

Final Project

Project Title: Airline Data Management and Analysis Using Power BI

1. Data Preparation and Cleaning

● Extract and transform data in Power Query.

Ans: Open Power BI, then navigate to the Data tab and select Get Data > From File, depending on where the data is stored. Import the three datasets—Flight_Information, Passenger_Information, and Ticket_Information—and open each dataset in the Power Query Editor.

Queries [3]

✕

✓

fx

= Table.TransformColumnTypes(#"Promoted Headers",{{"FlightID", Int64.Type}, {"FlightNumber", type text},

Flight_Information

Passenger_Information

Ticket_Information

	1 ² FlightID	A ^B _C FlightNumber	A ^B _C Airline	A ^B _C Destination	A ^B _C Status	
1		1001	FL1102	Airline D	Houston	On Time
2		1002	FL1435	Airline B	Chicago	On Time
3		1003	FL1860	Airline A	New York	Cancelled
4		1004	FL1270	Airline C	Chicago	Delayed
5		1005	FL1106	Airline C	New York	Delayed
6		1006	FL1071	Airline A	Phoenix	On Time
7		1007	FL1700	Airline C	Los Angeles	Cancelled
8		1008	FL1020	Airline C	Los Angeles	Delayed
9		1009	FL1614	Airline A	Los Angeles	Cancelled
10		1010	FL1121	Airline D	Chicago	Cancelled

Queries [3] ✕ ✓ fx = Table.TransformColumnTypes(#"Promoted Headers",{{"PassengerID", Int64.Type,

	1 ² PassengerID	1 ² FlightID	A ^B _C SeatNumber
1		1	1161 38A
2		2	1157 24D
3		3	1141 30B
4		4	1046 17E
5		5	1035 29D
6		6	1134 10A
7		7	1082 10A

Close New Query Data Sources Parameters Query Manage Columns Reduce Rows Sort

Queries [3] ✕ ✓ fx = Table.TransformColumnTypes(#"Promoted Headers",{{"TicketID", Int64.Type}

	1 ² TicketID	1 ² FlightID	A ^B _C BookingStatus
1		5001	1178 Pending
2		5002	1078 Confirmed
3		5003	1117 Cancelled
4		5004	1120 Cancelled
5		5005	1137 Cancelled
6		5006	1162 Pending
7		5007	1076 Pending
8		5008	1035 Cancelled
9		5009	1001 Cancelled

- **Clean data: remove duplicates, handle missing values, and format columns.**

Ans: In the Power Query Editor, for the “Flight_Information” table, select the “Flight_ID” column that defines unique rows. Similarly, for the “Passenger_Information” table, select the “PassengerID” column, and for the “Ticket_Information” table, select the “TicketID” column.

Next, navigate to the “Home” tab, click the “Remove Rows” dropdown, and select “Remove Duplicates”.

The screenshot shows the Power Query Editor with the 'Flight_Information' table loaded. The formula bar displays the query: `= Table.Distinct(#"Changed Type", {"FlightID"})`. The 'Applied Steps' pane on the right shows the sequence: Source, Navigation, FilterNullAndWhitespace, Removed Other Columns, Promoted Headers, Changed Type, and **Removed Duplicates** (highlighted with a red box).

FlightID	FlightNumber	Airline	Destination	Status	
1	1001	FL1102	Airline D	Houston	On Time
2	1002	FL1435	Airline B	Chicago	On Time
3	1003	FL1860	Airline A	New York	Cancelled
4	1004	FL1270	Airline C	Chicago	Delayed
5	1005	FL1106	Airline C	New York	Delayed
6	1006	FL1071	Airline A	Phoenix	On Time
7	1007	FL1700	Airline C	Los Angeles	Cancelled
8	1008	FL1020	Airline C	Los Angeles	Delayed
9	1009	FL1614	Airline A	Los Angeles	Cancelled
10	1010	FL1121	Airline D	Chicago	Cancelled
11	1011	FL1466	Airline A	Phoenix	On Time
12	1012	FL1214	Airline D	New York	Delayed
13	1013	FL1330	Airline C	Houston	On Time

The screenshot shows the Power Query Editor with the 'Passenger_Information' table loaded. The formula bar displays the query: `= Table.Distinct(#"Changed Type", {"PassengerID"})`. The 'Applied Steps' pane on the right shows the sequence: Source, Navigation, FilterNullAndWhitespace, Removed Other Columns, Promoted Headers, Changed Type, and **Removed Duplicates** (highlighted with a red box).

PassengerID	FlightID	SeatNumber
1	1	1161 38A
2	2	1157 24D
3	3	1141 30B
4	4	1046 17E
5	5	1035 29D
6	6	1134 10A
7	7	1082 10A
8	8	1115 20E
9	9	1197 34E
10	10	1047 2E
11	11	1153 43C
12	12	1194 48C

The screenshot shows the Power Query Editor with the 'Ticket_Information' table loaded. The formula bar displays the query: `= Table.Distinct(#"Changed Type", {"TicketID"})`. The 'Applied Steps' pane on the right shows the sequence: Source, Navigation, FilterNullAndWhitespace, Removed Other Columns, Promoted Headers, Changed Type, and **Removed Duplicates** (highlighted with a red box).

TicketID	FlightID	BookingStatus
1	5001	1178 Pending
2	5002	1078 Confirmed
3	5003	1117 Cancelled
4	5004	1120 Cancelled
5	5005	1137 Cancelled
6	5006	1162 Pending
7	5007	1076 Pending
8	5008	1035 Cancelled
9	5009	1001 Cancelled
10	5010	1040 Cancelled
11	5011	1064 Pending
12	5012	1150 Cancelled
13	5013	1060 Cancelled
14	5014	1064 Confirmed

In Power query editor, for “Flight Information” table, filtered the “Status” column and unchecked “Cancelled”, cause this is the unnecessary rows. Same task doing for “Ticket_Information” table, filtered “BookingStatus” column and unchecked “Cancelled”.

File Home Transform Add Column View Tools Help

Close & Apply Close New Source Recent Sources Enter Data Data source settings Data Sources Manage Parameters Parameters Refresh Preview Query Properties Advanced Editor Manage Query Choose Columns Remove Columns Manage Columns Keep Rows Remove Rows Reduce Rows Sort Split Column Group By Data Type: Text Use First Row as Headers Replace Values Transform

Queries [3] `= Table.SelectRows(#"Removed Duplicates", each ([Status] <> "Cancelled"))`

FlightID	FlightNumber	Airline	Destination	Status
1	1001	FL1102	Airline D	
2	1002	FL1435	Airline B	
3	1004	FL1270	Airline C	
4	1005	FL1106	Airline C	
5	1006	FL1071	Airline A	
6	1008	FL1020	Airline C	
7	1011	FL1466	Airline A	
8	1012	FL1214	Airline D	
9	1013	FL1330	Airline C	
10	1014	FL1458	Airline C	
11	1015	FL1087	Airline C	
12	1016	FL1372	Airline B	
13	1017	FL1099	Airline D	
14	1018	FL1871	Airline B	
15	1020	FL1130	Airline A	

Sort Ascending
Sort Descending
Clear Sort
Clear Filter
Remove Empty
Text Filters
Search
☐ (Select All)
☐ Cancelled
☒ Delayed
☒ On Time

Query Settings

PROPERTIES
Name
Flight_Information
All Properties

APPLIED STEPS
Source
Navigation
FilterNullAndWhitespace
Removed Other Columns
Promoted Headers
Changed Type
Removed Duplicates
X Filtered Rows

File Home Transform Add Column View Tools Help

Close & Apply Close New Source Recent Sources Enter Data Data source settings Data Sources Manage Parameters Parameters Refresh Preview Query Properties Advanced Editor Manage Query Choose Columns Remove Columns Manage Columns Keep Rows Remove Rows Reduce Rows Sort Split Column Group By Data Type: Text Use First Row as Headers Replace Values Transform

Queries [3] `= Table.SelectRows(#"Removed Duplicates", each ([Status] <> "Cancelled"))`

FlightID	FlightNumber	Airline	Destination	Status
1	1001	FL1102	Houston	On Time
2	1002	FL1435	Chicago	On Time
3	1004	FL1270	Chicago	Delayed
4	1005	FL1106	New York	Delayed
5	1006	FL1071	Phoenix	On Time
6	1008	FL1020	Los Angeles	Delayed
7	1011	FL1466	Phoenix	On Time
8	1012	FL1214	New York	Delayed
9	1013	FL1330	Houston	On Time
10	1014	FL1458	New York	Delayed
11	1015	FL1087	Houston	Delayed
12	1016	FL1372	New York	Delayed
13	1017	FL1099	Phoenix	Delayed
14	1018	FL1871	Houston	Delayed
15	1020	FL1130	New York	On Time
16	1022	FL1308	Houston	Delayed
17	1023	FL1769	Chicago	On Time

Query Settings

PROPERTIES
Name
Flight_Information
All Properties

APPLIED STEPS
Source
Navigation
FilterNullAndWhitespace
Removed Other Columns
Promoted Headers
Changed Type
Removed Duplicates
X Filtered Rows

File Home Transform Add Column View Tools Help

Close & Apply Close New Source Recent Sources Enter Data Data source settings Data Sources Manage Parameters Parameters Refresh Preview Query Properties Advanced Editor Manage Query Choose Columns Remove Columns Manage Columns Keep Rows Remove Rows Reduce Rows Sort Split Column Group By Data Type: Text Use First Row as Headers Replace Values Transform

Queries [3] `= Table.SelectRows(#"Removed Duplicates", each ([BookingStatus] <> "Cancelled"))`

TicketID	FlightID	BookingStatus
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
11	5	
12	5	
13	5	
14	5	
15	5	
16	5029	1159 Pending
17	5029	1062 Pending

Sort Ascending
Sort Descending
Clear Sort
Clear Filter
Remove Empty
Text Filters
Search
☐ (Select All)
☐ Cancelled
☒ Confirmed
☒ Pending

Query Settings

PROPERTIES
Name
Ticket_Information
All Properties

APPLIED STEPS
Source
Navigation
FilterNullAndWhitespace
Removed Other Columns
Promoted Headers
Changed Type
Removed Duplicates
X Filtered Rows

Table: SelectRows(#"Removed Duplicates", each ([BookingStatus] <> "Cancelled"))

	TicketID	FlightID	BookingStatus
1	5001	1178	Pending
2	5002	1078	Confirmed
3	5006	1162	Pending
4	5007	1076	Pending
5	5011	1064	Pending
6	5014	1064	Confirmed
7	5015	1093	Confirmed
8	5016	1072	Pending
9	5019	1014	Confirmed
10	5020	1060	Pending
11	5021	1030	Confirmed
12	5022	1035	Confirmed
13	5023	1165	Confirmed
14	5024	1005	Confirmed
15	5027	1078	Confirmed
16	5028	1154	Pending
17	5029	1062	Pending
18	5030	1132	Pending

X

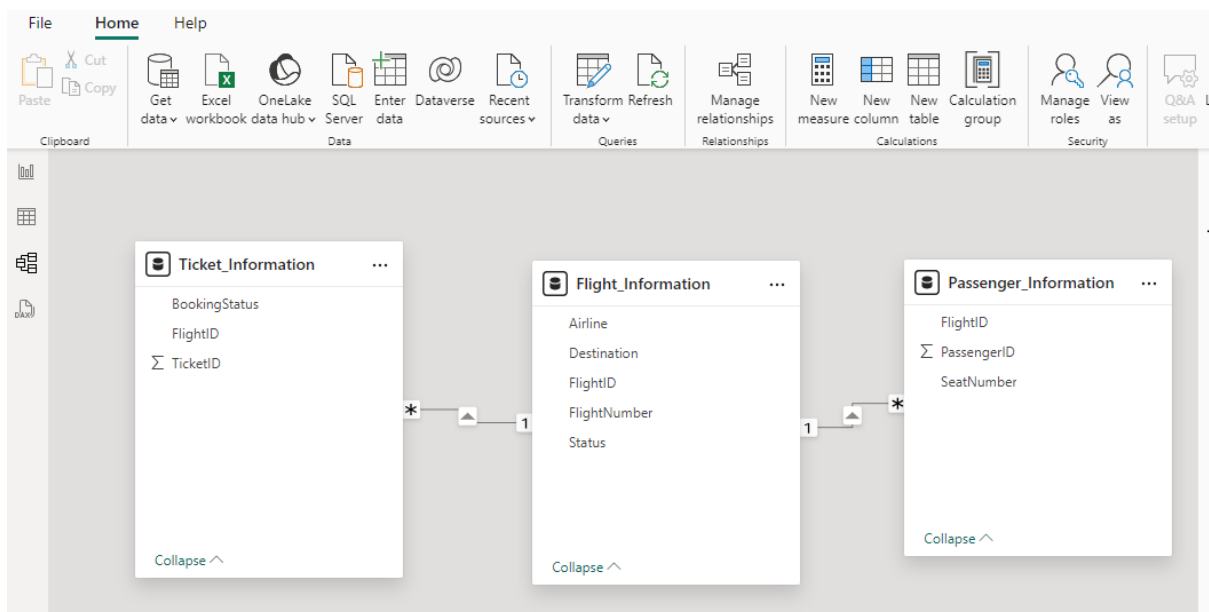
2. Data Modeling

- Create relationships between datasets (FlightID as the key).
- Understand cardinality and configure the model appropriately.

Ans: In the “Model View”, Drag the “Flight_ID” column from the “Flight_Information” table and drop it onto the corresponding “Flight_ID” column in the “Passenger_Information” table.

Similarly, link the “Flight_ID” column from the “Flight_Information” table to the “Flight_ID” column in the “Ticket_Information” table.

The relationships are set to “One-to-Many”, with the *Flight_Information* table as the One side, and the *Passenger_Information* and *Ticket_Information* tables as the Many sides.



X

3. Enhanced Data Insights

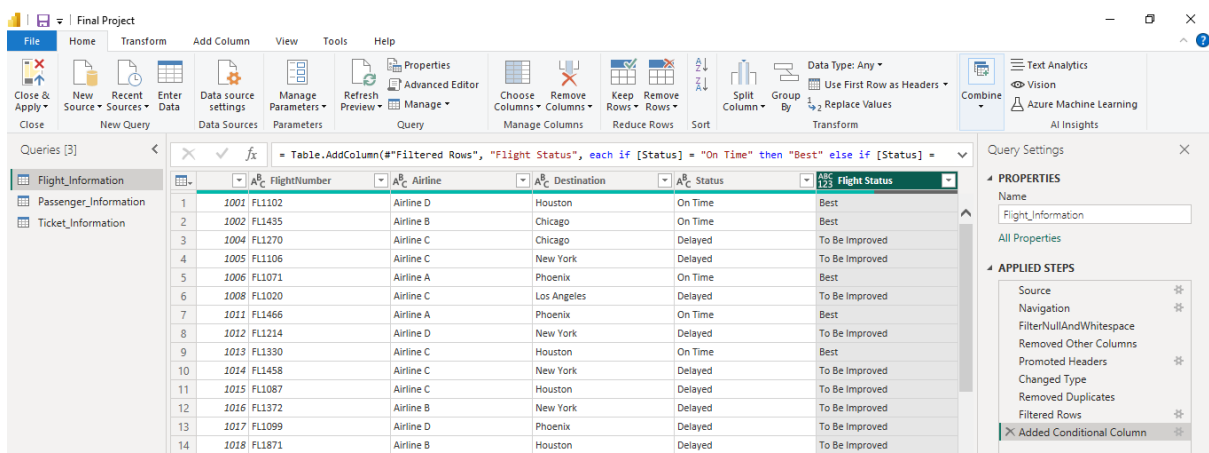
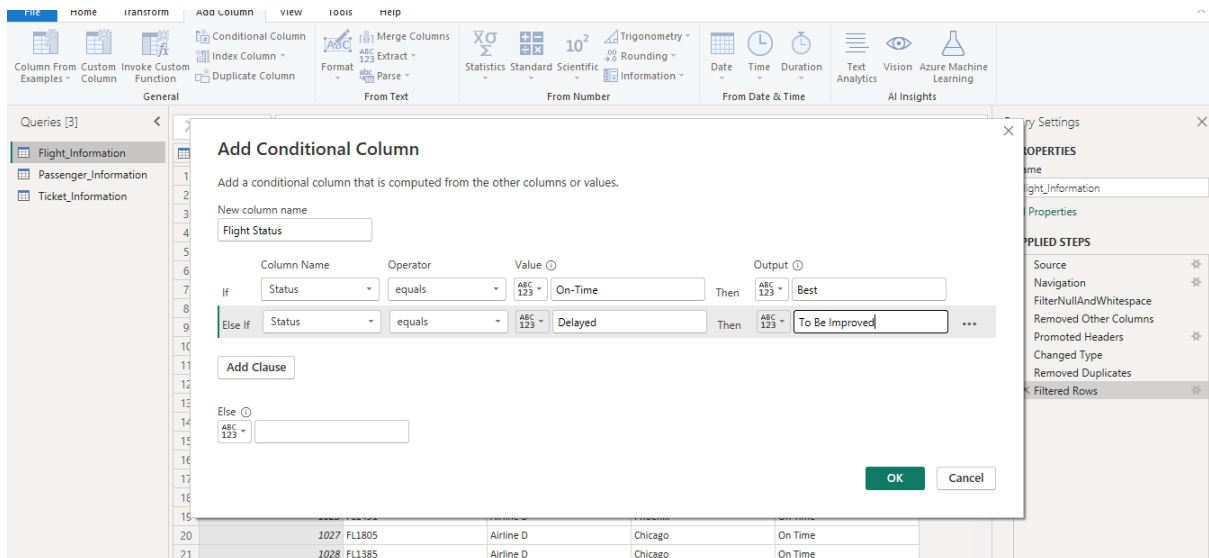
- Add a conditional column to classify flights as "Best" or "To Be Improved" based on status.
- Use "Column from Examples" to extract the flight number from FlightNumber.

Ans: In the Power Query editor, Select the “Flight_Information” table, then go to the “Add Column” tab and click “Conditional Column”. Set the column name as “Flight Status”.

Then set the condition

- If Status equals 'On-Time' then 'Best'.
- If Status equals 'Delayed' then 'To Be Improved'.

and click “OK”.



For, extract the flight number from “FlightNumber” column, in the “Flight_Information” table, choose the “FlightNumber” column.

Then go to the “Add Column” tab and click “Column from Examples” > “From Selection”.

Then in the data preview section, start typing the **desired output** in the new column. For example, If FlightNumber is "FL1102" and I want to extract "1102" then type "1102" in the new column.

After that, Power Query will automatically detect the pattern and suggest a formula to extract the flight number.

Then click “OK”.

The screenshot shows the Power Query Editor with the 'Add Column' tab selected. The 'Column from Examples' > 'From Selection' path is chosen. The formula bar displays the M formula: `= Table.RenameColumns(#"Removed Columns",{{"Text After Delimiter", "FlightNumber"}})`. The data preview shows a table with columns: FlightID, FlightNumber, Airline, Destination, Status, and Flight Status. The 'FlightNumber' column is highlighted, and the formula bar shows the extraction logic.

X

4. Calculations Using DAX

● Calculate:

○ Total tickets booked.

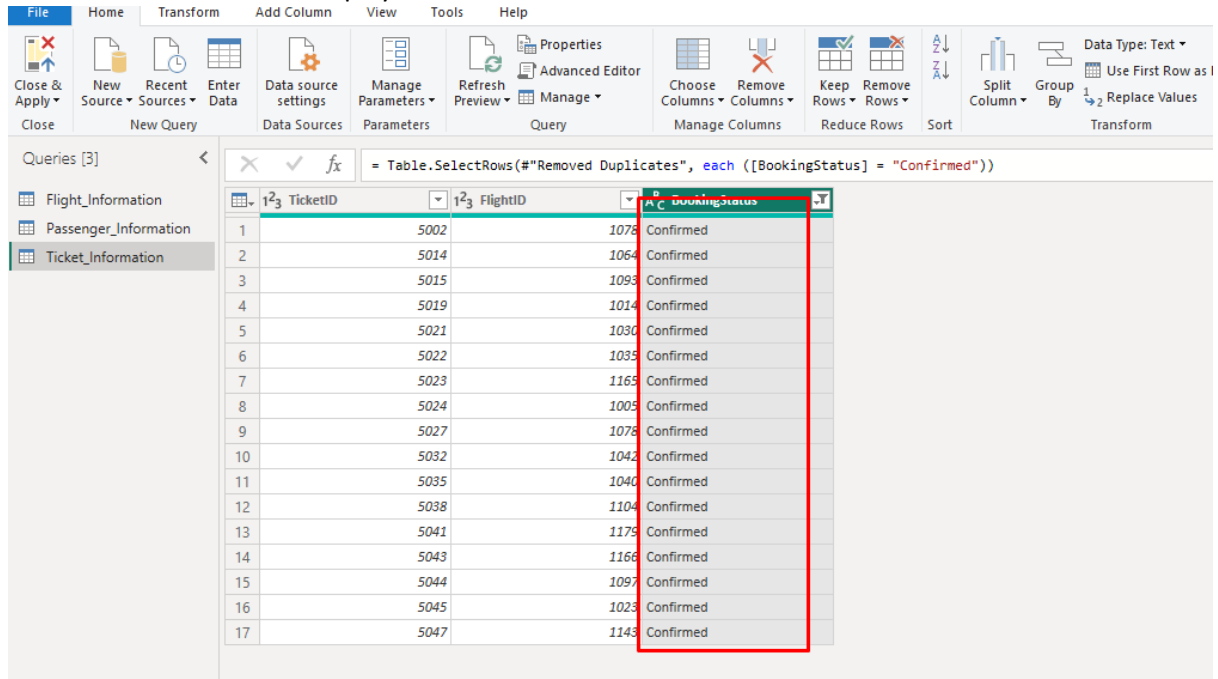
○ Filtered table showing "Best" flights only.

Ans: To calculate the “Total tickets booked” using DAX,

At first creating a measure, that counts the rows in the Ticket_Information table where the BookingStatus indicates that the ticket has been confirmed:

TotalTicketsBooked = CALCULATE(COUNTROWS(Ticket_Information),
Ticket_Information[BookingStatus] = "Confirmed")

Then Use a card visual to display the booked tickets.



Queries [3]

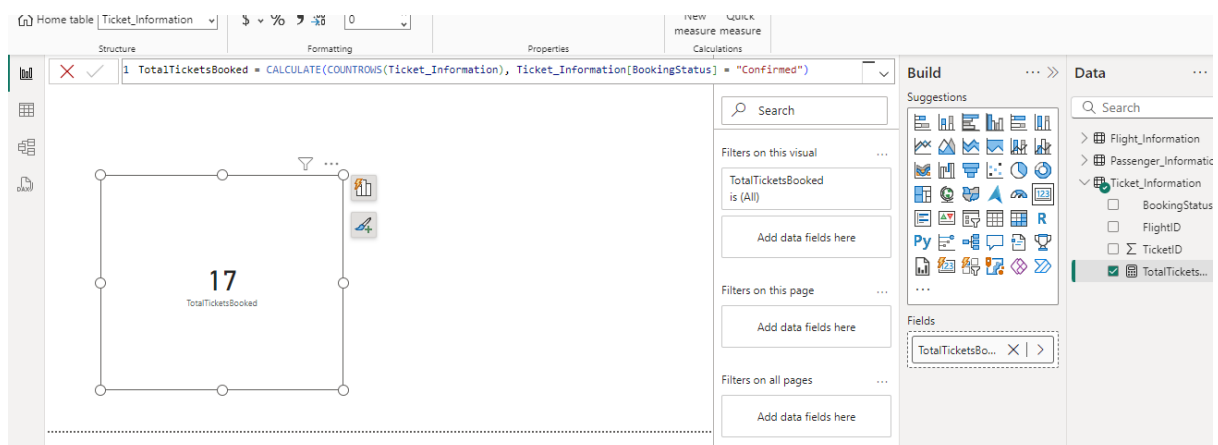
Flight_Information

Passenger_Information

Ticket_Information

Table.SelectRows(#"Removed Duplicates", each ([BookingStatus] = "Confirmed"))

	TicketID	FlightID	BookingStatus
1	5002	1078	Confirmed
2	5014	1064	Confirmed
3	5015	1093	Confirmed
4	5019	1014	Confirmed
5	5021	1030	Confirmed
6	5022	1035	Confirmed
7	5023	1165	Confirmed
8	5024	1005	Confirmed
9	5027	1078	Confirmed
10	5032	1042	Confirmed
11	5035	1040	Confirmed
12	5038	1104	Confirmed
13	5041	1175	Confirmed
14	5043	1166	Confirmed
15	5044	1097	Confirmed
16	5045	1023	Confirmed
17	5047	1143	Confirmed



So, total 17 tickets are booked after calculation.

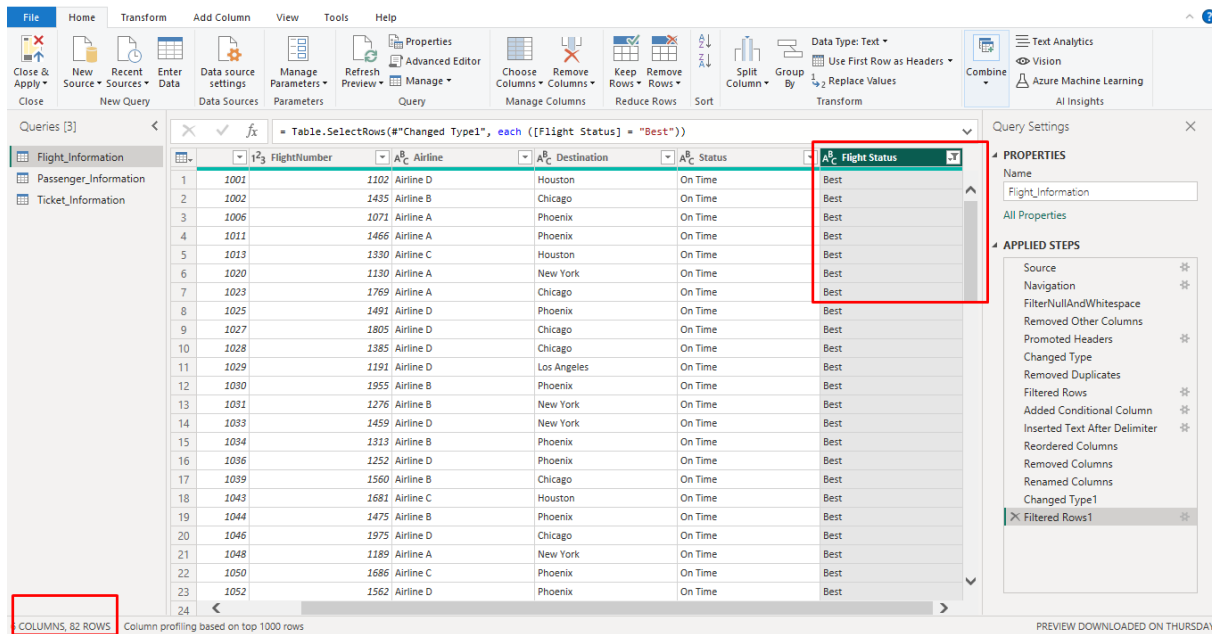
Calculate filtered table showing "Best" flights only:

Create a filtered table in Power BI that shows only the "Best" flights using DAX, firstly create a calculated table.

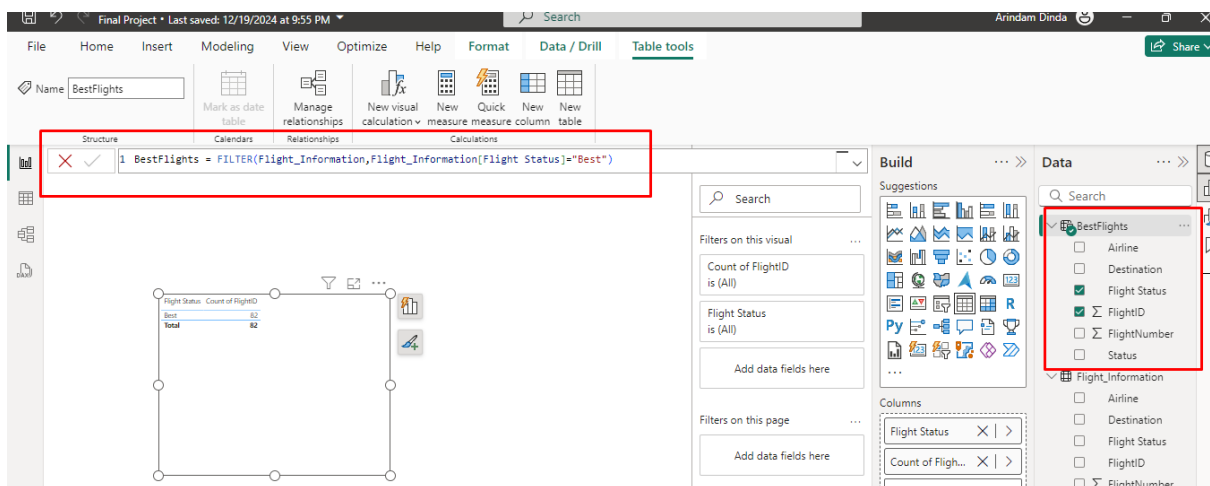
In "Modeling" tab, Select "New Table". Then enter the DAX expression for "Best Flights".

BestFlights = FILTER(Flight_Information, Flight_Information[Flight Status]="Best")

Then create a table visual, then drag the "Flight Status" and "Flight Number" column.



In Power Query Editor, only 82 best flight are there, after filtered,



X

5. Visualization and Interactive Features

- Create visuals for:
 - Passenger count by airline.
 - Ticket booking statuses.
 - Flights by airline and destination.

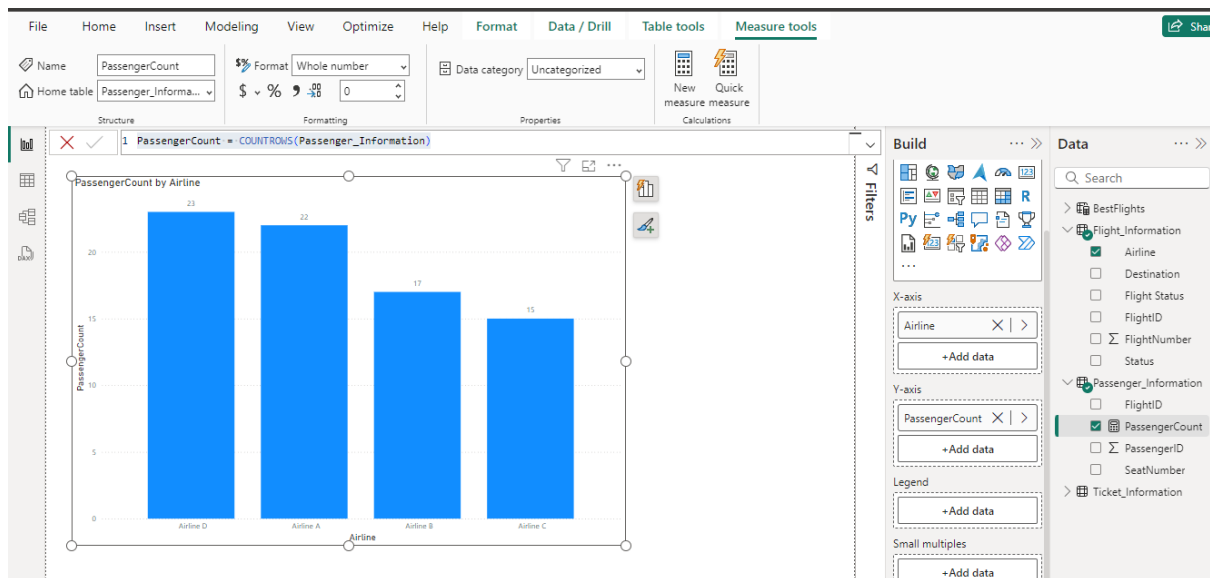
Ans: For Passenger count by airline-

Create a DAX measure in "Passenger_Information" to calculate the total number of passengers:

PassengerCount = COUNTROWS(Passenger_Information)

This measure counts the rows in the Passenger_Information table, where each row represents a passenger.

Then using “Stacked Column Chart”, this visual perfectly analyse.

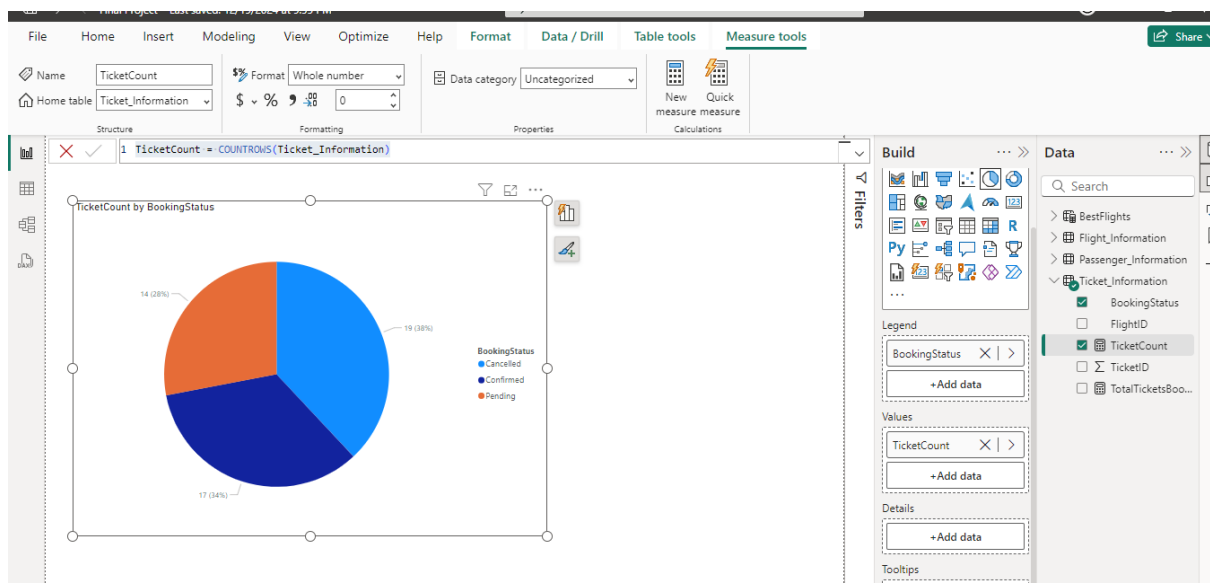


For ticket booking statuses:

Create a DAX formula in “Ticket_Information” to find the ticket count:

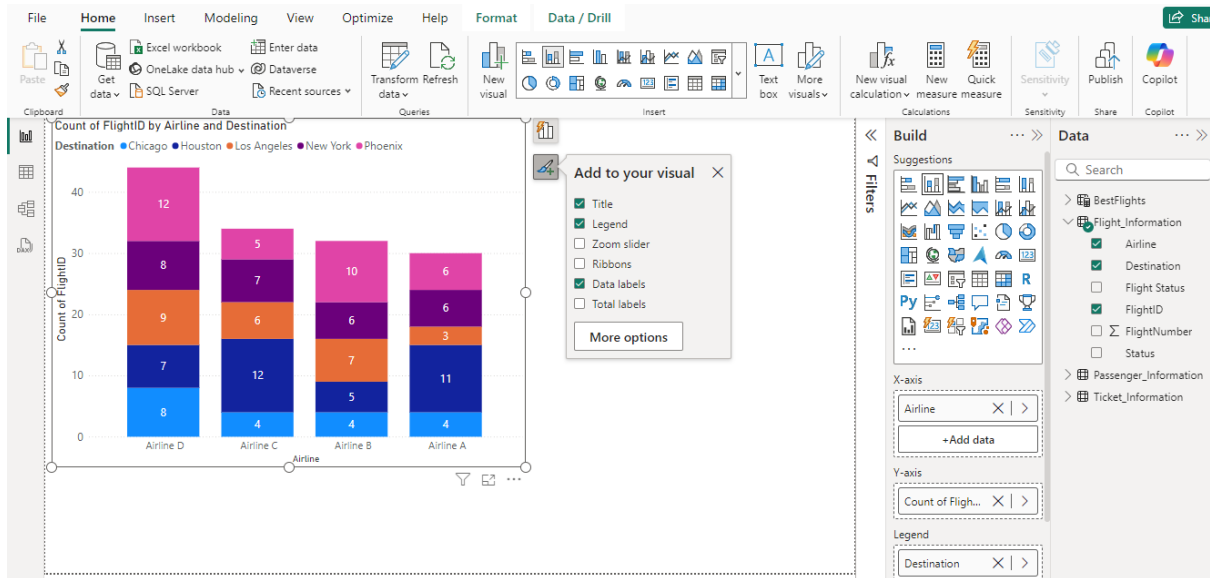
`TicketCount = COUNTROWS(Ticket_Information)`

Then using a “Pie Chart”, drag “BookingStatus” in “Legend” field and “TicketCount” in “Values” field.



For Flights by airline and destination:

For this, “Stacked column chart” is the best option.



Add interactive features for:

- **Destination and Airline.**
- **Quick views.**
- **Airline-specific pages.**

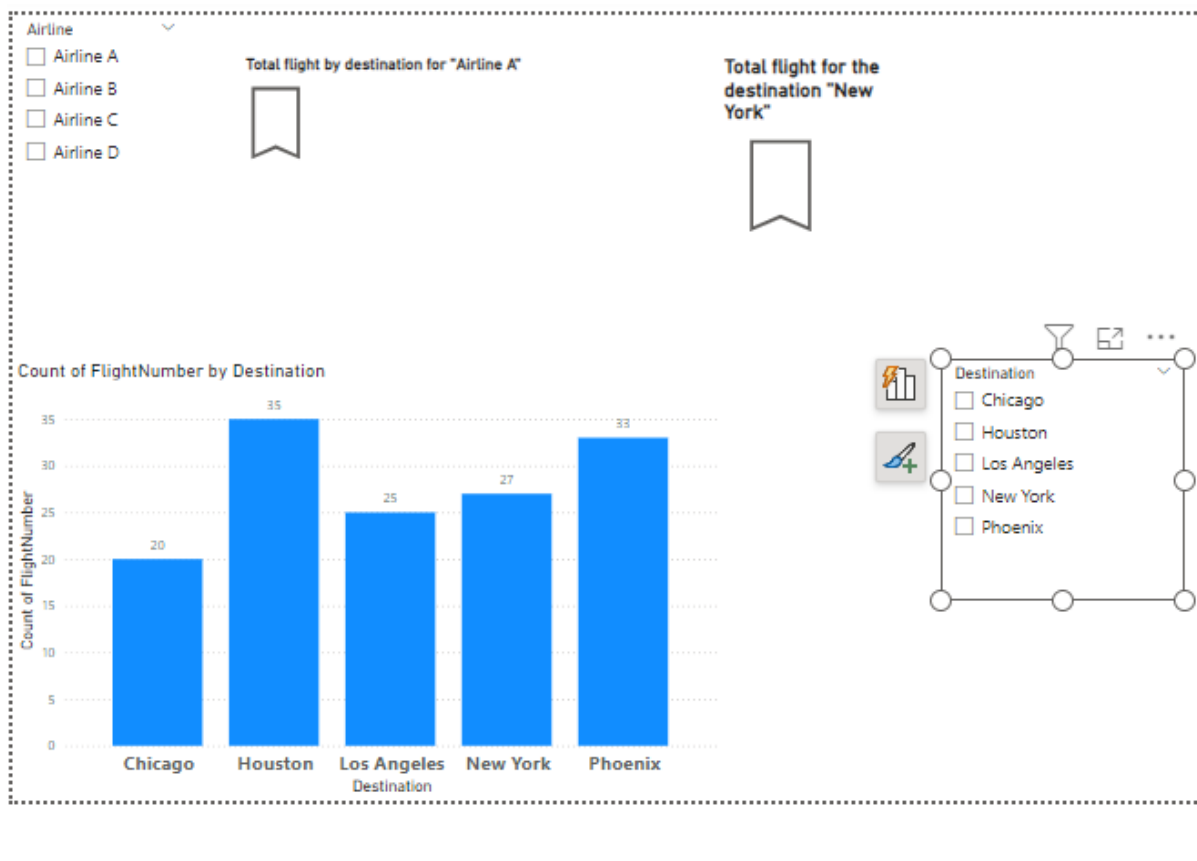
Ans:

For Destination and Airline:

To add interactive features for “Destination” and “Airline”, we can incorporate Slicers, Tooltips, Drill-through, and Interactive Filtering. These features allow users to filter data dynamically, view detailed information, and interact with the visuals on the report.

Slicers for Destination and Airline: Create two slicer, for “Airline” & “Destination”.

Quick Views Using Bookmarks and Buttons: Quick views allow users to quickly navigate between different views of the data, such as overviews or detailed breakdowns for specific airlines.

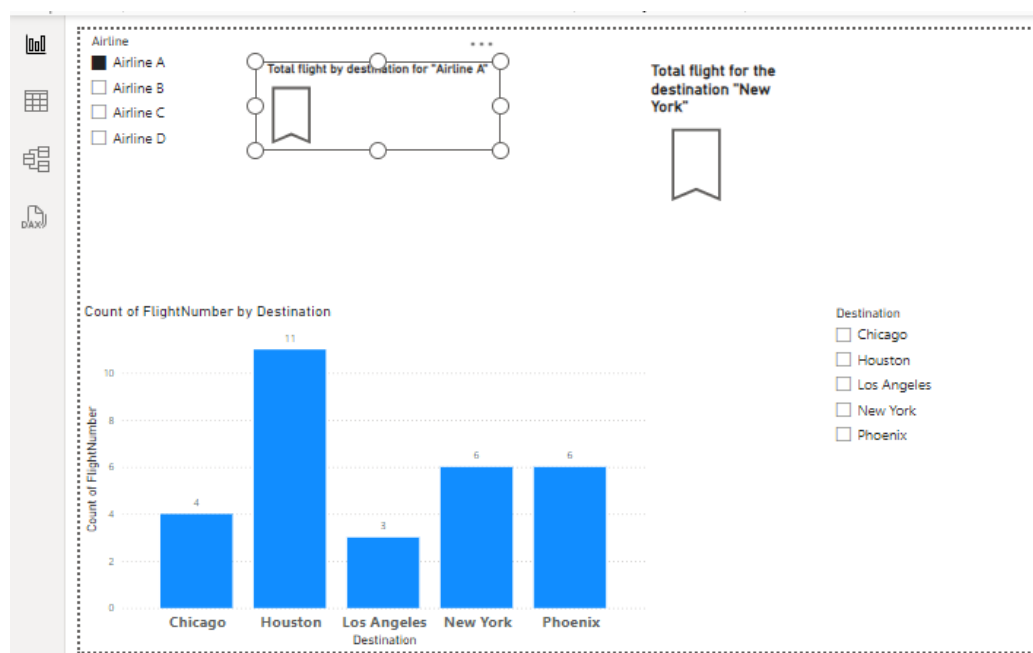


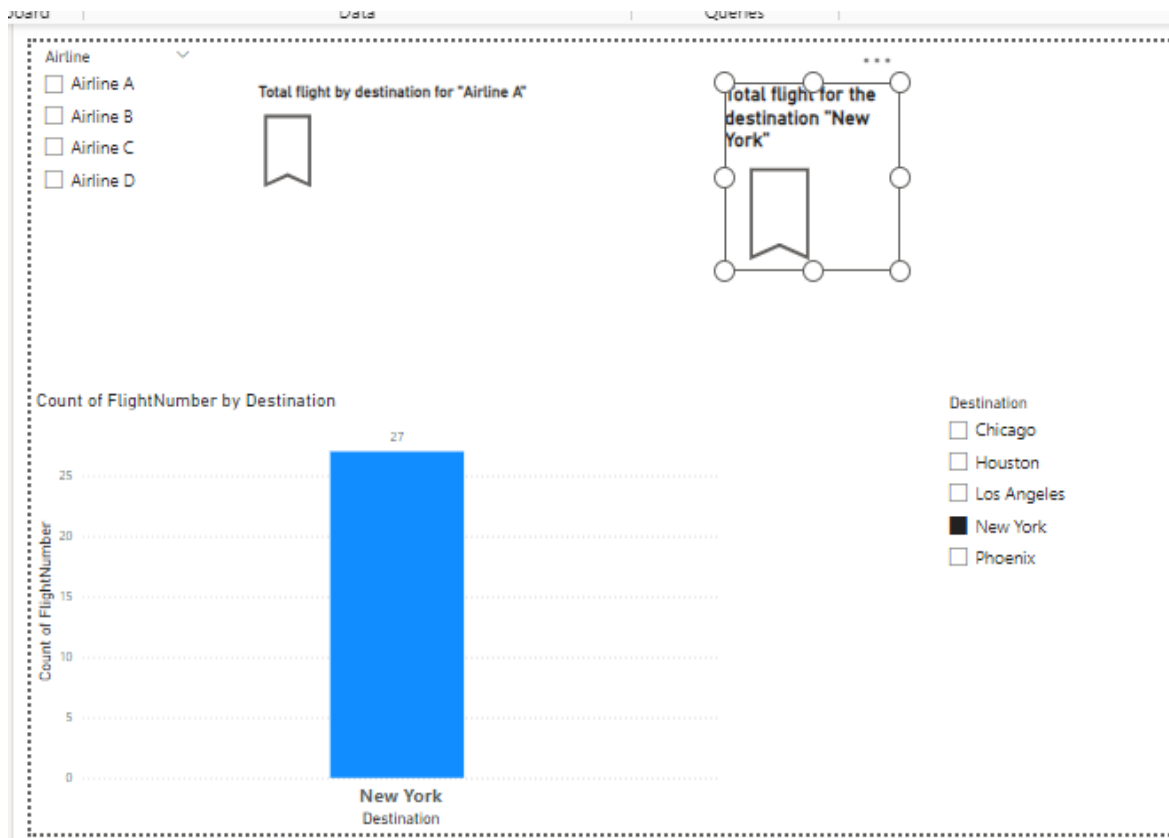
After that, go to the "View" tab and select "Bookmarks". Click add to create bookmarks and making two individuals view:

- Total flight by destination for "Airline A".
- Total flight for the destination "New York"

Then add two individual "Bookmark" button from "Insert" ribbon and assign those two views in action field:

This view for "Airline A"

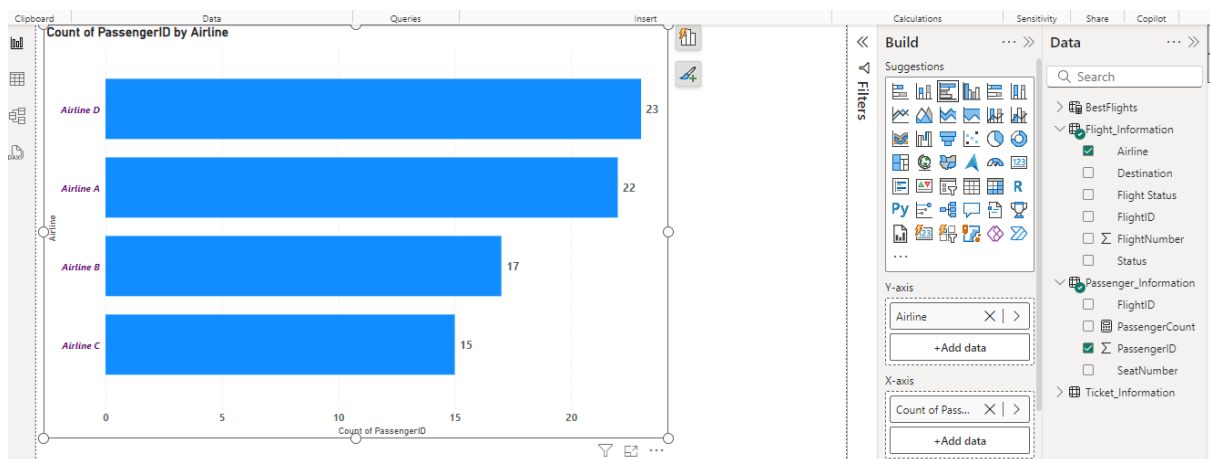




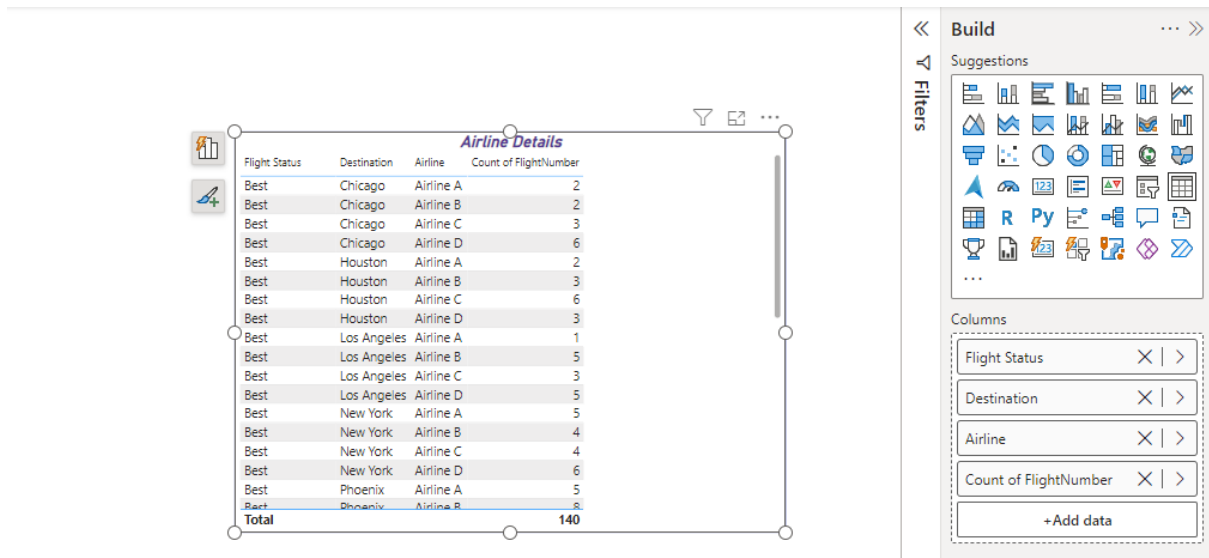
This view for "Total flight for the destination "New York"

For Airline-specific pages : Using "Drillthrough" pages, we can view detailed information related to that airline by right-click on an Airline.

At first create a new report page using "Clustered Bar Chart" and make a visual "Count of Passenger ID by Airline".

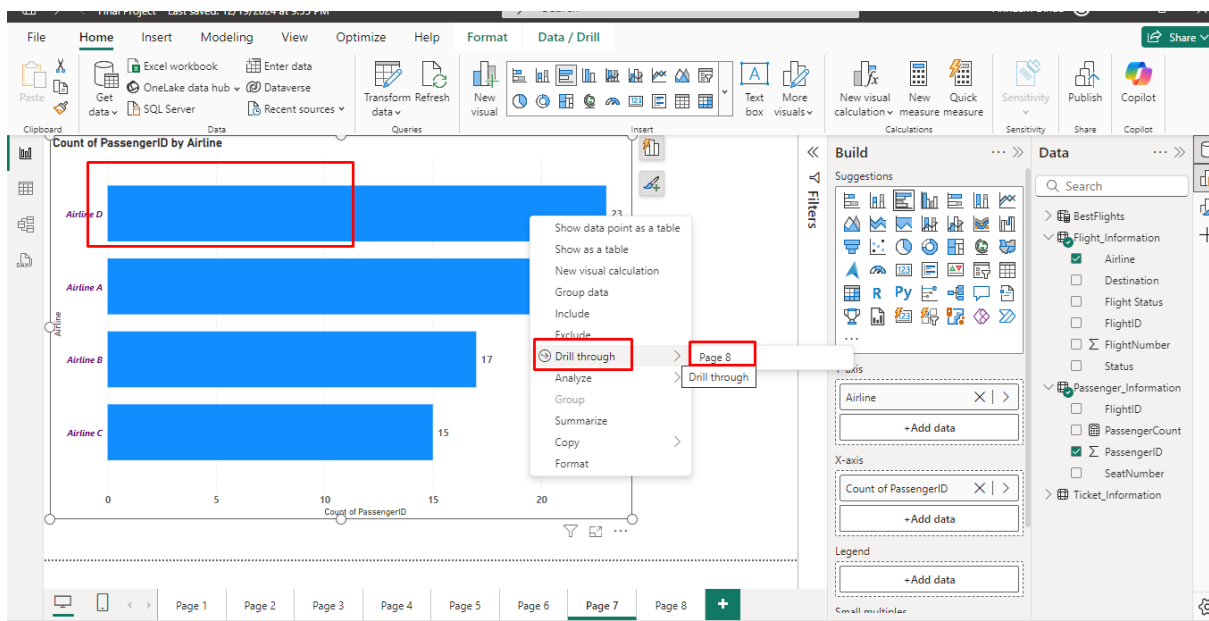


Then in another page, create a new visual table "Airline Details"



Then, Drag the "Airline" field from the "Flight_Information" table to the Drill-through section in the Fields pane. This will allow the drill-through feature to pass the selected Airline context from one visual to the drill-through page.

After that, in "Clustered Bar Chart", right-click on "Airline D" chart, click "Drillthrough"> "Page 8"



Now, the visuals will show data specific to the selected Airline.

Flight Status	Destination	Airline	Count of FlightNumber
Best	Chicago	Airline D	6
Best	Houston	Airline D	3
Best	Los Angeles	Airline D	5
Best	New York	Airline D	6
Best	Phoenix	Airline D	6
To Be Improved	Chicago	Airline D	2
To Be Improved	Houston	Airline D	4
To Be Improved	Los Angeles	Airline D	2
To Be Improved	New York	Airline D	4
To Be Improved	Phoenix	Airline D	6
Total			44

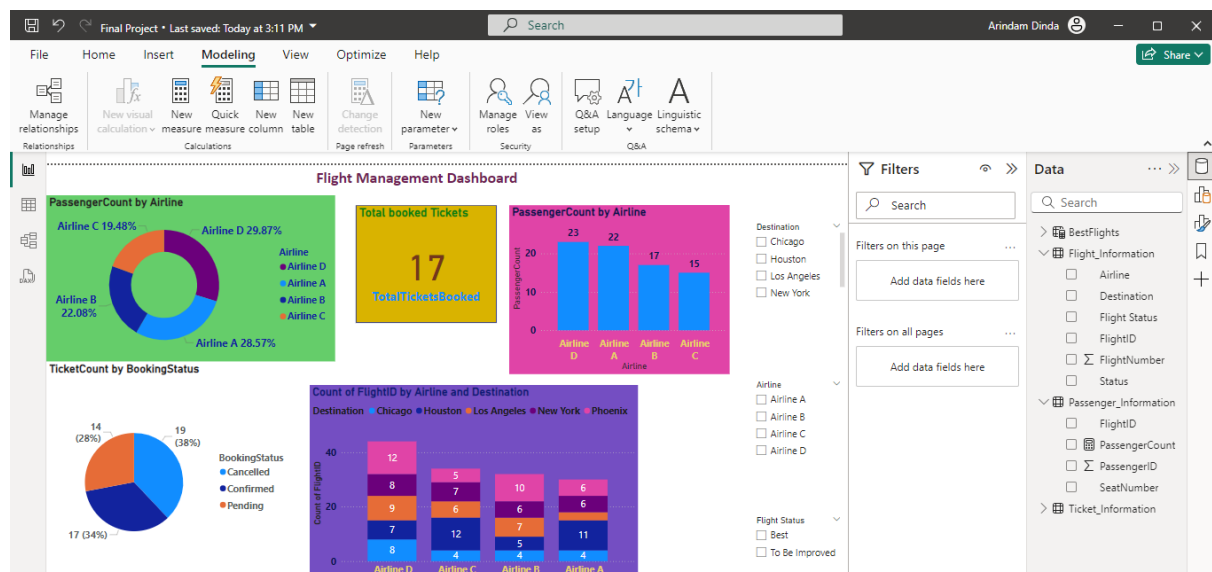
X

6. Final Dashboard and Power BI Service

- Design a comprehensive dashboard with key visuals and insights.
- Configure Row-Level Security (RLS) for Airline A data and assign it to a user.
- Set up a schedule refresh at 5 PM daily.

Ans:

Design a comprehensive dashboard with key visuals and insights



Configure Row-Level Security (RLS) for Airline A data and assign it to a user

For configuration, go to the “Modeling” tab in the ribbon, click on “Manage Roles”.

In the “Manage Roles” window, click Create and name the role as “Airline A”

The screenshot shows the 'Manage security roles' window with the 'Filter data' tab selected. The window is divided into three main sections: Roles, Select tables, and Filter data.

- Roles:** Contains a '+ New' button and a role named 'Airline A'.
- Select tables:** Lists tables: BestFlights, Flight_Informa..., Passenger_Info..., and Ticket_Informa....
- Filter data:** Contains a 'Switch to DAX editor' button, a '+ New' button, a 'Select all' button, a 'Delete' button, a 'Group' button, and an 'Ungroup' button. Below these, it says 'Show data if All of these rules are true'. A table with columns 'Column', 'Condition', and 'Value' is shown, with a single rule: 'Airline' equals 'Airline A'.

Manage security roles

Create new security roles and use filters to define row-level data restrictions.

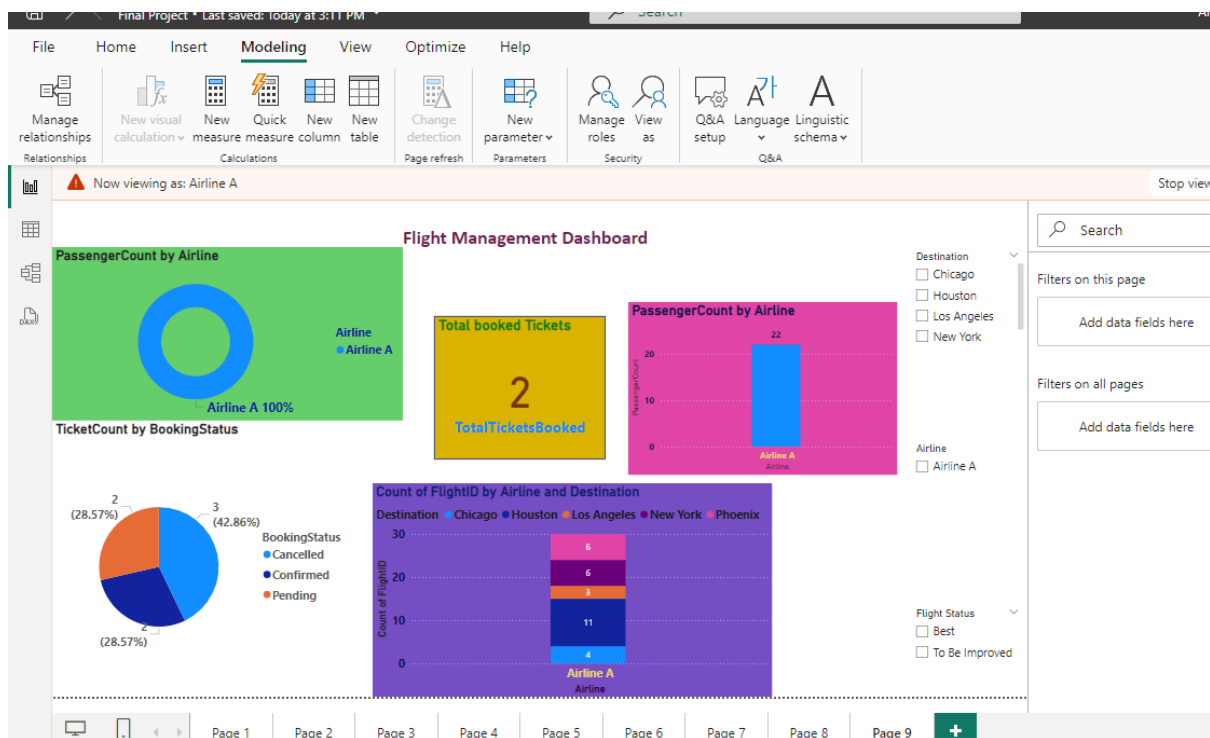
The screenshot shows the 'Manage security roles' window with the 'Filter data' tab selected. The window is divided into three main sections: Roles, Select tables, and Filter data.

- Roles:** Contains a '+ New' button and a role named 'Airline A'.
- Select tables:** Lists tables: BestFlights, Flight_Informa..., Passenger_Info..., and Ticket_Informa....
- Filter data:** Contains a 'Switch to default editor' button, a checkmark, and a close button. Below these, a DAX query is shown: `1 [Airline] == "Airline A"`.

Then click “Save”.

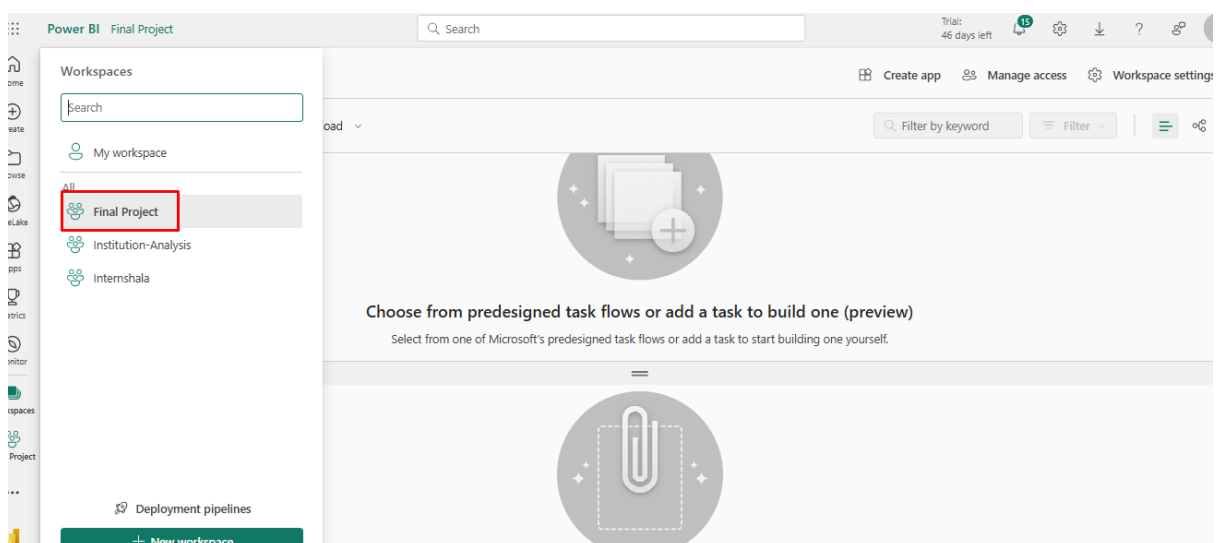
After that need to validating this “RLS Configuration”.

So, go to the “Modeling” tab and click “View as Roles” and select the role “Airline A”.



Now, all values showing as “Airline A” data.

For assigning, at first create a workspace in “Power BI Service” and give the name as “Final Project”.



Then coming to the power BI desktop, in the “Home” ribbon, click on “Publish”, then select “Final Project” and click “Ok”.

Then click on this marking link.

Total

Total

t of Flightl

nation • Chi

Publishing to Power BI

✓ Success!

[Open 'Final Project.pbix' in Power BI](#)

[Get Quick Insights](#)

Did you know?

You can create a portrait view of your report, tailored for mobile phones. On the **View** tab, select **Mobile Layout**. [Learn more](#)

Got it

Final Project | Data updated 12/22/24 | Search

Trial: 46 days left

File | Export | Share | Chat in Teams | Explore this data | Get insights | Set alert | Edit | Copilot

Pages

Page 1

Page 2

Page 3

Page 4

Page 5

Page 6

Page 7

Page 8

Page 9

Flight Management Dashboard

PassengerCount by Airline

Airline	Count	Percentage
Airline C	19	48%
Airline D	29	87%
Airline B	22	08%
Airline A	28	57%

Total booked Tickets

17

TotalTicketsBooked

PassengerCount by Airline

Airline	Count
Airline D	23
Airline A	22
Airline B	17
Airline C	15

TicketCount by BookingStatus

BookingStatus	Count	Percentage
Cancelled	14	28%
Confirmed	19	38%
Pending	17	34%

Count of FlightID by Airline and Destination

Airline	Chicago	Houston	Los Angeles	New York	Phoenix
Airline D	12	8	9	7	8
Airline C	5	7	6	12	4
Airline B	10	6	7	5	4
Airline A	6	6	11	4	6

Destination

☐ Chicago

☐ Houston

☐ Los Angeles

☐ New York

Airline

☐ Airline A

☐ Airline B

☐ Airline C

☐ Airline D

Flight Status

☐ Best

☐ To Be Improved

Final Project

+ New item

New folder

Upload

Choose from predefined task flows or add a task to build one (preview)

Select from one of Microsoft's predefined task flows or add a task to start building one yourself.

	Name	Type	Task	Owner	Refreshed	Next refresh	Er
	Final Project	Report	—	Final Project	22/12/2024, 3:53...	—	—
	Final Project	Semantic mo...	—	Final Project	22/12/2024, 3:5...	N/A	—

After that, click on three dot of the “Final Project” data set.

Final Project

+ New item

New folder

Upload

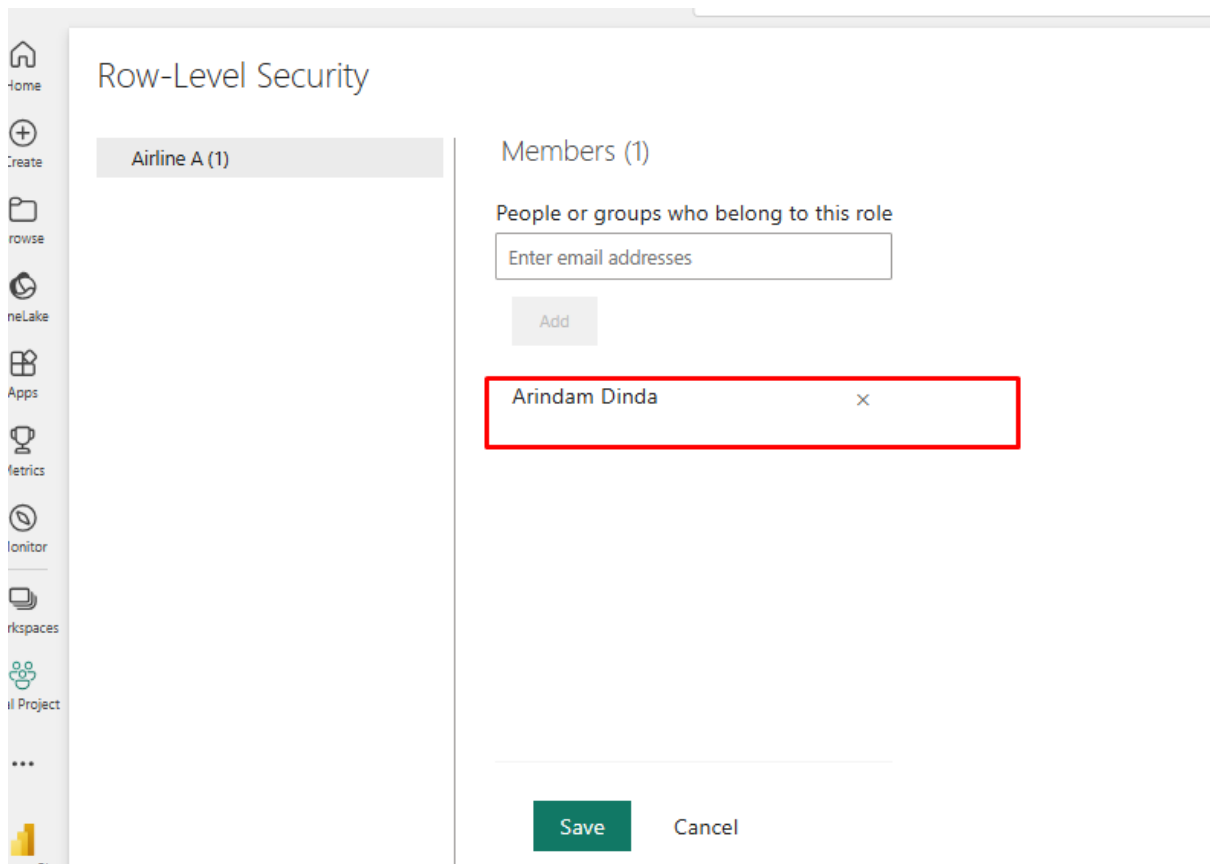
Choose from predefined task flows

Select from one of Microsoft's predefined task fl

	Name	Type	Task	Owner
	Final Project	Report	—	Final Project
<div><div></div><div>...</div></div>	Final Project	Semantic mo...	—	Final Project

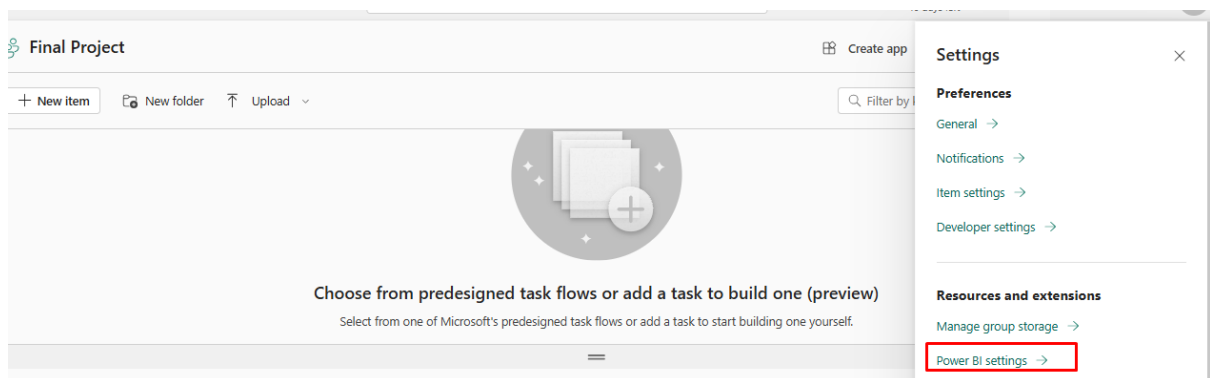
More options

“row level security” dashboard will open. After that in the blank field “Member” enter any email id, which I want to assign. Then click “Add”. This is the way to assign any people.



Set up a schedule refresh at 5 PM daily:

Go to the settings of “Power BI Service”, then click “Power BI setting”



Then click on “Semantic models” and scroll down, we can see “Refresh” option. After that set the time as per requirement and click on apply

Refresh

Time zone

① Time zone configuration is applied not only to determine the schedule refresh time but also to establish the current date and time for incremental refresh models during on-demand and API refreshes.[Learn more](#)

(UTC+05:30) Chennai, Kolkata, Mumbai

Configure a refresh schedule

Define a data refresh schedule to import data from the data source into the semantic model. [Learn more](#)

☒ On

Refresh frequency

Daily

Time

5 00 PM

[Add another time](#)

Send refresh failure notifications to

☒ Semantic model owner

☐ These contacts:

Enter email addresses

Apply

Discard

End of the Project