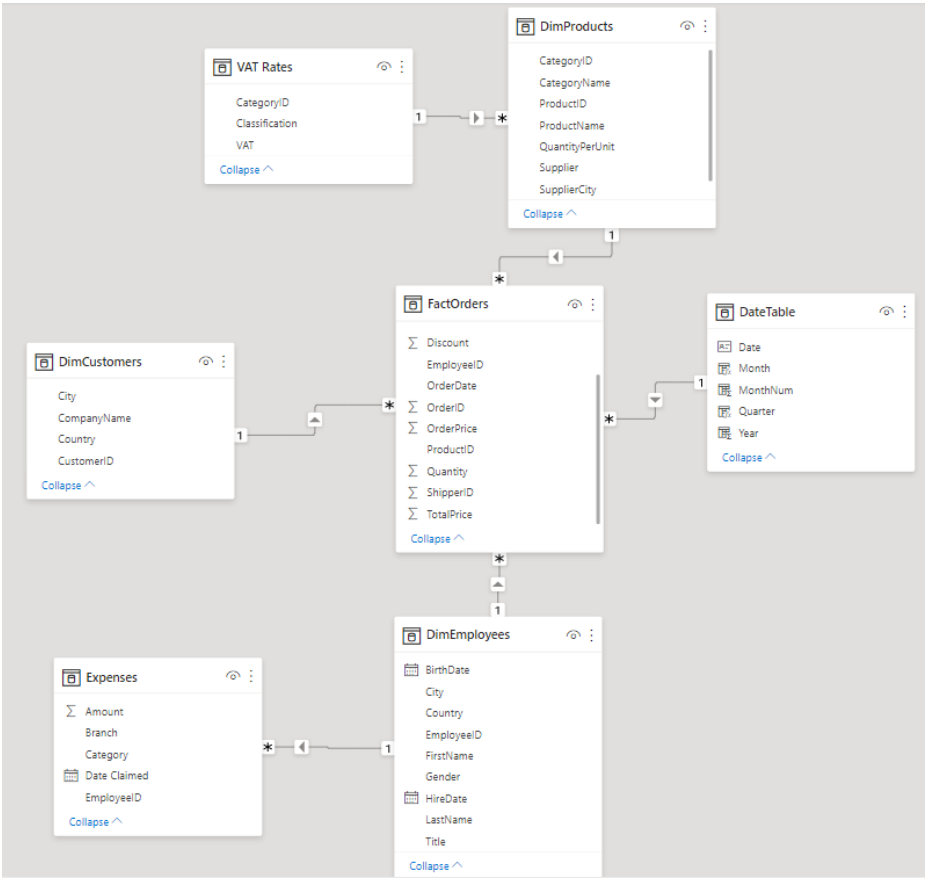
```
DateTable = CALENDAR(
      DATE(YEAR(MIN(Orders[OrderDate])),1,1),
      DATE(YEAR(MAX(Orders[OrderDate])),12,31)
      )
```

   - Check if the single column table named **DateTable** has been created with a *Date* column.
   - Use the **New Column** command to add four columns to the table, using the following formulas:

```
Year = YEAR('DateTable'[Date])
Quarter = FORMAT('DateTable'[Date], "Q")
MonthNum = MONTH('DateTable'[Date])
Month = FORMAT('DateTable'[Date], "MMMM")
```

   - Mark this table as a date table and choose *Date* as the date column.

- Create a relationship to link the **DateTable** to the main **FactOrders** table using the *Date* and *OrderDate* fields.
- Your data model should like the one below:

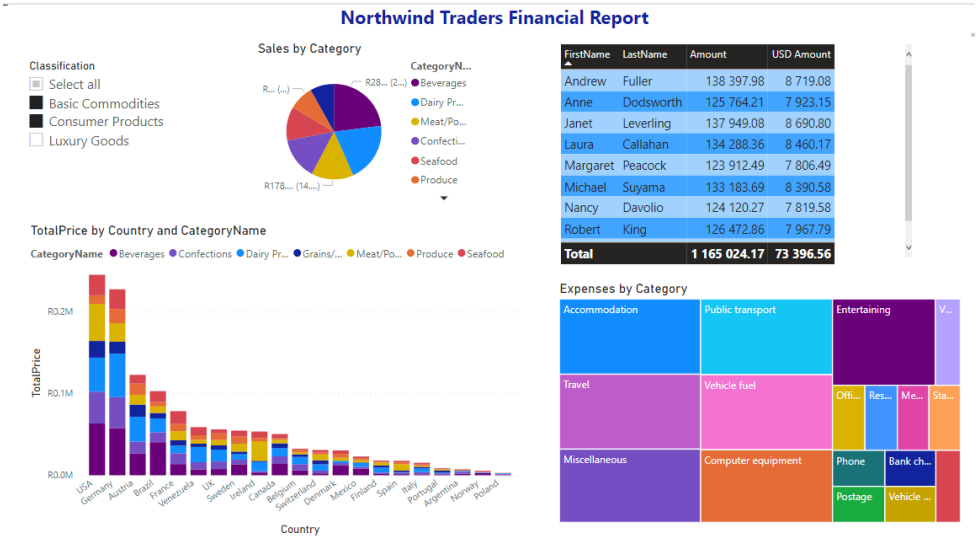


6. Connect to the following Web data source http://www.currency-converter.org.uk/currency-exchange-rates.html to get the currency exchange rate information. [10]
    - Select the table called "*foreign currency exchange rates today...*". The table contains exchange rates for converting a number of different currencies into six major currencies: GBP, EUR, USD, AUD, NZD and CAD.
    - Remove the first two columns.
    - Use First Row as Headers
    - Filter out the repeated column headers. They have the same value as the column heading.
    - In all columns except the ISO column, replace the period (".") decimal symbol with a decimal symbol recognised by your system.
    - Change the data type of these columns to Decimal Number.
    - We are interested in South African Rand conversions only. Filter out all currencies in ISO column except "ZAR" only.
    - Rename the query: "*Exchange Rates Today*"
7. While in Power Query Editor, select the *Expenses* query.
    - Create a new column named "ISO", and make sure that the new column has the word "ZAR" in every row.
    - Click **Close and Apply**.

- In Model tab, check if all relationships between *Expenses* and *Exchange Rates Today* has been detected correctly.
- Switch to Model tab and create a new column in the Expenses query using the following DAX formula:

```
USD Amount = Expenses[Amount] * RELATED('Exchange Rates Today'[USD])
```

8. Your data model is now complete, and you will proceed to create visualizations. [20]
   - Add a Text Box named Northwind Traders Financial Report and change the Text Size to 18pt and Font family to **Segoe UI Bold**.
   - Create the Slicer, Pie Chart, Stacked Column Chart, Table and Treemap visuals as shown below.



   - The Slider visual shows the product classifications from the *Vat Rates* query.
   - Enable Multiple Selection and "Select All" using Format options.
   - Change font sizes as necessary to improve the readability of text.
   - The Pie Chart visual uses the *CategoryName* from the *DimProducts* as the Legend and *TotalPrice* from *FactOrders* as the Values.
   - Rename the title using Format options.
   - The Stacked Column Chart visual uses *Country* from *DimCustomers* as Axis, *CategoryName* from the *DimProducts* as the Legend and *TotalPrice* from *FactOrders* as the Values.
   - The Table visual uses *FirstName* and *LastName* from *DimEmployees*, and Amount and *USD Amount* from *Expenses* as Values. Note that the values may differ from the displayed values due to fluctuations in forex exchanges rates.
   - Change font sizes as necessary to improve the readability of text.
   - The Treemap visual uses *Category* as Group and *Amount* as Values. Both fields are in the *Expenses* query.
   - Rename the title using Format options.

Save the Power BI project in the format ***StudentName_Traders_CT2.pbix*** and upload it on AssessmentQ.