

# Lab: School Data Analysis with Power BI

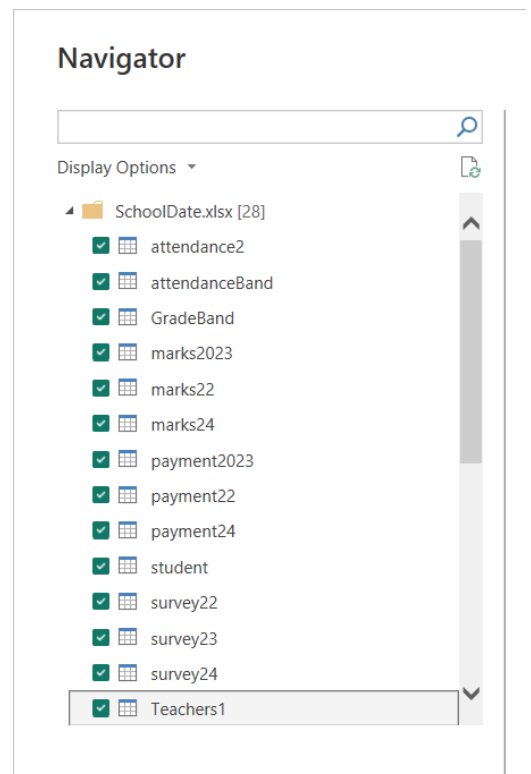
## Introduction

You are a **school administrator** responsible for analyzing students' academic performance and financial data across multiple academic years. The school data is stored in an Excel file containing students, attendance, payments, surveys, teachers, and marks for **2022, 2023, and 2024**. Your task is to prepare, model, and calculate the data correctly in **Power BI** to support accurate analysis and reporting.

## Section 1: Data Preparation

### Step 1: Load Data

Load **all tables** from the Excel file **SchoolData.xlsx** into Power BI.

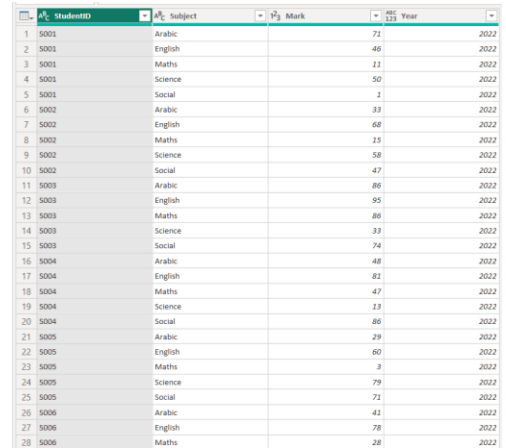


### Step 2: Prepare Marks Tables – Add Year

- Before combining the marks tables, add a new column named **Year** in each table
- **marks22** → Year = 2022 - **marks2023** → Year = 2023 - **marks24** → Year = 2024

### Step 3: Unpivot Marks 2022

- The **marks22** table has subjects stored as columns.
- Use **Power Query - Unpivot Columns**
- Rename: - **Attribute as Subject - Value as Mark**



The screenshot shows a table with columns: StudentID, Subject, Mark, and Year. The data is as follows:

StudentID	Subject	Mark	Year	
1	5001	Arabic	71	2022
2	5001	English	46	2022
3	5001	Maths	11	2022
4	5001	Science	50	2022
5	5001	Social	1	2022
6	5002	Arabic	33	2022
7	5002	English	68	2022
8	5002	Maths	15	2022
9	5002	Science	58	2022
10	5002	Social	47	2022
11	5003	Arabic	86	2022
12	5003	English	95	2022
13	5003	Maths	86	2022
14	5003	Science	33	2022
15	5003	Social	74	2022
16	5004	Arabic	48	2022
17	5004	English	81	2022
18	5004	Maths	47	2022
19	5004	Science	13	2022
20	5004	Social	86	2022
21	5005	Arabic	29	2022
22	5005	English	60	2022
23	5005	Maths	3	2022
24	5005	Science	79	2022
25	5005	Social	71	2022
26	5006	Arabic	41	2022
27	5006	English	78	2022
28	5006	Maths	28	2022

### Step 4: Combine Marks Data

- Append **marks22**, **marks2023**, and **marks24** into a new query.
- Rename **Append1** to **Marks**
- disable load the original marks queries (**marks22**, **marks2023**, **marks24**)

### Step 5: Combine Payments Data

- Append **payments22**, **payments23**, and **payments24** into a new query.
- Rename the new query to **Payment**
- disable load the **payments22**, **payments23**, **payments24**.

### Step 6: Combine Survey Data

- Append **survey22**, **survey23**, and **survey24** into a new query , rename it as **Survey**.

- Rename the new query to **Survey** - disable load the **survey22**, **survey23**, **survey24**.

## Section 2: Data Modeling

### Step 1: Student Relationships

Create **1-to-many** relationships between **Student** and the following tables using **StudentID**: - Payment - Attendance - Marks - Survey

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### Step 2: Create Years Table

Create a calculated table using DAX:

```
Years = DISTINCT(Payment[Year])
```

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### Step 3: Link Tables to Years

Create **1-to-many** relationships between: - **Years[Year]** and **Survey[Year]** - **Years[Year]** and **Marks[Year]** - **Years[Year]** and **Attendance[Year]**

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## Section 3: Formatting and DAX Calculations

### Step 1: Result Column (Marks)

Create a calculated column in **Marks** to define pass and fail:

```
Result = IF(Marks[Mark] < 50, "Fail", "Pass")
```

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## Step 2: Outstanding Amount (Payment)

Create a calculated column in **Payment**:

Outstanding = Payment[Fees] - Payment[Paid]

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## Step 3: Grade Calculation (Marks)

Use **SWITCH** to assign grades:

Grade =

```
SWITCH(  
    TRUE(),  
    Marks[Mark] < 50, "Fail",  
    Marks[Mark] < 65, "Pass",  
    Marks[Mark] < 75, "Good",  
    Marks[Mark] < 85, "Very Good",  
    "Excellent"  
)
```

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## Step 4: Absences Measure (Attendance)

Create a DAX **measure** to calculate absence days:

Absences =

```
SUM ( Attendance[DaysPossible] )  
- SUM ( Attendance[DaysPresent] )
```

## Section 4: Visualization

### Part 1: School Performance Report Page

#### Page Setup

- Change **Canvas height** to **1000**.

#### Slicers

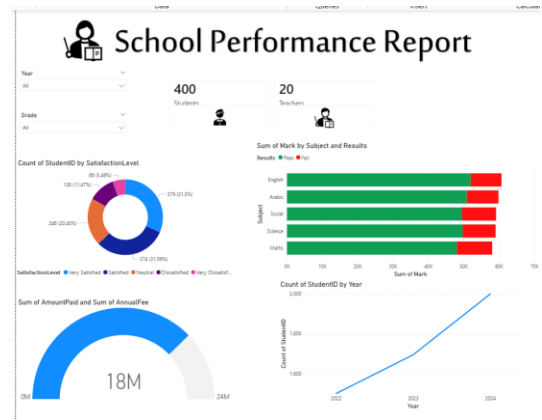
- Add a **Year** slicer.
- Add a **Grade** slicer.

#### Cards

- Card: **Count of StudentID**.
  - Add a **student icon** to the card.
- Card: **Count of TeacherID**.
  - Add a **teacher icon** to the card.

#### Charts

- **Stacked bar chart**: Count of **Pass** and **Fail** by **Year**.
  - Set **Pass** color to **green**.
  - Set **Fail** color to **red**.
  - Sort the visual so **Pass** appears **first**.
- **Donut chart**: Count of StudentID by **Satisfaction Level**.
  - Move the **legend** to **bottom center**.
- **Line chart**: Number of students by **Year**.
- **Gauge**: **Amount Paid** vs **Annual Fees**.



## Part 2: Student Report Page

- Create a **new report page** named **Student Report**. Make canvas size 650h \* 600 w

### *Slicers*

- Add a **StudentID slicer** and set it to **single select**.

### *Student Profile*

- Use the **Image** custom visual to display the student photo using **Student[ImageURL]**.
- Add **two cards**:
  - **Student Name**
  - **Grade**

StudentID: S002

Year: 1 2 3 4 5 6 7 8 9 10 11 12 Total

Year	1	2	3	4	5	6	7	8	9	10	11	12	Total
2022	2	1	1	4	0	0	0	0	2	0	2	1	13
2023	3	1	1	2	2	0	1	0	1	1	0	3	15
2024	3	0	1	0	2	0	0	1	1	1	1	1	11
<b>Total</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>39</b>

Noura Singh  
Grade 6

Year	Arabic	English	Maths	Science	Social	Total
2022	33	68	15	58	47	221
2023	31	28	17	94	13	183
2024	3	89	59	62	68	281
<b>Total</b>	<b>67</b>	<b>185</b>	<b>91</b>	<b>214</b>	<b>128</b>	<b>685</b>

Year	Sum of AnnualFee	Sum of AmountPaid	Sum of Outstanding
2022	21000	15750	5250
2023	18000	9000	9000
2024	19000	9500	9500
<b>Total</b>	<b>58000</b>	<b>34250</b>	<b>23750</b>

### *Academic Performance*

- Add a **matrix** showing **student marks by subject** for **2022, 2023, and 2024**.

### *Attendance*

- Add a **matrix** showing **student absences by month** for **each year**.

### *Payments*

- Add a **matrix** displaying **Fees, Paid, and Outstanding by Year**.