FINAL PROJECT

Welcome to the Final Project wherein we will be building a comprehensive dashboard [Dynamic report] in Power BI Desktop. To create this extensive dashboard 3 major components of Power BI which include, **Power Query** for data extraction and transformation, **Power BI Report View** to create interactive visuals and **Power BI Service** to publish our report on the service account in your respective workspace.

There are 6 core pillars to create your dashboard or report in Power BI from getting the dataset to creating an attractive report.

1. **Extraction: (Data from the data source)**
2. **Transformation & Modelling (Build table relationship)**
3. **Calculation (Data massaging, Calculated fields, Measures and KPIs)**
4. **Visualization (Interactive, dynamic, and structured visuals)**
5. **Distribution (Publishing)**
6. **Automation**

In this Final Project we will be going to use all the pillars to create an advance report view in order to analyze Sales Portfolio of **Winfex Store Limited.**

Winfex Store Limited is the UK based food & drinks products wholesaler wherein they provide products of food and drinks to various customers across the country. Unlike every firm across the world wants to expand its business operations, needs to look back to its historical performance and business cycle in a way that it will provide some meaningful information to take the strategic and informed decision for their expansion. Owner of **Winfex** wants to outsource this task, to analyze the trend, pattern, forecast, sales analysis, the performance of salespersons, team performance & its measures etc.

Furthermore, to comprehend their business we've two tables in which data of **Winfex - Revenue Info** (sales report) and **Winfex - Product** information is kept.

In **Revenue Info Sheet - Sales report data** -consist the information about how and when the orders are placed, and the quantity & number of sales made. This report essentially has focused on the performance of every sales employees horizontal and vertical performance.

Winfex Store Limited - Sales Report
Year: 2020

Order Date	Due Date	Order Number	Product ID	Salesperson ID	Salesperson	Supervisor	Team	Qty Items	Unit Price	Sales Amount
1/1/2020	1/28/2020	1748677	1019	215	Shahid Duran	Maci Pena	Retail	2	$9.86	$19.72
1/1/2020	1/12/2020	1797750	1048	125	King Landry	Benn Pitt	Wholesales	27	$1.64	$44.28
1/1/2020	1/14/2020	1807663	1048	183	Fintan Knott	Patrycja Bloggs	Retail	9	$1.68	$15.12
1/1/2020	1/17/2020	1816377	1048	215	Shahid Duran	Maci Pena	Retail	9	$1.69	$15.21
1/1/2020	1/18/2020	1834054	1048	125	King Landry	Benn Pitt	Wholesales	18	$1.59	$28.62
1/1/2020	1/9/2020	1743090	1049	265	Roshan Jeffery	Benn Pitt	Wholesales	9	$1.64	$14.76
1/1/2020	1/19/2020	1809500	1049	265	Roshan Jeffery	Benn Pitt	Wholesales	9	$1.67	$15.03
1/1/2020	1/24/2020	1856396	1049	215	Shahid Duran	Maci Pena	Retail	9	$1.63	$14.67
1/1/2020	1/28/2020	1847624	1073	125	King Landry	Benn Pitt	Wholesales	6	$10.02	$60.12
1/1/2020	1/8/2020	1847624	1074	125	King Landry	Benn Pitt	Wholesales	6	$10.02	$60.12
1/1/2020	1/17/2020	1748310	1126	215	Shahid Duran	Maci Pena	Retail	2	$29.93	$59.86
1/1/2020	1/26/2020	1749590	1126	183	Fintan Knott	Patrycja Bloggs	Retail	6	$28.54	$171.24
1/1/2020	1/31/2020	1748310	1128	215	Shahid Duran	Maci Pena	Retail	4	$17.60	$70.40
1/1/2020	1/13/2020	1749590	1128	183	Fintan Knott	Patrycja Bloggs	Retail	6	$16.78	$100.68
1/1/2020	1/17/2020	1807980	1131	215	Shahid Duran	Maci Pena	Retail	10	$2.19	$21.90

Data Definition of Revenue sheet is given below:

Order Date: when the order is placed.

Due Date: what is the due date to deliver the product.

Order Number: unique order number and reference

Product ID: specific product ID for each type of product

Salesperson ID: unique salesperson ID

Salesperson: salesperson name

Supervisor: supervisor under which salespersons works

Team: department or vertical

Qty Items: no of quantity ordered.

Unit Price: unit price to sale (for each) in dollars.

Sales Amount: total sales amount in dollars

The second sheet that we've is **Winfex - Product Info**– wherein details about the product line of **Winfex Store Limited** deals is given. What all products they've, category of product, which group they belongs to, Products Cost sheet and the details of suppliers.

Product ID	Product	Group	Category	Supplier	Unit Cost
PK 108	Product 108	Ground Coffee	Food	King Coffee	35.18
PS 111	Product 111	Horticulture	Food	Saint Rose Food	3.56
PS 114	Product 114	Spices	Food	Saint Rose Food	3.22
PS 118	Product 118	Spices	Food	Saint Rose Food	1.78
PS 120	Product 120	Spices	Food	Saint Rose Food	6.96
PK 142	Product 142	Ground Coffee	Food	King Coffee	19.46
PK 143	Product 143	Ground Coffee	Food	King Coffee	19.53
PK 144	Product 144	Ground Coffee	Food	King Coffee	19.65
PK 145	Product 145	Ground Coffee	Food	King Coffee	19.99
PS 146	Product 146	Olive Oils	Food	Saint Rose Food	1.56
PK 157	Product 157	Powdered Milk	Food	King Coffee	2.60
PK 158	Product 158	Powdered Milk	Food	King Coffee	3.03
PK 159	Product 159	Coffee Pods	Food	King Coffee	7.73
PK 168	Product 168	Coffee Pods	Food	King Coffee	4.05
PS 175	Product 175	Olive Oils	Food	Saint Rose Food	1.56
PS 176	Product 176	Olive Oils	Food	Saint Rose Food	1.56
PS 180	Product 180	Olive Oils	Food	Saint Rose Food	7.93
PS 183	Product 183	Horticulture	Food	Saint Rose Food	3.37
PS 186	Product 186	Horticulture	Food	Saint Rose Food	3.85
PS 187	Product 187	Horticulture	Food	Saint Rose Food	4.40
PS 191	Product 191	Horticulture	Food	Saint Rose Food	5.02

Below are the details of each attribute:

Product ID: product ID for each product

Product: product along with product id

Group: group of product or name

Category: category or type of each product whether it is food or drink

Supplier: name of the suppliers

Unit Cost: the cost price of each product in dollars

Phase 1: Extraction:

- **Data extraction** is a process that involves the retrieval of data from various sources. Frequently, companies extract data in order to process it further, migrate the data to a data repository (such as a data warehouse or a data lake) or to further analyze it. And in order to extract the data for our Final Project, Power Query is a quite powerful tool for quick data extracts and transformations from the web or any other source. The best part is that it is all based in Excel which does not require prior extensive knowledge of any programming language or ETL processes. You can just find a cool dataset on the web and load it into Power Query.
- For extracting data for our Final Project, download the entire folder of the dataset and reference files.
- One by one import '**Winfex - Product Info & Winfex – Revenue Info**' sheet as transform data.
- First – after importing the Revenue sheet, clean the data for better use of calculation and visualization. For e.g. clear unwanted rows, change data type, headers etc.
- Convert the Revenue sheet as below image:

	Order Date	Due Date	Order Number	Product ID	Salesperson ID	Salesperson
1	1/1/2019	1/28/2019	1748677	1019	215	Shahid Duran
2	1/1/2019	1/12/2019	1797750	1048	125	King Landry
3	1/1/2019	1/14/2019	1807663	1048	183	Fintan Knott
4	1/1/2019	1/17/2019	1816377	1048	215	Shahid Duran
5	1/1/2019	1/18/2019	1834054	1048	125	King Landry
6	1/1/2019	1/9/2019	1743090	1049	265	Roshan Jeffery
7	1/1/2019	1/19/2019	1809500	1049	265	Roshan Jeffery
8	1/1/2019	1/24/2019	1856396	1049	215	Shahid Duran
9	1/1/2019	1/28/2019	1847624	1073	125	King Landry
10	1/1/2019	1/8/2019	1847624	1074	125	King Landry
11	1/1/2019	1/17/2019	1748310	1126	215	Shahid Duran
12	1/1/2019	1/26/2019	1749590	1126	183	Fintan Knott
13	1/1/2019	1/31/2019	1748310	1128	215	Shahid Duran
14	1/1/2019	1/13/2019	1749590	1128	183	Fintan Knott
15	1/1/2019	1/17/2019	1807980	1131	215	Shahid Duran
16	1/1/2019	1/25/2019	1807980	1132	215	Shahid Duran
17	1/1/2019	1/30/2019	1743090	1133	265	Roshan Jeffery
18	1/1/2019	1/26/2019	1807980	1133	215	Shahid Duran
19	1/1/2019	1/17/2019	1743090	1135	265	Roshan Jeffery
20	1/1/2019	1/19/2019	1807980	1135	215	Shahid Duran
21	1/1/2019	1/16/2019	1848585	1135	144	Kayan Walters
22	1/1/2019	1/23/2019	1856396	1135	215	Shahid Duran
23	1/1/2019	1/15/2019	1847624	1139	125	King Landry

- Click on 'Product Table' – change the table name from **dProduct** to Product.
- Now we have 2 tables or queries, let us start building the relationship between these 2 queries.

Autodetect during load

When we bring two or more than two tables at the same time, Power BI Desktop attempts to find and create relationships automatically for you. The relationship options Cardinality, Cross filter direction, and Make this relationship active are automatically set. Power BI Desktop looks at column names in the tables you are querying to determine if there are any potential relationships. If there are, those relationships are created automatically. If Power BI Desktop cannot determine with a high level of confidence there's a match, it doesn't create the

relationship. However, you can still use the Manage relationships dialog box to manually create or edit relationships.

- In our case we've matching column **'Product ID'** in both the table, however the data is not similar in columns. Use your logic, clean the data, and establish a relationship between these two tables.
  [***Hint – Use power query editor to change Product ID of Product Table so that it can match with the Product ID of Revenue Table.]***

Phase 2: Transformation & Modeling:

- Whenever we connect to a data source and to use data, usually it is very known and we can say "raw" because there is a lot of information that may or may not need, structured or not, so we have always to prepare them by using Power Query, that we can call a "magic box" since it is where we structure and "clean" (transform) our data.
- As we can see, we got sales amount, quantity sold and selling price as well, but we do not know what is the actual cost that company has incurred on each order. Using M function create a new column named 'Cost Price' and get the cost price on each order.
  [*Hint – Use appropriate M function to get the cost per unit data from 'product table' and bring new a column in 'Revenue' table.]*

After the new column 'Cost Price' our Revenue table will look like:

Order Date	Due Date	Order Number	Product ID	Salesperson ID	Salesperson	Supervisor	Team	Qty Items	Unit Price	Sales Amount	Cost Price
02/09/2019	03/01/2019	1877015	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
04/11/2019	05/05/2019	1945252	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
05/18/2019	06/14/2019	1969183	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
05/27/2019	06/04/2019	1986318	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/01/2019	06/13/2019	1969509	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/13/2019	07/05/2019	2002740	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/15/2019	07/03/2019	1959525	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/20/2019	07/18/2019	1942425	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/21/2019	06/29/2019	1949226	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/26/2019	07/16/2019	1983032	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/27/2019	07/05/2019	2013269	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/28/2019	07/11/2019	1945282	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/28/2019	07/20/2019	2004974	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/30/2019	07/18/2019	1959534	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58
06/30/2019	07/09/2019	2032539	1154	265	Roshan Jeffery	Benn Pitt	Wholesales	6	$3.24	$19.44	$11.58

Most of the time in Power BI we will work with data models that contain data from multiple tables that must be connected through relationships. Well prepared and through tables that are connected by relationships that are required between these tables to function together to allow visualizations to be sliced and diced by data from different tables.

In our case, we have already established a relationship in the Revenue and Product table based on **'Product ID'** which is **one to many relationships**. *(Default setting & relationship)*

When configuring a One-to-many or Many-to-one relationship, you will choose the one that matches the order in which you relate the columns. Consider how you would configure the

relationship from the Product table to the Sales table by using the ProductID column found in each table. The cardinality type would be One-to-many, as the ProductID column in the Product table contains unique values.

Phase 3: Calculation:

In this section we will create some dynamic **measures, calculated columns and conditional columns** in Power Query editor window based on the requirement mentioned below:

	Order Date	Due Date	Delivery Time span
1	1/1/2019	1/28/2019	27
2	1/2/2019	1/12/2019	10
3	1/1/2019	1/12/2019	11
4	1/1/2019	1/14/2019	13
5	1/1/2019	1/17/2019	16
6	1/1/2019	1/18/2019	17
7	1/2/2019	1/29/2019	27
8	1/2/2019	1/13/2019	11
9	1/3/2019	2/2/2019	30
10	1/3/2019	1/11/2019	8
11	1/3/2019	1/14/2019	11
12	1/2/2019	1/10/2019	8
13	1/2/2019	1/18/2019	16
14	1/1/2019	1/8/2019	7

- Add new column '**Delivery time Span**' that will show, how much time is taken by each order to deliver the product to the potential client based on the 'Due Date'.
- Update the data type of 'Unit Price' and 'Sales Amount' to '**Currency – $ English Dollar'**.
- Create one new query name '**Revenue Calculation'** and merge all the columns of 'Revenue' table into it and 'Team, Group, Category and Unit Cost' from the 'Product Table' into it.
- Calculate '**Cost Amount'** in a new column.
- Add one new column and calculate **Gross Margin** which essentially tells you about the margin's spare by firm on each sale of product. **[*Hint: Total revenue – Total cost]***
- There is **tax** which deducted on each project sales, that amount **12.8%** of their entire gross margin which Winfex must pay. Calculate the same as well.
- Now, Calculate **PAT (Profit after Tax**) after deducting Tax.
- Add another column 'Gross Margin Status' wherein you have the specific criteria.

	ount	Unit Cost	Cost Amount	Gross Margin	Gross Margin %	GM Status
1	19.72	5.74	11.48	8.24	41.78%	Average GM
2	21.34	5.74	11.48	9.86	46.20%	Average GM
3	44.28	0.85	22.95	21.33	48.17%	Average GM
4	15.12	0.85	7.65	7.47	49.40%	Average GM
5	15.21	0.85	7.65	7.56	49.70%	Average GM
6	28.62	0.85	15.30	13.32	46.54%	Average GM
7	14.31	0.85	7.65	6.66	46.54%	Average GM
8	15.12	0.85	7.65	7.47	49.40%	Average GM
9	30.24	0.85	15.30	14.94	49.40%	Average GM
10	15.03	0.85	7.65	7.38	49.10%	Average GM

  - If gross margin % is in '0 to 30%' it's – 'Low'
  - If gross margin % is '30% to 55%' its – 'Average'
  - If gross margin % is 'Above 55% it's – 'High'
- Create one duplicate sheet include all expression that we have done till now, name '**Revenue Calculation – 1'** and hide it from the view of Power BI Report to maintain the work simplicity.

Phase 4: Visualization:

The main idea of dashboards is they must give the answer which has been looked for just by looking at the analysis, without explaining or any question. It must always be easy to understand.

- In order to create the final report or Dashboard of **Winfex Store Limited.,** you need the resource file which includes [Icons, logos, background image etc.]
- Create 4 visuals to understand the company's financial and operational performance.
    1. Display the company's sales throughout the year 2020 on the **Multiple Line chart**.
    2. Financial performance can be appropriate & recommended to show with numbers, hence create one **matrix** which shows the data of sales, Net profit and gross margin percent based on the company's each supplier. Additionally, append 'Group' below suppliers so that end user can **drill down** the matrix to see the added information.
    3. In order to compare and identify the relationship between 2 numeric variables, we use **Scatter plot**. Draw scatter plot to show the details of 'Group' wherein, it shows Sales & Gross Margin on X & Y axis, respectively. Make the size dynamic by Quantity ordered and 'Team' as legends.
    4. Draw one **donut** in middle, based on sales made under each supervisor. Turn of the legends and enable detailed data labels.

- What do you understand by filters?
  Filters in Power BI sort data and information based on some selected criteria. That is, you can select particular fields or values within fields and view only the information related to that. In the given case, to make your report more interactive create **2 filter** of '**Order Date-Month only', & 'Category'.** All filters style should be in dropdown selection so that they can compressed easily and displayed structured in your report.
- Sometimes a single number is the most important thing you want to track in your Power BI dashboard or report, such as total sales, market share year over year, or total opportunities. This type of visualization is called a **Card.**
  Draw 4 cards in your report:
    1. Sum of Total Sales. [with 'revenue1' icon]
    2. Sum of Net Profit. [with 'revenue2' icon]
    3. Sum of Total Cost. [with 'cashflow1' icon]
    4. Draw a text card, wherein you can show the name of highest sale made by the group, Top-1. **[*Hint – used dynamic filter on visual*]**
    5. Add another text card which shows least Net Profit.
    6. Also add one more card that shows, Average Delivery Time.
- Create one more **filter** for 'Group' with **Horizontal orientation** and place it at the bottom of the report.
- At last, at the top of your report below title draw one '**Animated Scroller'** which display the sales made each salesperson.

- **Formatting rules:**
    1. Page size – 1700 width and 1000 height.
    2. Disable background for all the visuals.

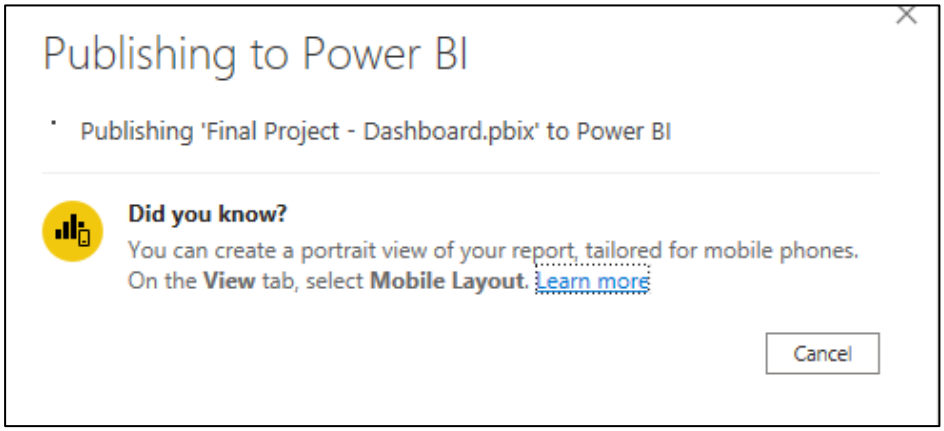
3. Heading of all the visuals should be in ‘Segoe Bold’ font with ‘text size 16’.
4. Card’s category text size should be 17.
5. Both the filters of ‘Order Date-Month only’ & ‘Category’– Disable the Slicer Header, Item- 14, Title – central aligned, Font size -17, and with Segoe Bold font.
6. Border should be enabled. For visuals – with the Radius of 15px and Black color and for Filters – with the Radius of 30px and black in colors.
7. All the visuals, filters, and card are displayed under the ‘Rectangle Shape’, arrange the shape – Send to back. Disable the background of all the shapes, shadow on along with 50% transparency.
8. Labels should be on with font size 12 and color black.
9. Name your report **‘Winfex Store Limited – Sales Data Analysis’** at top left corner, with transparent text box and with ‘sales-analytics’ icon.

Phase 6: Distribution (Publishing):

Once your BI reports are created in Power BI desktop, you can also share the reports with other business users and publish on Power BI service account.

Let publish our report’ **Winfex Store Limited – Sales Data Analysis’** BI report using Power BI desktop tool.

- Once the report is created, navigate to the Publish button on the Home tab in Power BI desktop.
- Once you select the Publish service, your visuals, custom measures, and reports are all packaged and published to Power BI service. Power BI files have an extension .pbix files. When the upload is in process, you get a dialog box that Publishing is in process.



- Once the upload is complete, you will get a confirmation message announcing the “Success”.

- In Power BI, you can also use different Export options to export data from BI report. To use the export option, navigate to Power BI service and select the BI report you want to export.
- Export your dashboard file in both PowerPoint and PDF format.

Phase 7: Automation:

With Power BI automation you can perform management tasks on Power BI objects such as reports, datasets, and workspaces. In order to take a glimpse of automation go the feature of 'Quick Insights' of your dashboard in Power BI service and understand the output visuals and interpretations which will generate automatically. Also, in order to schedule automatic refresh of your published dashboard in Power BI Service, you can establish connection between your workspace & personal system using Gateway and refresh your Dashboard whenever you want. For the same please refer to the last video of module 4 Power BI Service Introduction.

Awesome! Congratulations. You have successfully completed the Final Project.

"The goal is to turn data into information, and information into insight."

- Carly Fiorina