

Backend Work of Dashboard

Project Name: Bus Transportation Analysis

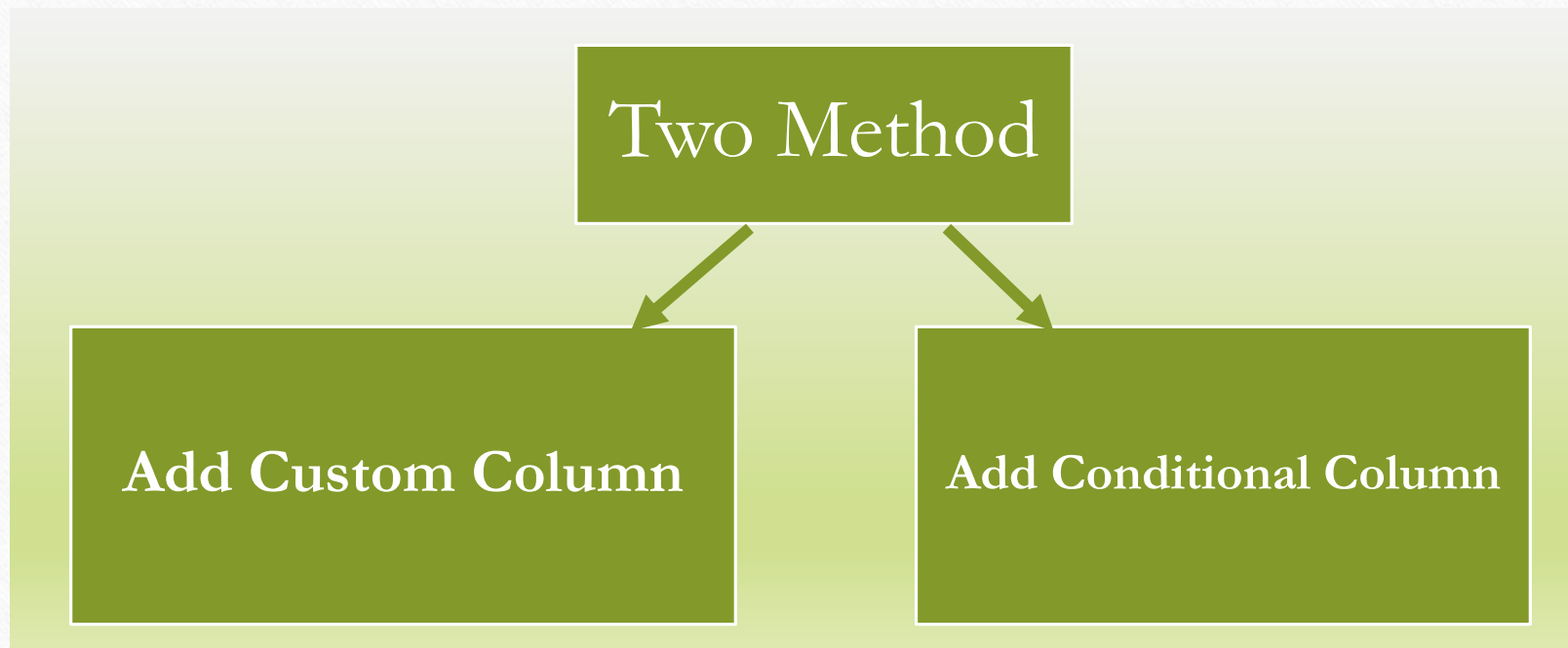
Tool: Microsoft Excel

Four Type of Data sheet

- Dim_buses
- Dim_demographics
- Dim_routes
- Facttable_ridership
- Dim_DateTable
- Calculation

Dim_demographics

Change age into age_group



Through Add Conditional column

- Go into power query
- Go into add column
- Go to general group and select add conditional column

Add Conditional Column

Add a conditional column that is computed from the other columns or values.

New column name

Age group

	Column Name	Operator	Value ①		Output ①	
If	Age	is less than or equ...	ABC 123 19	Then	ABC 123 0-19	...
Else If	Age	is less than or equ...	ABC 123 29	Then	ABC 123 20-29	
Else If	Age	is less than or equ...	ABC 123 39	Then	ABC 123 30-39	
Else If	Age	is less than or equ...	ABC 123 49	Then	ABC 123 40-49	
Else If	Age	is less than or equ...	ABC 123 59	Then	ABC 123 50-59	

Add Clause

Else ①

ABC 123

60+

OK

Cancel

Through Custom Column

- Go into power query
- Go into add column
- Go to general group and select Custom Column

Custom Column

Add a column that is computed from the other columns.

New column name

Custom

Custom column formula

```
=  
if [Age] <= 19 then "0-19"  
else if [Age] <= 29 then "20-29"  
else if [Age] <= 39 then "30-39"  
else if [Age] <= 49 then "40-49"  
else if [Age] <= 59 then "50-59"  
else "60+"
```

[Learn about Power Query formulas](#)

✓ No syntax errors have been detected.

Available columns

RiderID
Age
Gender
Occupation
Age group

<< Insert

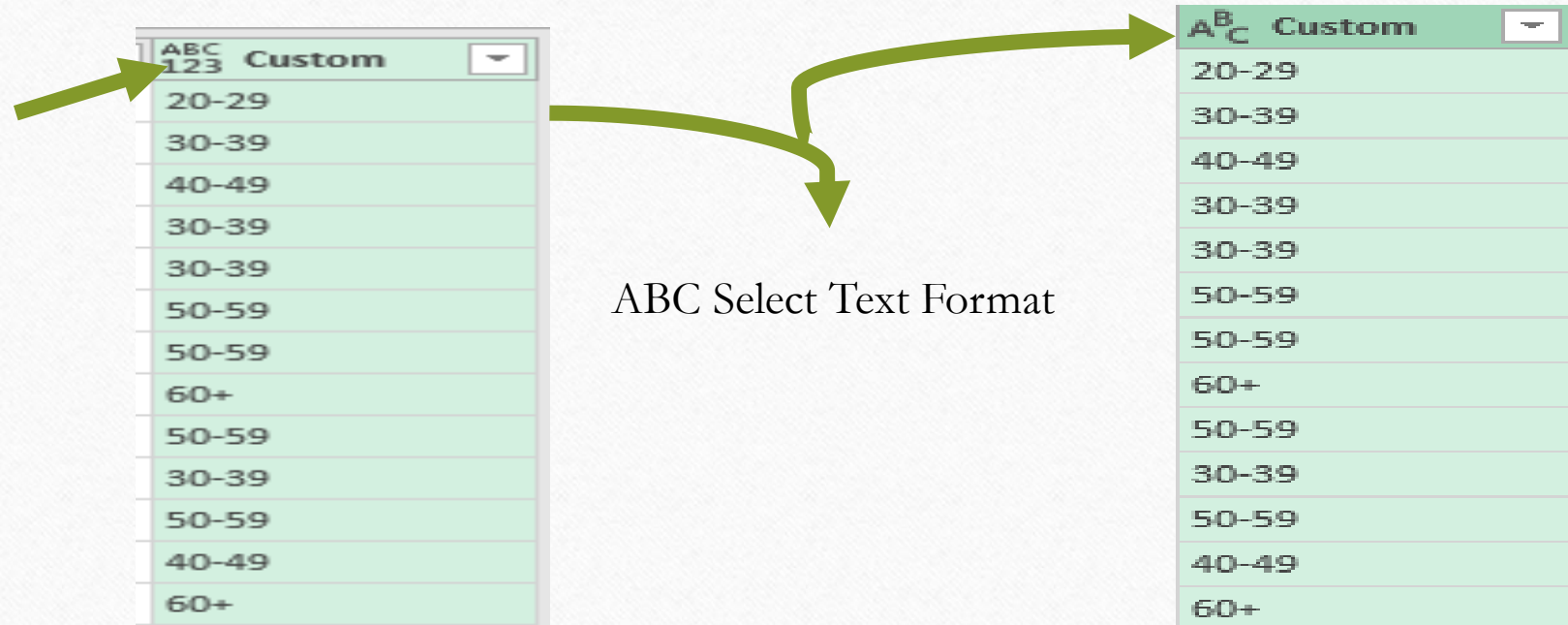
OK

Cancel

Output Column Highlighted with green

	1 ² ₃ RiderID	1 ² ₃ Age	A ^B _C Gender	A ^B _C Occupation	A ^B _C Age group	A ^B _C Custom
1	1	27	Other	Self-Employed	20-29	20-29
2	2	39	Female	Self-Employed	30-39	30-39
3	3	48	Female	Professional	40-49	40-49
4	4	34	Male	Other	30-39	30-39
5	5	33	Male	Self-Employed	30-39	30-39
6	6	51	Male	Unemployed	50-59	50-59
7	7	54	Male	Self-Employed	50-59	50-59
8	8	67	Male	Retired	60+	60+
9	9	56	Male	Self-Employed	50-59	50-59
10	10	34	Male	Other	30-39	30-39
11	11	50	Male	Professional	50-59	50-59
12	12	40	Male	Other	40-49	40-49
13	13	70	Male	Professional	60+	60+
14	14	65	Male	Self-Employed	60+	60+
15	15	55	Male	Professional	50-59	50-59
16	16	56	Male	Retired	50-59	50-59
17	17	37	Male	Unemployed	30-39	30-39
18	18	46	Male	Other	40-49	40-49
19	19	41	Male	Other	40-49	40-49
20	20	29	Male	Unemployed	20-29	20-29
21	21	68	Male	Other	60+	60+
22	22	58	Male	Unemployed	50-59	50-59
23	23	60	Male	Professional	60+	60+
24	24	30	Male	Unemployed	30-39	30-39

Change Custom Column Data Type



Convert Time into Time Group

- Go into power query
- Select Facttable_ridership
- Go into add column
- Go to general group and select Custom Column

Custom Column

Add a column that is computed from the other columns.

New column name

Time Group

Custom column formula

```
= if Time.Hour([Time]) >= 0 and Time.Hour([Time]) < 5 then  
  "12AM-5AM"  
else if Time.Hour([Time]) >= 5 and Time.Hour([Time]) < 10 then  
  "5AM-10AM"  
else if Time.Hour([Time]) >= 10 and Time.Hour([Time]) < 15  
then "10AM-3PM"  
else if Time.Hour([Time]) >= 15 and Time.Hour([Time]) < 20  
then "3PM-8PM"  
else "8PM-12AM"
```



[Learn about Power Query formulas](#)



No syntax errors have been detected.

Available columns

RecordID
BusID
Date
Time
Operation movement
NumberOfRiders
RiderID

<< Insert

OK

Cancel

Output Column Highlighted with green

Queries [6]

fx

= Table.AddColumn(#"Renamed Columns", "Time Group", each if Time.Hour([Time]) >= 0 and Time.Hour([Time]) < 5 then "12AM-5AM")

123

RecordID

123

BusID

Date

Time

ABC

Operation movement

123

NumberOfRiders

123

RiderID

ABC

Last Characters

ABC

123

Time Group

1

1

18

12/17/2023

5:00:00 AM

PM

34

1

PM

5AM-10AM

2

2

40

12/31/2023

9:41:00 AM

AM

40

2

AM

5AM-10AM

3

3

10

1/5/2024

3:57:00 AM

PM

40

3

PM

12AM-5AM

4

4

26

12/11/2023

11:40:00 AM

PM

18

4

PM

10AM-3PM

5

5

27

12/20/2023

9:04:00 AM

PM

48

5

PM

5AM-10AM

6

6

15

12/10/2023

7:26:00 AM

PM

25

6

PM

5AM-10AM

7

7

8

12/28/2023

1:50:00 AM

PM

45

7

PM

12AM-5AM

8

8

20

12/31/2023

1:42:00 AM

PM

59

8

PM

12AM-5AM

9

9

11

12/19/2023

5:56:00 AM

PM

36

9

PM

5AM-10AM

10

10

16

12/31/2023

8:29:00 AM

PM

20

10

PM

5AM-10AM

11

11

32

12/29/2023

8:45:00 AM

PM

46

11

PM

5AM-10AM

12

12

17

12/18/2023

10:23:00 AM

AM

46

12

AM

10AM-3PM

13

13

37

12/16/2023

7:25:00 AM

AM

30

13

AM

5AM-10AM

14

14

3

12/26/2023

1:37:00 AM

PM

19

14

PM

12AM-5AM

Merging Column Highlighted with green Colour

Go to Data Go to Home Tab

Select Combine Group and select Merge Column

Queries [4]

- Dim_buses
- Dim_demographics
- Dim_routes
- Facttable_ridership**

123 RecordID

RecordID	BusID	Date	Time	Operation Moment	NumberOfRiders	RiderID	Time Group
1	18	12/17/2023	5:00:00 AM	PM	34	1	5:00 AM - 10:00
2	40	12/31/2023	9:41:00 AM	AM	40	2	5:00 AM - 10:00
3	10	1/5/2024	3:57:00 AM	PM	40	3	12:00 AM - 5:00
4	26	12/11/2023	11:40:00 AM	PM	18	4	10:00 AM - 3:00

Dim_buses

BusID	RouteID	BusNumber	Capacity
1	7	Bus 1	30
2	1	Bus 2	60
3	2	Bus 3	40
4	1	Bus 4	50
5	2	Bus 5	60

Join Kind

Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

Fuzzy matching options

✓ The selection matches 200 of 200 rows from the first table.

OK **Cancel**

Bus Utilization Percentage

- Go into power query
- Select Facttable_ridership
- Go into add column
- Go to general group and select Custom Column
- Output Highlighted in green color

Queries [6]

- Dim_buses
- Dim_demographics
- Dim_routes
- Facttable_ridership
- Dim_DateTable
- Calculations

fx = Table.AddColumn(#"Expanded Dim_buses", "Utilization Pct", each [NumberOfRiders]/[Capacity])

RecordID	BusID	Date	Time	Operation movement	NumberOfRiders	RiderID	Last Characters	Time...	Ca...	Utilization Pct
1	1	12/17/2023	5:00:00 AM	PM	34	1	PM	5AM-10AM	60	0.566666667
2	20	12/16/2023	12:31:00 PM	PM	29	20	PM	10AM-3PM	60	0.483333333
3	2	12/31/2023	9:41:00 AM	AM	40	2	AM	5AM-10AM	40	1
4	16							10AM	40	0.8
5	18							10AM	60	0.316666667
6	30							5AM	60	0.266666667
7	3							5AM	60	0.666666667
8	22							10AM	60	0.583333333
9	34							10AM	60	0.266666667
10	41							5AM	60	0.316666667
11	14							5AM	40	0.475
12	4							3PM	40	0.45
13	28							5AM	50	0.32
14	5							10AM	40	1.2
15	19							3PM	40	1.5
16	40							5AM	60	0.6
17	6							10AM	40	0.625
18	38							5AM	50	0.58
19	7							5AM	50	0.9
20	23							10AM	30	1.766666667
21	8							5AM	30	1.966666667
22	9							10AM	50	0.72
23	10							10AM	60	0.333333333

Custom Column

Add a column that is computed from the other columns.

New column name
Utilization Pct

Custom column formula
= [NumberOfRiders]/[Capacity]

Available columns
RecordID
BusID
Date
Time
Operation movement
NumberOfRiders
RiderID

<< Insert

Learn about Power Query formulas

✓ No syntax errors have been detected.

OK Cancel

Convert Utilization Pct in to three Segment

- Go into power query
- Go into add column
- Go to general group and select add conditional column
- Output Highlighted in green color

Formula Bar: `= Table.AddColumn(#"Changed Type2", "Custom", each if [Utilization Pct] < 0.5 then "Under-Utilized" else if [Utilization Pct] < 0.9 then "Over-`

BusID	Date	Time	Operator	Number	RiderID	Last Characters	Time	Ca...	% Utilization Pct	Custom
1	12/17/2023	5:00:00 AM	PM	34	1	PM	5AM-10AM	60	56.67%	Over-Utilized
2	12/16/2023	12:31:00 PM	PM	29	20	PM	10AM-3PM	60	48.33%	Under-Utilized
3	12/31/2023	9:41:00 AM	AM	40	2	AM	5AM-10AM	40	100.00%	Well-Utilized
4									80.00%	Over-Utilized
5									31.67%	Under-Utilized
6									26.67%	Under-Utilized
7									66.67%	Over-Utilized
8									58.33%	Over-Utilized
9									26.67%	Under-Utilized
10									31.67%	Under-Utilized
11									47.50%	Under-Utilized
12									45.00%	Under-Utilized
13									32.00%	Under-Utilized
14									120.00%	Well-Utilized
15									150.00%	Well-Utilized
16									60.00%	Over-Utilized
17									62.50%	Over-Utilized
18									58.00%	Over-Utilized
19									90.00%	Well-Utilized
20									176.67%	Well-Utilized
21									196.67%	Well-Utilized
22									72.00%	Over-Utilized
23									33.33%	Under-Utilized

Add Conditional Column

Add a conditional column that is computed from the other columns or values.

New column name:

	Column Name	Operator	Value		Output
If	Utilization Pct	is less than	0.5	Then	Under-Utilized
Else If	Utilization Pct	is less than	0.9	Then	Over-Utilized

Else: Well-Utilized

Dim_Date Sheet Changes

- In power query Editor
- Go into add column
- Go into Date option and select Year, Month Name, Month, Day Name. Week Number, and Weektype individually.
- Output Highlighted in green color

Queries [6]

Dim_buses

Dim_demographics

Dim_routes

Facttable_ridership

Dim_DateTable

Calculations

fx = Table.RemoveColumns(#"Inserted Day of Week2",{"Day of Week"})

	Date	Year	Month Name	Month	Day Name	Week Number	Weektype
Dim_buses	12/17/2023	2023	Dec	12	Sun	0	Weekned
2	12/16/2023	2023	Dec	12	Sat	6	Weekend
3	12/31/2023	2023	Dec	12	Sun	0	Weekned
4	12/15/2023	2023	Dec	12	Fri	5	Weekday
5	12/28/2023	2023	Dec	12	Thu	4	Weekday
6	12/29/2023	2023	Dec	12	Fri	5	Weekday
7	1/5/2024	2024	Jan	1	Fri	5	Weekday
8	12/13/2023	2023	Dec	12	Wed	3	Weekday
9	12/23/2023	2023	Dec	12	Sat	6	Weekend
10	12/11/2023	2023	Dec	12	Mon	1	Weekday
11	12/26/2023	2023	Dec	12	Tue	2	Weekday
12	12/22/2023	2023	Dec	12	Fri	5	Weekday

Dim_Date Sheet Changes

- In power query Editor
- Go into add column
- Go into Date option and select Year, Month Name, Month, Day Name. Week Number, and Weektype individually.
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Queries [6]

Dim_buses

Dim_demographics

Dim_routes

Facttable_ridership

Dim_DateTable

Calculations

fx = Table.RemoveColumns(#"Inserted Day of Week2",{"Day of Week"})

	Date	Year	Month Name	Month	Day Name	Week Number	Weektype
Dim_buses	12/17/2023	2023	Dec	12	Sun	0	Weekned
2	12/16/2023	2023	Dec	12	Sat	6	Weekend
3	12/31/2023	2023	Dec	12	Sun	0	Weekned
4	12/15/2023	2023	Dec	12	Fri	5	Weekday
5	12/28/2023	2023	Dec	12	Thu	4	Weekday
6	12/29/2023	2023	Dec	12	Fri	5	Weekday
7	1/5/2024	2024	Jan	1	Fri	5	Weekday
8	12/13/2023	2023	Dec	12	Wed	3	Weekday
9	12/23/2023	2023	Dec	12	Sat	6	Weekend
10	12/11/2023	2023	Dec	12	Mon	1	Weekday
11	12/26/2023	2023	Dec	12	Tue	2	Weekday
12	12/22/2023	2023	Dec	12	Fri	5	Weekday

Convert Week Number into 3 Segment

- Go into power query
- Go into add column
- Go to general group and select add conditional column
- If Sunday Day of week will be 0 , and if Saturday Than Day of Week will be 6 and both will showa weekend, and remaining day Weektype shows WeekDday
- Output Highlighted in green color

fx = Table.AddColumn(#"Inserted Day of Week", "Weektype", each if [Day of Week] = 0 then "Weekned" else if [Day of Week] = 6 then "Weekend" else "Weekday")

	Date	Year	Month Name	Month	Day Name	Day of Week	Weektype
1	12/17/2023	2023	Dec	12	Sun	0	Weekned
2	12/16/2023	2023	Dec	12	Sat	6	Weekend
3	12/31/2023	2023	Dec	12	Sun	0	Weekned
4	12/15/2023	2023	Dec	12	Fri	5	Weekday
5	12/28/2023	2023	Dec	12	Thu	4	Weekday
6	12/29/2023	2023	Dec	12	Fri	5	Weekday
7	1/5/2024	2024	Jan	1	Fri	5	Weekday

Add Conditional Column

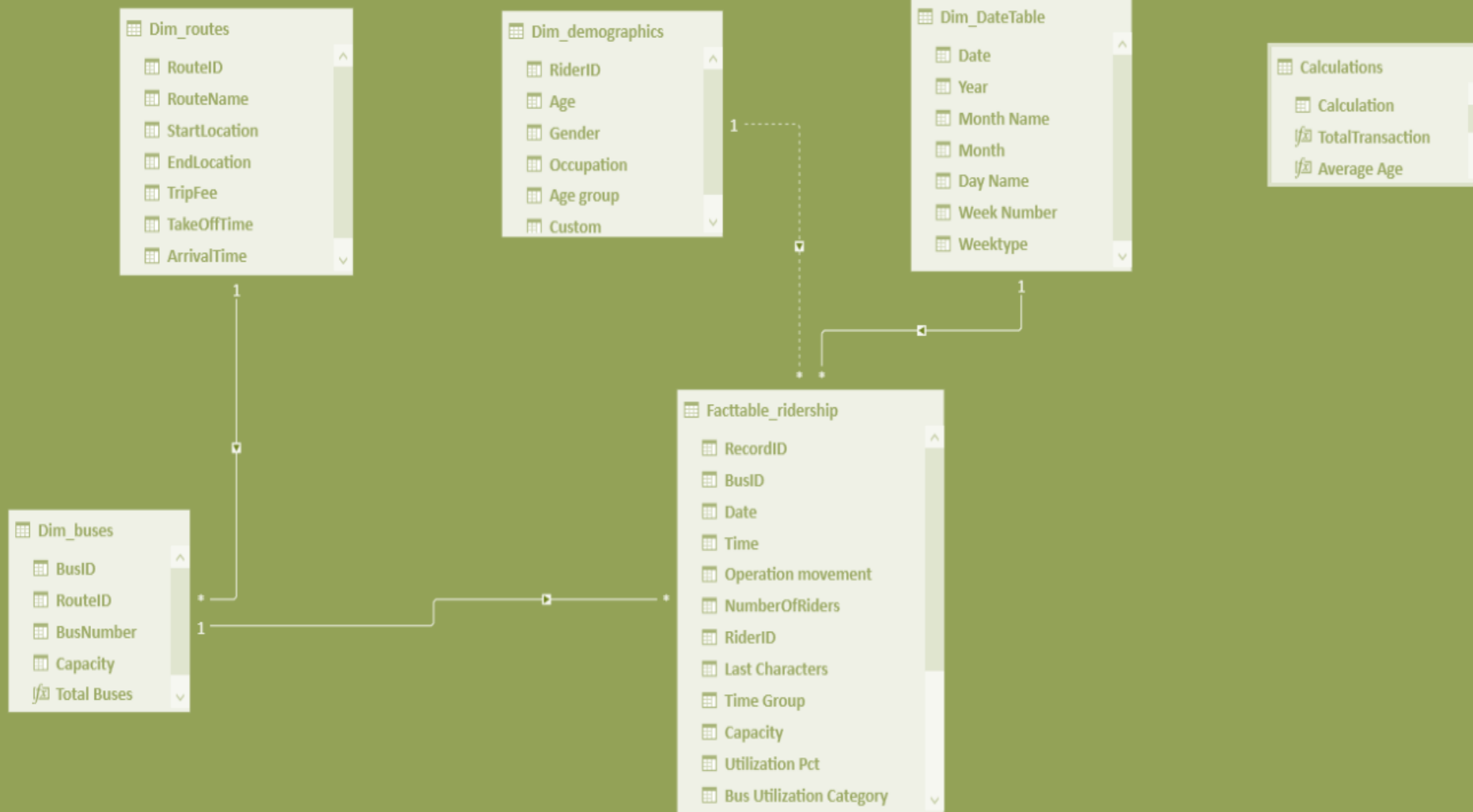
Add a conditional column that is computed from the other columns or values.

New column name

Weektype

	Column Name	Operator	Value ①		Output ①
16	If	Day of Week	equals	0	Then Weekned
17					...
18	Else If	Day of Week	equals	6	Then Weekend
19					
20					
21					
22					
23	Else ①				Weekday

Creating Relationship Model Diagram View in Power Pivot



Creating DAX function KPIs in Power Pivot

Calculation for KPIs Preparation

❑ Total Transaction

Formula: =COUNTROWS(Facttable_ridership)

❑ Average Age

Formula: =AVERAGE(Dim_demographics[Age])

❑ Total Rider (Passanger)

Formula: =SUM(Facttable_ridership[NumberOfRiders])

❑ Avg Ride Per Trip

Formula: =AVERAGE(Facttable_ridership[NumberOfRiders])

My Learning

- Power Pivot
- Power Query
- Conditional Column
- Adding Custom Column
- Merging Column
- Data Type Changes
- Data Connection
- Data Modeling
- Dax Functions
- M-code
- Load & Load to function

Final Dashboard



Transportation Dashboard

Total Passangers

6,587

Avg Rider Per Trip

33

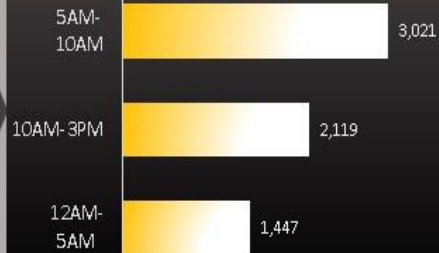
Busiest Route

East-West Express

Least Busy Route

South Line

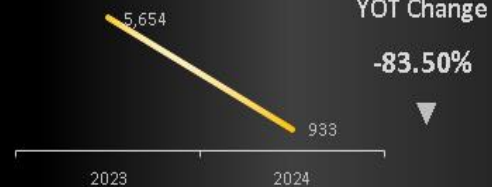
Bus Utilization By Time Range (Total Passenger by Time)



Peak Hour of Operation
11:41:00 AM

Off-Peak Hour of Operation
12:34:00 PM

Total Rider Yearly distribution



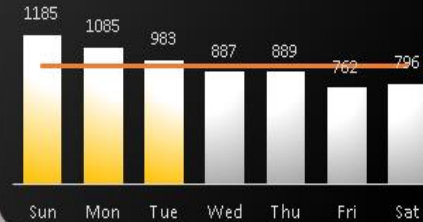
YOY change suggest room for improvement, "We are doing well on the current Year"

Riders Monthly Distribution



Rider Monthly Distribution

Focus on Highlighted Weekdays: they exceeded the 941 Passenger Average and account for 49.4% of the Total Passengers



Under-Utilized

19



Over-Utilized

36



Well-Utilized
29

Total Rider Buses on the Movement of Trip



Total Riders By AM
35.39%



Total Riders By PM
64.61%

Thanks

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