IT1391 DATA VISUALISATION

Assignment

AY2024 Semester 2

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Introduction

Data analysts enable businesses to maximize the value of their data assets through the use of visualisation tools. As subject matter experts, data analysts are responsible for designing and building scalable data models, cleaning and transforming data, and enabling advanced analytic capabilities that provide meaningful business value through easy-to-comprehend data visualisations. Data analysts also collaborate with key stakeholders across verticals to deliver relevant insights based on identified business requirements.

In this assignment, you are required to form a team of **4 members** to design and build scalable data models, clean and transform data and design easy-to-comprehend data visualisations. The dataset of this assignment will be an MS SQL database, Northwind.

The base marks of this assignment are **40 marks,** and it constitutes **40%** of your total ICA marks for this competency unit.

Copying work from others or any other sources (including the internet) is strictly prohibited. If proven guilty, it will be considered as an act of plagiarism, and you will be subjected to disciplinary action.

You may also wish to note that your submission may be checked for plagiarism by Brightspace. The allowable percentage for similarity should not exceed 25%.

Submission Format and Mode

Below are the required deliverables for this assignment.

1. Single consolidated **Report** (using Report template provided)
2. Single consolidated **Power BI workbook**
3. Individual **Video Presentation** (publicly accessible video link and/or video file)

Please be reminded to submit all the deliverables via BrightSpace **by the end of Week 9, 15 December 2024 (Sunday) 2359hr**

Late Submission Penalty

Late submission of assignment is subjected to penalty as shown below.

No. of Calendar Days	Penalty
If submission is **late** by <=5 working days	**Cap at 50%** (of the base marks)
If submission is late for > 5 working days	**0 marks**

Assessment Components

Assignment Component	Deliverables
Task 1 (Team, 10m)	• **Data Modelling**. Document the data transformation steps during the data modelling process in the report.
Task 2 (Individual, 15m)	• **Sales Analysis Reports** by each team member to be documented in the report with screenshots and consolidated in a Power BI workbook.
Task 3 (Individual, 15m)	• **Deeper Analysis Reports** by each team member such as additional visuals or dashboards are required to be documented in the report and included in the same Power BI workbook as Task 2. • Deeper data analysis is to be explained via **video presentation**.

Please refer to **Annex A** for detailed assessment rubrics of this assignment.

Project Background

Northwind Traders imports and exports speciality food around the world. It is looking at expanding its business. Before deciding on their expansion plan, their management would like to understand more about their current sales analyse in terms of products, employees, suppliers, customers, and inventory. Your team has been tasked to develop reports to show your analysis and explain your approach to the expansion. The figure below shows the tables in the Northwind database and how they are related to one another.

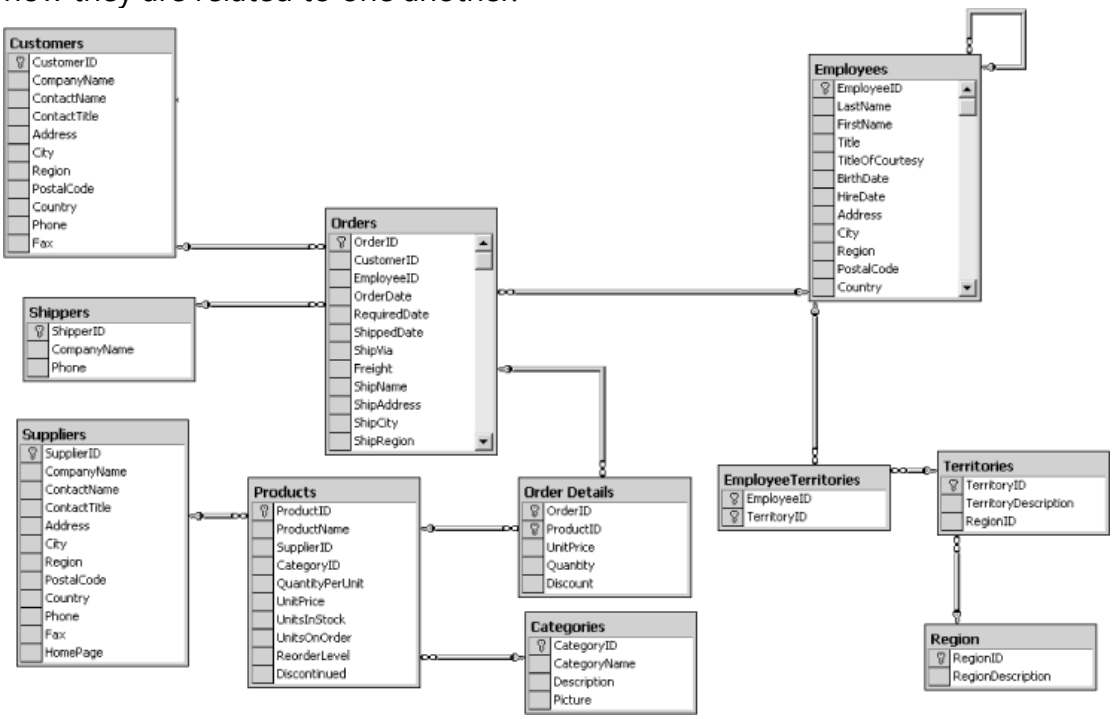

Table	Description
Categories	The category to which the product belongs.
Customers	Customer details who bought from Northwind Traders.
Employees	Employee details who work for Northwind Traders.
EmployeeTerritories	List of territories that are assigned to the employees.
Orders	Details of sales transactions take place between the customers and Northwind Traders.
Order Details	Details of the orders.
Products	Product details that Northwind Traders trades.
Regions	The region to which the territories belong.
Suppliers	Suppliers who supply the products to Northwind Traders.
Shippers	Details of shippers who ship the products to the end customers.
Territories	The sales territories of Northwind Traders.

Task 1: Design a Data Model in Power BI

Based on the given table structure, your team is required to design the data model of the project. It will involve creating relationships between tables, and then configuring table and column properties to improve the friendliness and usability of the data model. You will also create hierarchies, quick measures, measures and calculated columns that help in analysis later. Below are the steps to be included in your data transformation.

- Create model relationships
- Configure table and column properties
- Create hierarchies
- Arrange columns into display folders for readability
- Create calculated columns/quick measures/measures
- Create a date table

Task 2: Design Reports in Power BI

Organisations use reports to monitor and record performance and identify trends and variances. When an organisation is making decisions, it relies on the information that is provided by reports. Reports drive organisational behaviour and action, at every level, in every aspect. You may apply the following techniques to enhance the usability of your reports.

- Design a report layout
- Design report navigation
- Use basic interactions, advanced interactions and drill through
- Apply slicing, filtering, and sorting

Below is the list of reports required by Northwind Traders. Each student is required to complete one report individually.

1. Sales Analysis by Product

a. Create a visualisation showing the total sales of different product categories across the months in 2019.

b. Create a visualisation showing the product(s) that have the highest number of quantities sold and generate the highest sales.

c. Create a visualisation highlighting the products which are running low in stock.

d. Include necessary filters to allow users to filter the data.

2. Sales Analysis by Customer

a. Create a visualisation showing the sales in bins of $500 for all the orders. Sales amounts above $4500 will be grouped under one bin.

b. Create a visualisation showing the number of orders placed by each customer.

c. Create a visualisation showing the distribution of sales amount generated customers in the various regions.

d. Include necessary filters to enable users to filter the data.

3. Sales Analysis by Shipper

a. Create a visualisation showing the number of orders shipped by different shippers which have yet to be shipped out.

b. Create a visualisation showing the days of shipment in bins of **5** days for all the orders. Days of Shipment above **20** will be grouped under one bin and those without value for ShippedDate will be excluded from the analysis.

c. Create a visualisation showing the average number of days for shipment required to the different countries.

d. Include necessary filters to allow users to filter the data.

4. Sales Analysis by Employee

a. Create a visualisation showing the top 3 sales representatives who generate the most sales to the company.

b. Create a visualisation showing the total sales generated by each sales representatives and his/her country.

c. Create a visualisation showing the total sales generated by each sales representative for each product category.

d. Include necessary filters to allow users to filter the data.

5. Sales Analysis by Supplier

a. Create a visualisation showing the country of origin for suppliers and the total sales of their products.

b. Create a visualisation showing the product categories supplied by the suppliers.

c. Create a visualisation showing the number of distinct products supplied by the suppliers that have more than 10 units in stock currently.

d. Include necessary filters to allow users to filter the data.

Task 3: Video Presentation on Data Analysis in Power BI

Report designers can use more features to enhance their reports for analytical insights into their data with features like Q&A and exporting. They can apply and perform advanced analytics on the report for deeper and more meaningful data insights.

For this task, each team member is required to provide a deeper analysis of their reports generated in Task 2 in a video presentation, along with any necessary visual aids. There should be no duplicate analysis among the team members.

You may use any of the following to support your analysis but not limited to.

- Dashboard
- Animated scatter charts
- A visual to forecast values
- Decomposition tree visual
- Key influencers visual

In the video presentation, student's face presence is required for the recording. The video should not exceed more than 5 minutes. Student may use any appropriate video-making tool and is to ensure the video can be viewed offline after submission. If the video clip is too huge to be uploaded during submission, you may provide a link (ensure it is public) to your video clip.

Note:

Student will be called up for a separate presentation if there is a need to further explain the submitted assignment. If the student is unable to provide a detailed explanation during the presentation, marks will be deducted according to the rubrics provided for the other tasks as well.

Annex A: Assessment Rubrics

Task 1: Design a Data Model in Power BI					
Criteria	**Advanced**	**Proficient**	**Functional**	**Developing**	**Not Competent**
Model Relationship **(10 marks - Team)**	• All the relationships are addressed in the data model • All the tables are configured appropriately with the right use of hierarchies, display folders, calculated columns, quick measures, measures etc (8 to 10mks)	• Most of the relationships are addressed in the data model • Most of the tables are configured appropriately with the right use of hierarchies, display folders, calculated columns, quick measures, measures etc (6 to < 8mks)	• At least half of the relationships are addressed in the data model • At least half of the tables are configured appropriately with the right use of hierarchies, display folders, calculated columns, quick measures, measures etc (4 to < 6mks)	• Only a few of the relationships are addressed in the data model • Only a few of the tables are configured appropriately with the right use of hierarchies, display folders, calculated columns, quick measures, measures etc (2 to < 4mks)	• No relationship was created in the data model • None of the tables is configured with hierarchies, display folders, calculated columns, quick measures, measures etc (0 to < 2mks)
Task 2: Design Reports in Power BI					
Criteria	**Advanced**	**Proficient**	**Functional**	**Developing**	**Not Competent**
Data Representation & Visualisation **(10 marks - Individual)**	• All the graphic variable types used are suited for the type and scale of the data they represent. • All the visualisations address the required analysis concisely and clearly. (8 to 10mks)	• Most of the graphic variable types used are suited for the type and scale of the data they represent. • Most of the visualisations address the required analysis concisely and clearly. (6 to < 8mks)	• At least half of the graphic variable types used are suited for the type and scale of the data they represent. • At least half of the visualisations address the required analysis concisely and clearly. (4 to < 6mks)	• Only a few of the graphic variable types used are suited for the type and scale of the data they represent. • Only a few of the visualisations address the required analysis concisely and clearly. (2 to < 4mks)	• The selected graphic variable types used are not suitable for the type and scale of the data they represent. • The selected visualisations do not address the required analysis. (0 to < 2mks)
Overall Visual Design **(5 marks - Individual)**	• All the reports are well designed with appropriate use of colour, symbolism, or text that is relevant to the question. (4 to 5mks)	• Most of the reports are well designed with appropriate use of colour, symbolism, or text that is relevant to the question. (3 to < 4mks)	• At least half of the reports are well designed with appropriate use of colour, symbolism, or text that is relevant to the question. (2 to < 3mks)	• Only a few of the reports are well designed with appropriate use of colour, symbolism, or text that is relevant to the question. (0.5 to < 2mks)	• None of the reports is designed with the use of colour, symbolism, or text that are relevant to the question. (0 to < 0.5mks)

Task 3: Video Presentation on Data Analysis in Power BI					
Criteria	**Advanced**	**Proficient**	**Functional**	**Developing**	**Not Competent**
Data Analysis **(15 marks - Individual)**	• Concise analysis and use visuals to explain analysis with recommendations conveyed. • Video is well organized. Excellent, well thought out explanation shows superior effort. • Excellent usage of presentation tools. (12 to 15mks)	• Clear analysis and use visuals to explain the analysis. • Video is fairly well organized. Explanation shows good effort. • Appropriate usage of presentation tools. (9 to < 12mks)	• Moderate analysis and use visuals to explain the analysis. • Video is partially organized. Explanation shows some effort. • Appropriate usage of presentation tools. (6 to < 9mks)	• Brief analysis and uses only a few visuals to explain the analysis. • Video is not organized. Explanation shows minimal effort. • Appropriate usage of presentation tools. (3 to < 6mks)	• Unclear analysis and does not use visuals to explain the analysis. • Video is not organized. Explanation shows minimal effort. • No usage of presentation tools. (0 to < 3mks)