Course 3 Project
Title: Airline Data Management and Analysis Using Power BI
Name:Leepakshi Patankar

Problem Statement:

The airline industry operates with numerous complexities, requiring effective data management and insights into flight schedules, passenger details, and ticketing systems. This project aims to analyze airline operations for improving efficiency and customer satisfaction.

Datasets Used: ***Flight_Information, Ticket_Information , Passenger_Information***

1. Flight Information: Includes FlightID, FlightNumber, Airline, Destination, and Status.

2. Passenger Information: Includes PassengerID, FlightID, and SeatNumber.

3. Ticket Information: Includes TicketID, FlightID, and BookingStatus.

Used Snipping tool for more clarity

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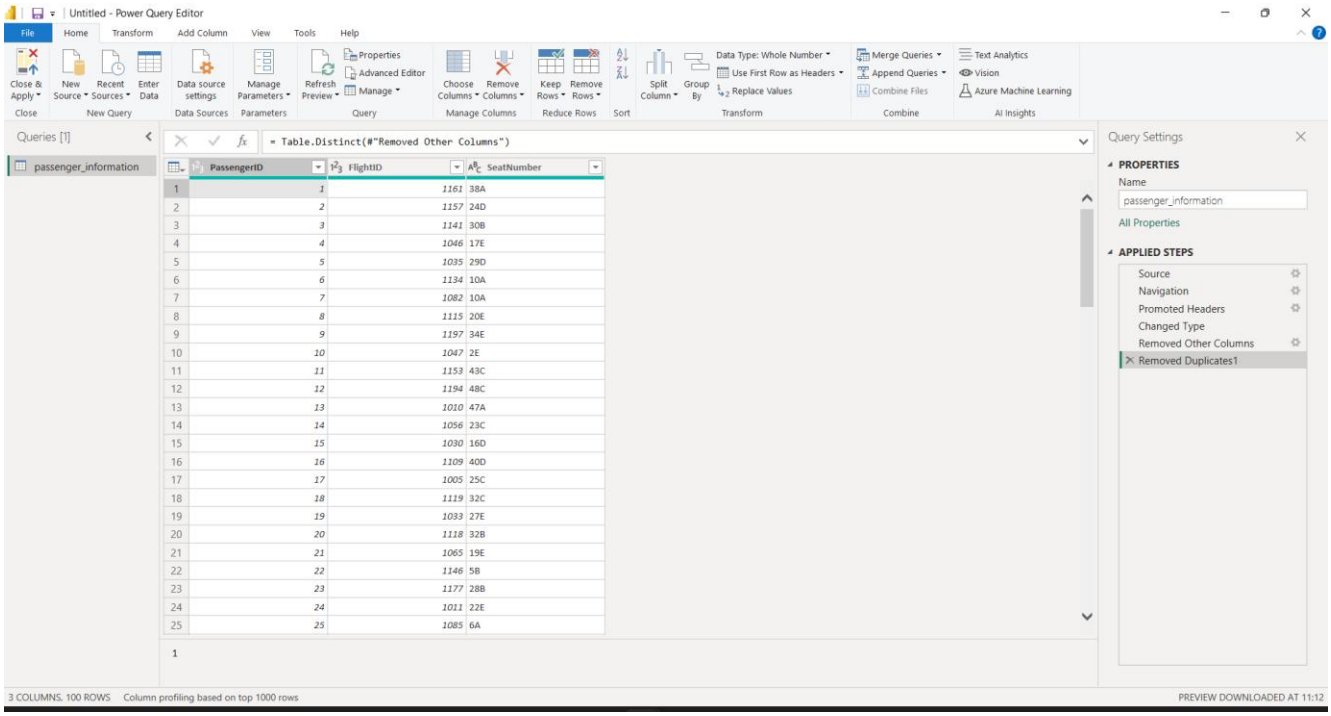
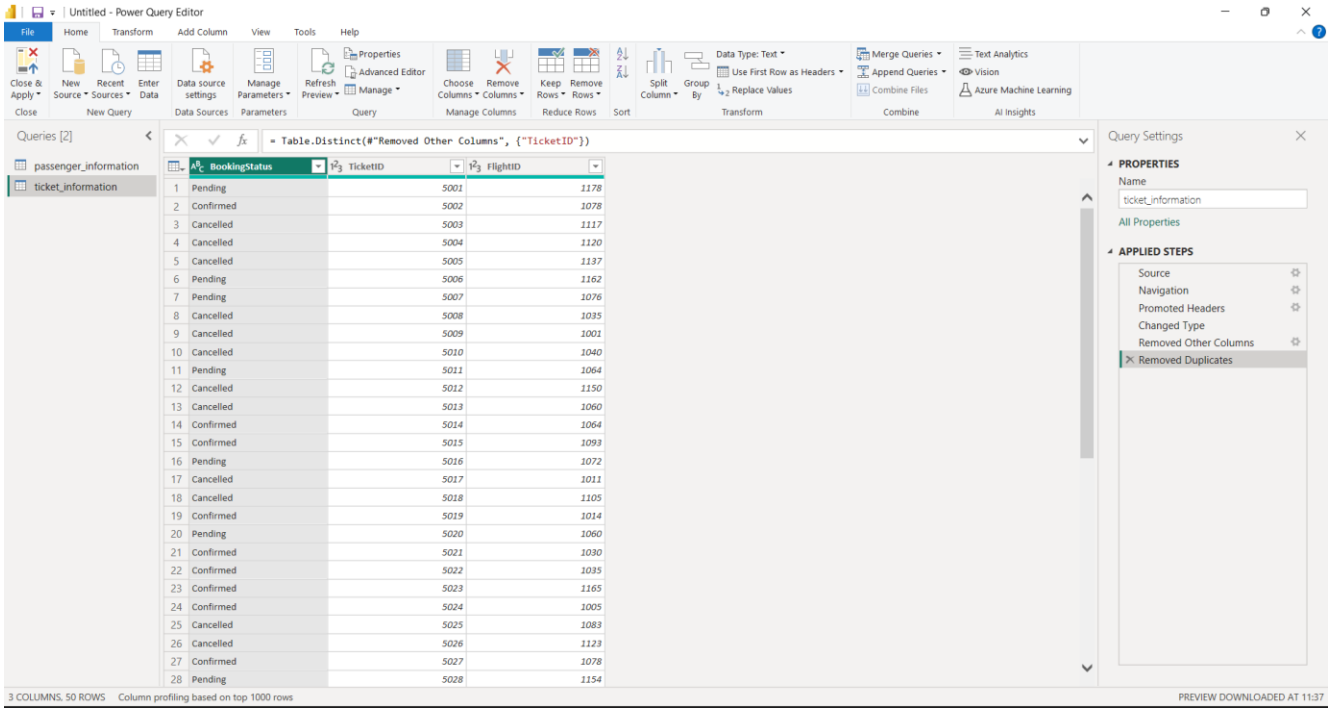
1. Data Preparation and Cleaning

Passenger information cleaned dataset.



	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
13	13	1010	47A
14	14	1056	23C
15	15	1030	16D
16	16	1109	40D
17	17	1005	25C
18	18	1119	32C
19	19	1033	27E
20	20	1118	32B
21	21	1065	19E
22	22	1146	5B
23	23	1177	28B
24	24	1011	22E
25	25	1085	6A

Ticket information cleaned dataset



	BookingStatus	TicketID	FlightID
1	Pending	5001	1178
2	Confirmed	5002	1078
3	Cancelled	5003	1117
4	Cancelled	5004	1120
5	Cancelled	5005	1137
6	Pending	5006	1162
7	Pending	5007	1076
8	Cancelled	5008	1035
9	Cancelled	5009	1001
10	Cancelled	5010	1040
11	Pending	5011	1064
12	Cancelled	5012	1150
13	Cancelled	5013	1060
14	Confirmed	5014	1064
15	Confirmed	5015	1093
16	Pending	5016	1072
17	Cancelled	5017	1011
18	Cancelled	5018	1105
19	Confirmed	5019	1014
20	Pending	5020	1060
21	Confirmed	5021	1030
22	Confirmed	5022	1035
23	Confirmed	5023	1165
24	Confirmed	5024	1005
25	Cancelled	5025	1083
26	Cancelled	5026	1123
27	Confirmed	5027	1078
28	Pending	5028	1154

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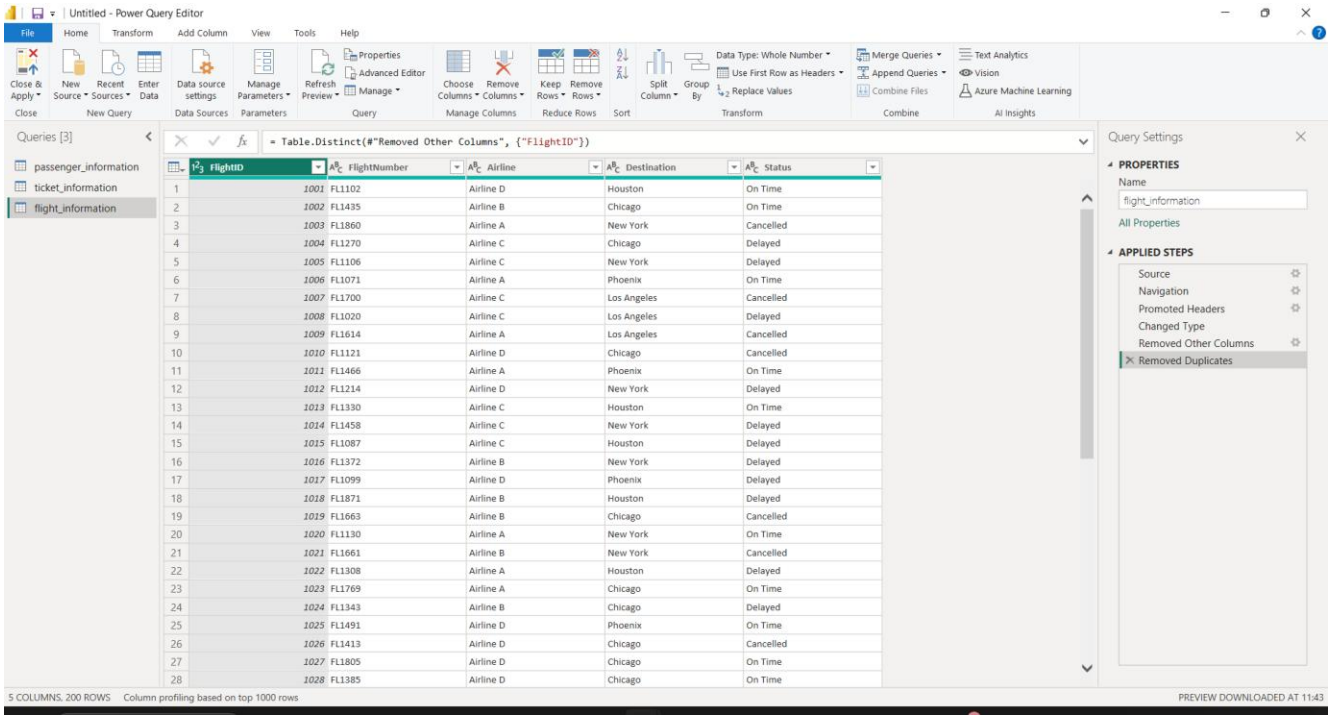
Flight information cleaned dataset



	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
14	1014	FL1458	Airline C	New York	Delayed
15	1015	FL1087	Airline C	Houston	Delayed
16	1016	FL1372	Airline B	New York	Delayed
17	1017	FL1099	Airline D	Phoenix	Delayed
18	1018	FL1871	Airline B	Houston	Delayed
19	1019	FL1663	Airline B	Chicago	Cancelled
20	1020	FL1130	Airline A	New York	On Time
21	1021	FL1661	Airline B	New York	Cancelled
22	1022	FL1308	Airline A	Houston	Delayed
23	1023	FL1769	Airline A	Chicago	On Time
24	1024	FL1343	Airline B	Chicago	Delayed
25	1025	FL1491	Airline D	Phoenix	On Time
26	1026	FL1413	Airline D	Chicago	Cancelled
27	1027	FL1805	Airline D	Chicago	On Time
28	1028	FL1385	Airline D	Chicago	On Time

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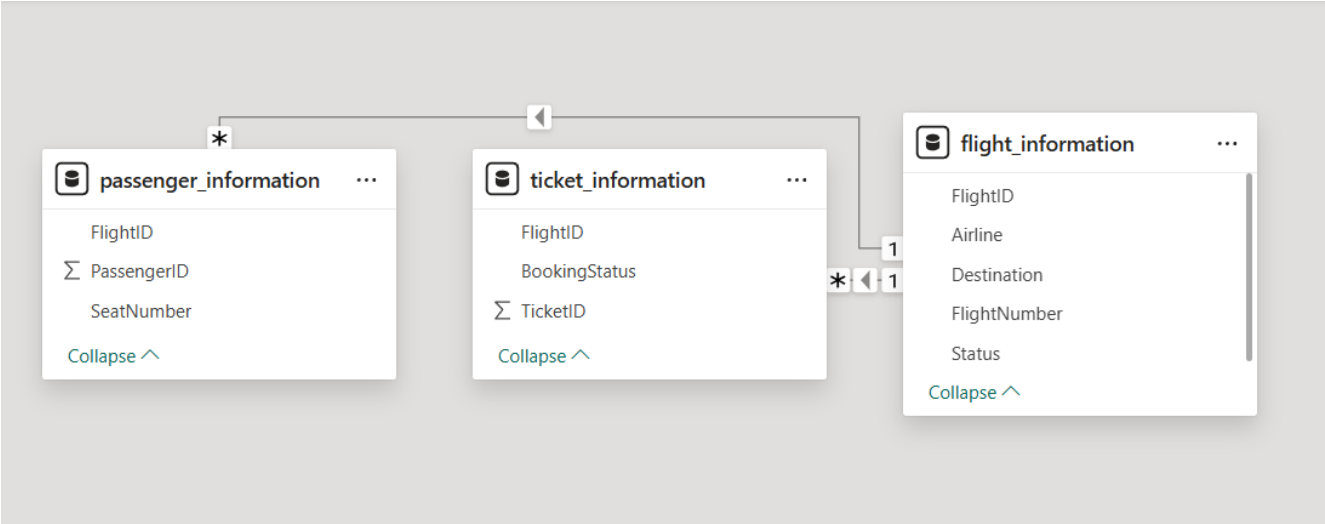
2. Data Modeling

Relationship created using "Flight id" as the common key as Primary key and as "Foreign key" in other tables.



Cardinality between tables.

Since Flight ID is present in multiple datasets, we will use it as the **primary key** in the Flight Information table and a **foreign key** in other tables.

Relationships

Table Name	Column Used (Flight ID)	Relationship Type
Flight Information (Primary)	Flight ID	One-to-Many
Passenger Data	Flight ID	Many-to-One
Ticket Information	Flight ID	Many-to-One

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Understanding Cardinality & Configuration

Cardinality defines how tables relate to each other:

- **One-to-Many (1:*)** → One flight can have multiple passengers and tickets.
- **Many-to-One (*:1)** → Many bookings link to one flight.

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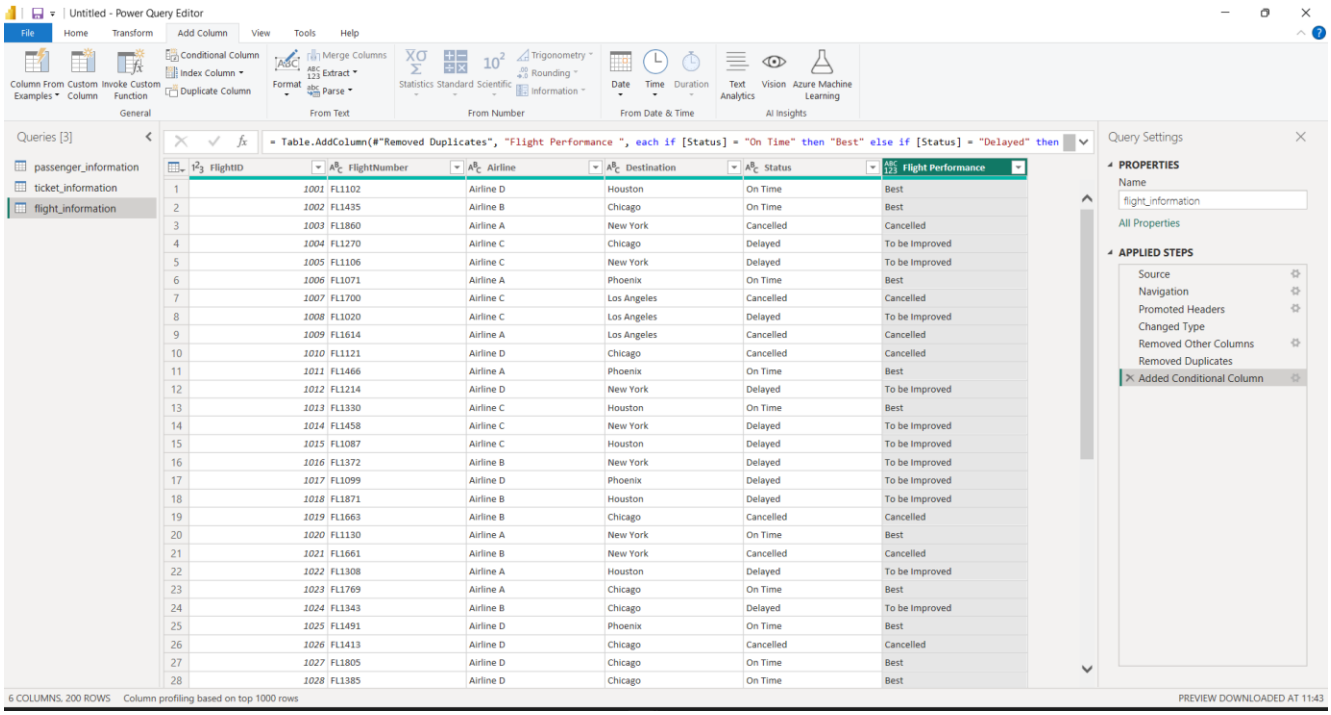
3.Enhanced Data Insights

Classifying flights as **"Best"** or **"To Be Improved"** or **"Cancelled"** based on status.



	FlightID	FlightNumber	Airline	Destination	Status	Flight Performance
1	1001	FL1102	Airline D	Houston	On Time	Best
2	1002	FL1435	Airline B	Chicago	On Time	Best
3	1003	FL1860	Airline A	New York	Cancelled	Cancelled
4	1004	FL1270	Airline C	Chicago	Delayed	To be Improved
5	1005	FL1106	Airline C	New York	Delayed	To be Improved
6	1006	FL1071	Airline A	Phoenix	On Time	Best
7	1007	FL1700	Airline C	Los Angeles	Cancelled	Cancelled
8	1008	FL1020	Airline C	Los Angeles	Delayed	To be Improved
9	1009	FL1614	Airline A	Los Angeles	Cancelled	Cancelled
10	1010	FL1121	Airline D	Chicago	Cancelled	Cancelled
11	1011	FL1466	Airline A	Phoenix	On Time	Best
12	1012	FL1214	Airline D	New York	Delayed	To be Improved
13	1013	FL1330	Airline C	Houston	On Time	Best
14	1014	FL1458	Airline C	New York	Delayed	To be Improved
15	1015	FL1087	Airline C	Houston	Delayed	To be Improved
16	1016	FL1372	Airline B	New York	Delayed	To be Improved
17	1017	FL1099	Airline D	Phoenix	Delayed	To be Improved
18	1018	FL1871	Airline B	Houston	Delayed	To be Improved
19	1019	FL1663	Airline B	Chicago	Cancelled	Cancelled
20	1020	FL1130	Airline A	New York	On Time	Best
21	1021	FL1661	Airline B	New York	Cancelled	Cancelled
22	1022	FL1308	Airline A	Houston	Delayed	To be Improved
23	1023	FL1769	Airline A	Chicago	On Time	Best
24	1024	FL1343	Airline B	Chicago	Delayed	To be Improved
25	1025	FL1491	Airline D	Phoenix	On Time	Best
26	1026	FL1413	Airline D	Chicago	Cancelled	Cancelled
27	1027	FL1805	Airline D	Chicago	On Time	Best
28	1028	FL1385	Airline D	Chicago	On Time	Best

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Status	Flight Performance
On Time	Best
On Time	Best
Cancelled	Cancelled
Delayed	To be Improved
Delayed	To be Improved
On Time	Best
Cancelled	Cancelled
Delayed	To be Improved
Cancelled	Cancelled
Cancelled	Cancelled
On Time	Best
Delayed	To be Improved
On Time	Best
Delayed	To be Improved
Delayed	To be Improved
Delayed	To be Improved
Delayed	To be Improved
Delayed	To be Improved
Cancelled	Cancelled
On Time	Best
Cancelled	Cancelled
Delayed	To be Improved
On Time	Best
Delayed	To be Improved
On Time	Best
Cancelled	Cancelled
On Time	Best
On Time	Best

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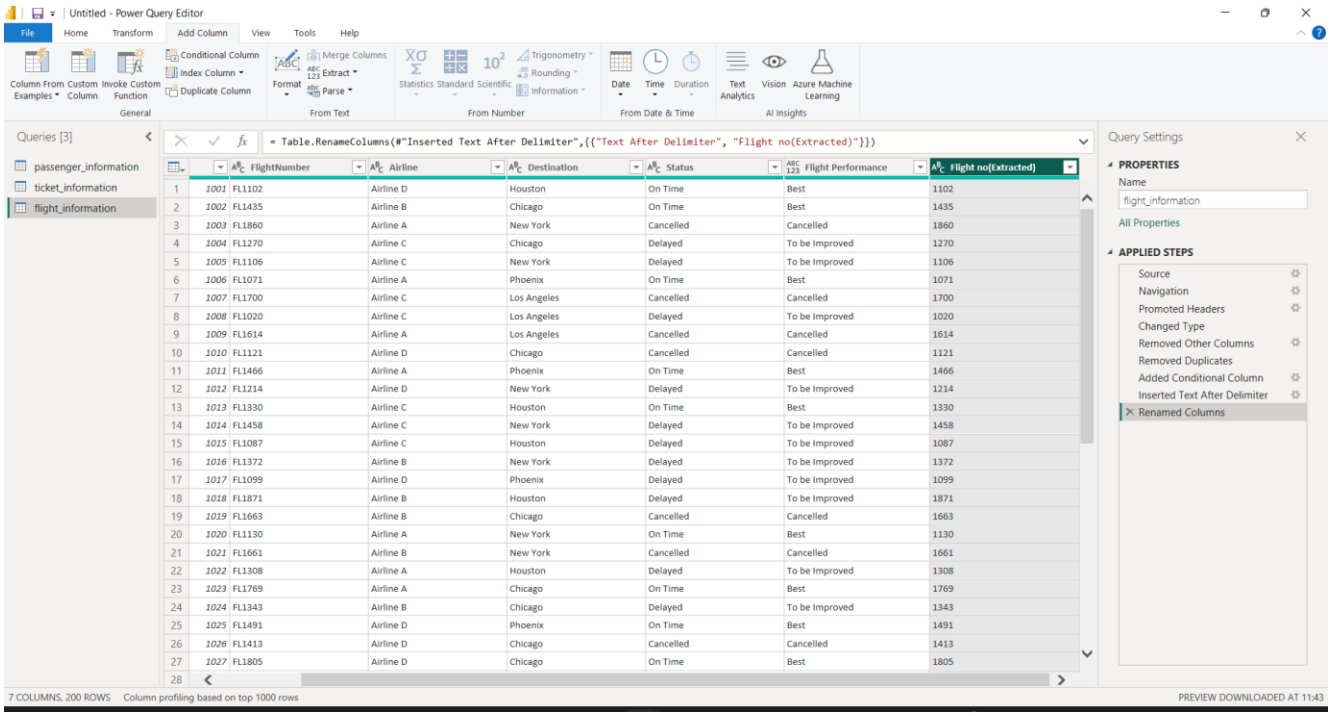
Extracted Flight number from Flight number.



	FlightNumber	Airline	Destination	Status	Flight Performance	Flight no(Extracted)
1	1001	FL1102	Airline D	Houston	On Time	Best	1102
2	1002	FL1435	Airline B	Chicago	On Time	Best	1435
3	1003	FL1860	Airline A	New York	Cancelled	Cancelled	1860
4	1004	FL1270	Airline C	Chicago	Delayed	To be Improved	1270
5	1005	FL1106	Airline C	New York	Delayed	To be Improved	1106
6	1006	FL1071	Airline A	Phoenix	On Time	Best	1071
7	1007	FL1700	Airline C	Los Angeles	Cancelled	Cancelled	1700
8	1008	FL1020	Airline C	Los Angeles	Delayed	To be Improved	1020
9	1009	FL1614	Airline A	Los Angeles	Cancelled	Cancelled	1614
10	1010	FL1121	Airline D	Chicago	Cancelled	Cancelled	1121
11	1011	FL1466	Airline A	Phoenix	On Time	Best	1466
12	1012	FL1214	Airline D	New York	Delayed	To be Improved	1214
13	1013	FL1330	Airline C	Houston	On Time	Best	1330
14	1014	FL1458	Airline C	New York	Delayed	To be Improved	1458
15	1015	FL1087	Airline C	Houston	Delayed	To be Improved	1087
16	1016	FL1372	Airline B	New York	Delayed	To be Improved	1372
17	1017	FL1099	Airline D	Phoenix	Delayed	To be Improved	1099
18	1018	FL1871	Airline B	Houston	Delayed	To be Improved	1871
19	1019	FL1663	Airline B	Chicago	Cancelled	Cancelled	1663
20	1020	FL1130	Airline A	New York	On Time	Best	1130
21	1021	FL1661	Airline B	New York	Cancelled	Cancelled	1661
22	1022	FL1308	Airline A	Houston	Delayed	To be Improved	1308
23	1023	FL1769	Airline A	Chicago	On Time	Best	1769
24	1024	FL1343	Airline B	Chicago	Delayed	To be Improved	1343
25	1025	FL1491	Airline D	Phoenix	On Time	Best	1491
26	1026	FL1413	Airline D	Chicago	Cancelled	Cancelled	1413
27	1027	FL1805	Airline D	Chicago	On Time	Best	1805

Flight no(Extracted)
1102
1435
1860
1270
1106
1071
1700
1020
1614
1121
1466
1214
1330
1458
1087
1372

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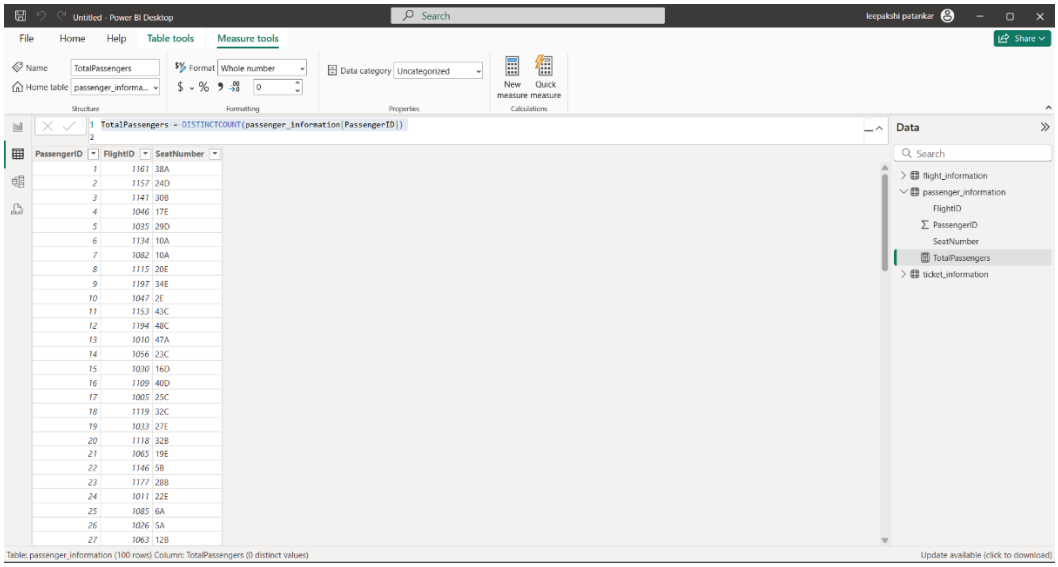
4. Calculations Using DAX

- Total passengers for a specific flight.

Formula: TotalPassengers = DISTINCTCOUNT(passenger_information[PassengerID])



Total Passengers per Flight

FlightID	TotalPassengers
1001	1
1003	2
1004	1
1005	1
1006	1
1010	1
1011	1
1012	1
1023	1
1026	1
1027	1
1030	2
1032	1
1033	1
1034	1
1035	1
1038	1
1039	1
1046	1
1047	2
1050	2
1051	1
1052	1
1053	1
1054	1
1055	1
1056	1
1057	1
1059	1
1063	1
1065	1
1066	1
1072	1
Total	100

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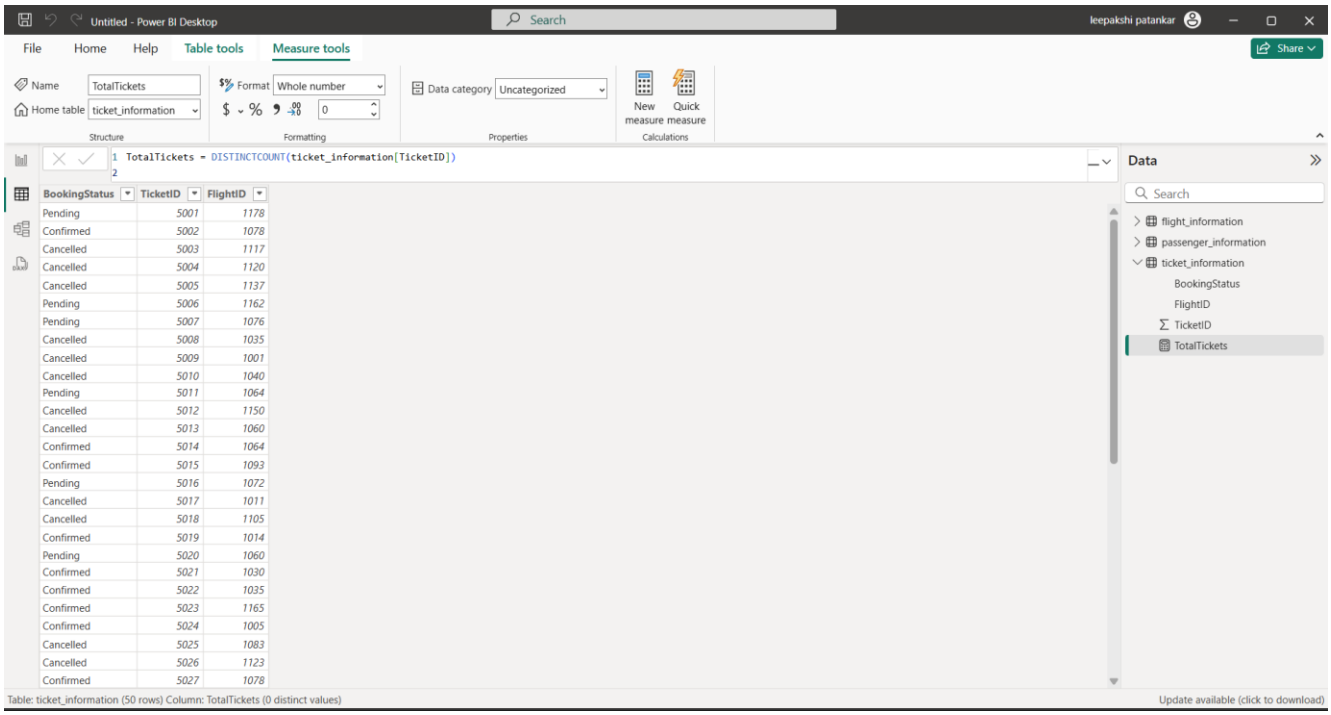
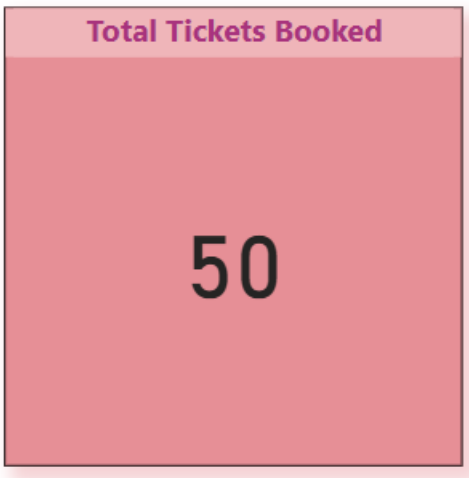
- Total tickets booked.

Formula used: TotalTickets = DISTINCTCOUNT(ticket_information[TicketID])



BookingStatus	TicketID	FlightID
Pending	5001	1178
Confirmed	5002	1078
Cancelled	5003	1117
Cancelled	5004	1120
Cancelled	5005	1137
Pending	5006	1162
Pending	5007	1076
Cancelled	5008	1035
Cancelled	5009	1001
Cancelled	5010	1040
Pending	5011	1064
Cancelled	5012	1150
Cancelled	5013	1060
Confirmed	5014	1064
Confirmed	5015	1093
Pending	5016	1072
Cancelled	5017	1011
Cancelled	5018	1105
Confirmed	5019	1014
Pending	5020	1060
Confirmed	5021	1030
Confirmed	5022	1035
Confirmed	5023	1165
Confirmed	5024	1005
Cancelled	5025	1083
Cancelled	5026	1123
Confirmed	5027	1078



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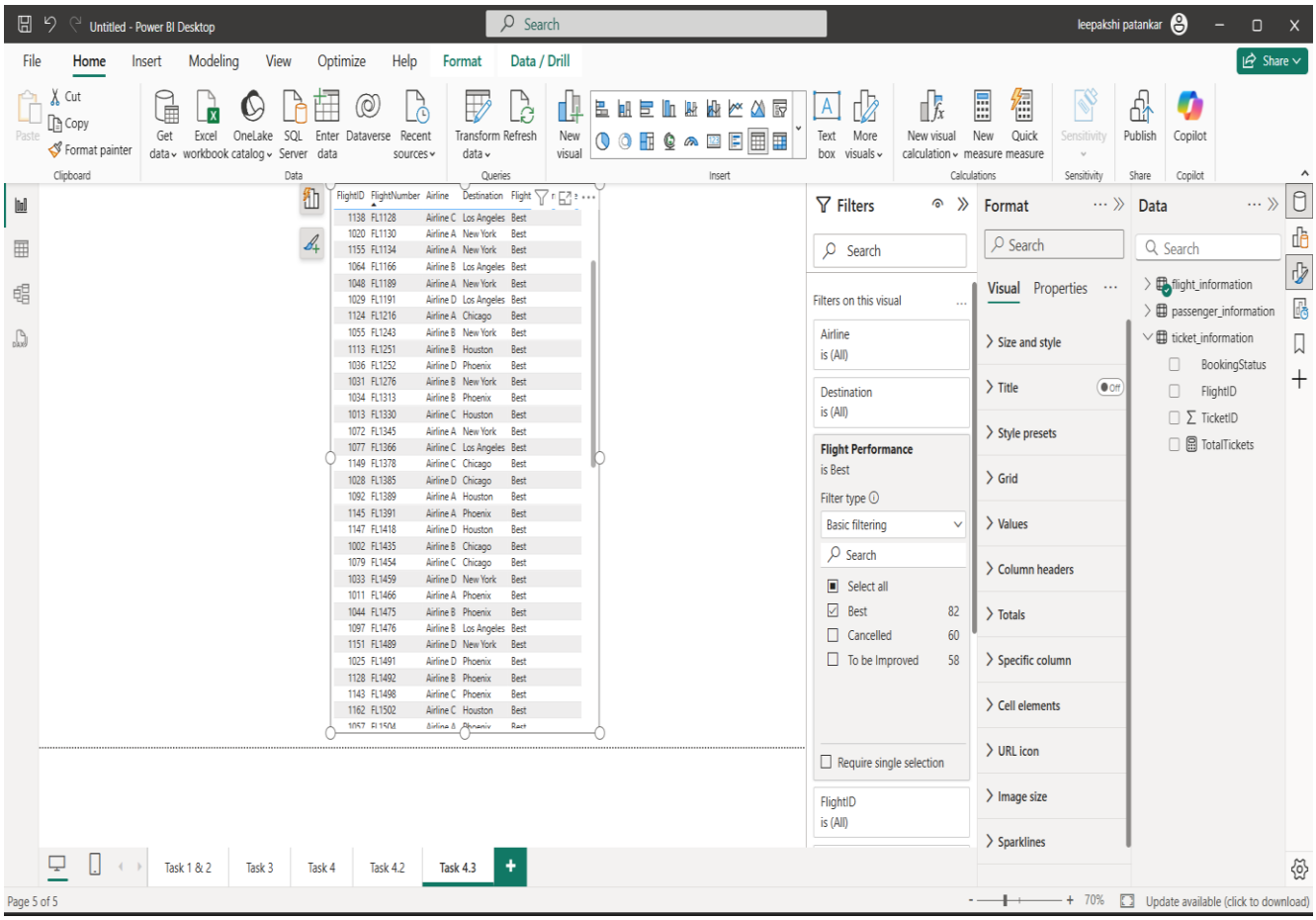
- Filtered table showing "Best" flights only.



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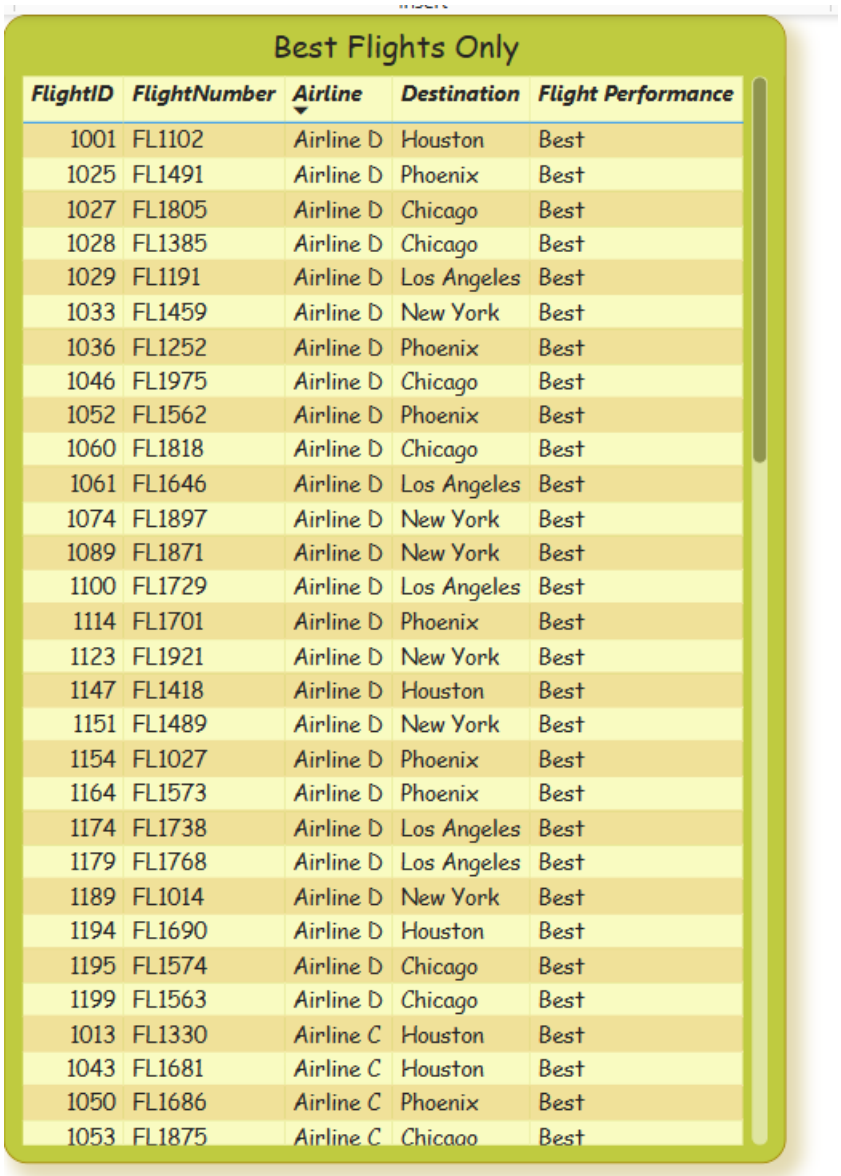
1. Used table visual to determine the flights with best only filter.



Best Flights Only

FlightID	FlightNumber	Airline	Destination	Flight Performance
1001	FL1102	Airline D	Houston	Best
1025	FL1491	Airline D	Phoenix	Best
1027	FL1805	Airline D	Chicago	Best
1028	FL1385	Airline D	Chicago	Best
1029	FL1191	Airline D	Los Angeles	Best
1033	FL1459	Airline D	New York	Best
1036	FL1252	Airline D	Phoenix	Best
1046	FL1975	Airline D	Chicago	Best
1052	FL1562	Airline D	Phoenix	Best
1060	FL1818	Airline D	Chicago	Best
1061	FL1646	Airline D	Los Angeles	Best
1074	FL1897	Airline D	New York	Best
1089	FL1871	Airline D	New York	Best
1100	FL1729	Airline D	Los Angeles	Best
1114	FL1701	Airline D	Phoenix	Best
1123	FL1921	Airline D	New York	Best
1147	FL1418	Airline D	Houston	Best
1151	FL1489	Airline D	New York	Best
1154	FL1027	Airline D	Phoenix	Best
1164	FL1573	Airline D	Phoenix	Best
1174	FL1738	Airline D	Los Angeles	Best
1179	FL1768	Airline D	Los Angeles	Best
1189	FL1014	Airline D	New York	Best
1194	FL1690	Airline D	Houston	Best
1195	FL1574	Airline D	Chicago	Best
1199	FL1563	Airline D	Chicago	Best
1013	FL1330	Airline C	Houston	Best
1043	FL1681	Airline C	Houston	Best
1050	FL1686	Airline C	Phoenix	Best
1053	FL1875	Airline C	Chicago	Best

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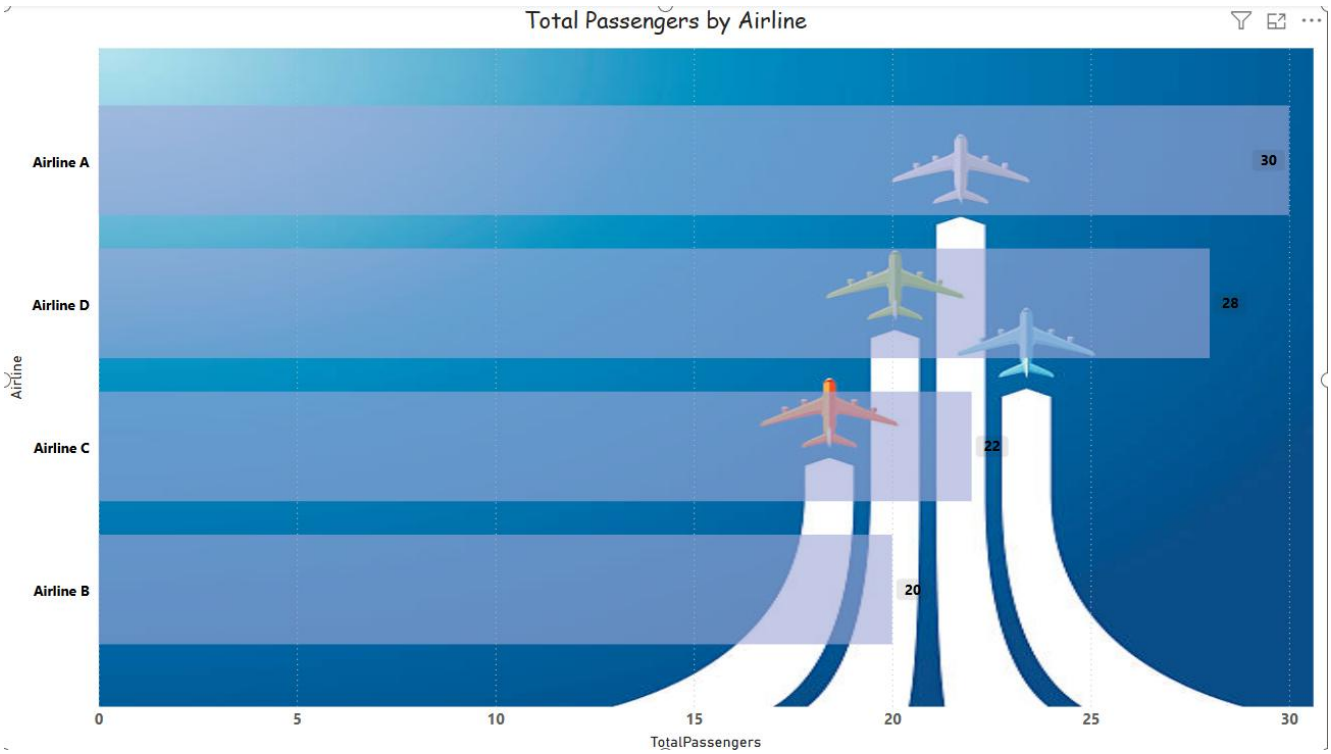
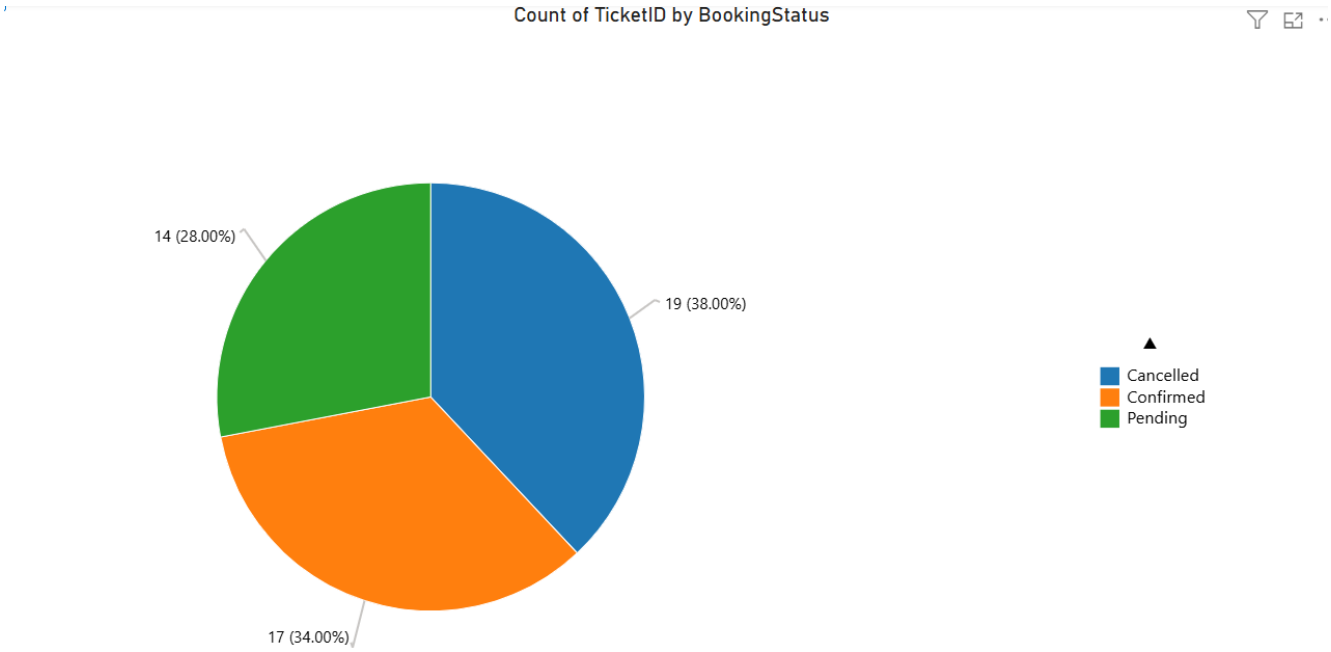
5. Visualization and Interactive Features

- Passenger count by airline.



- Ticket booking statuses.



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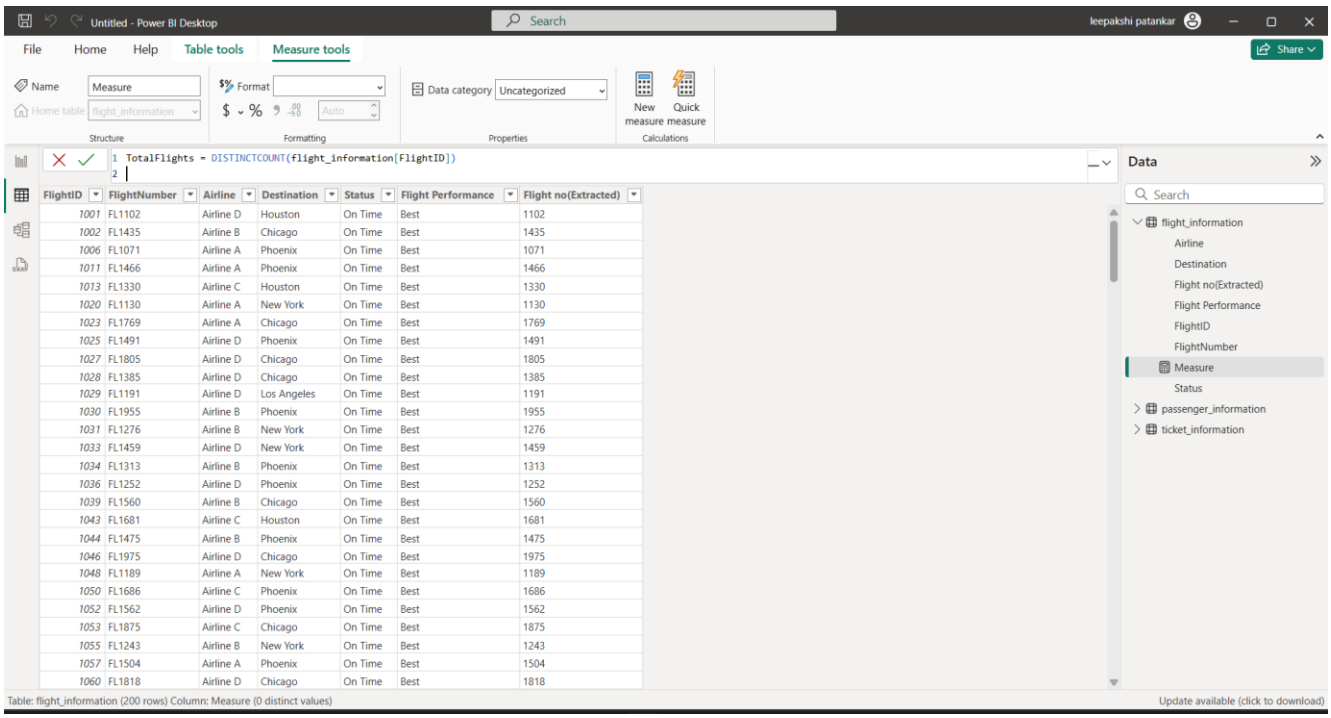
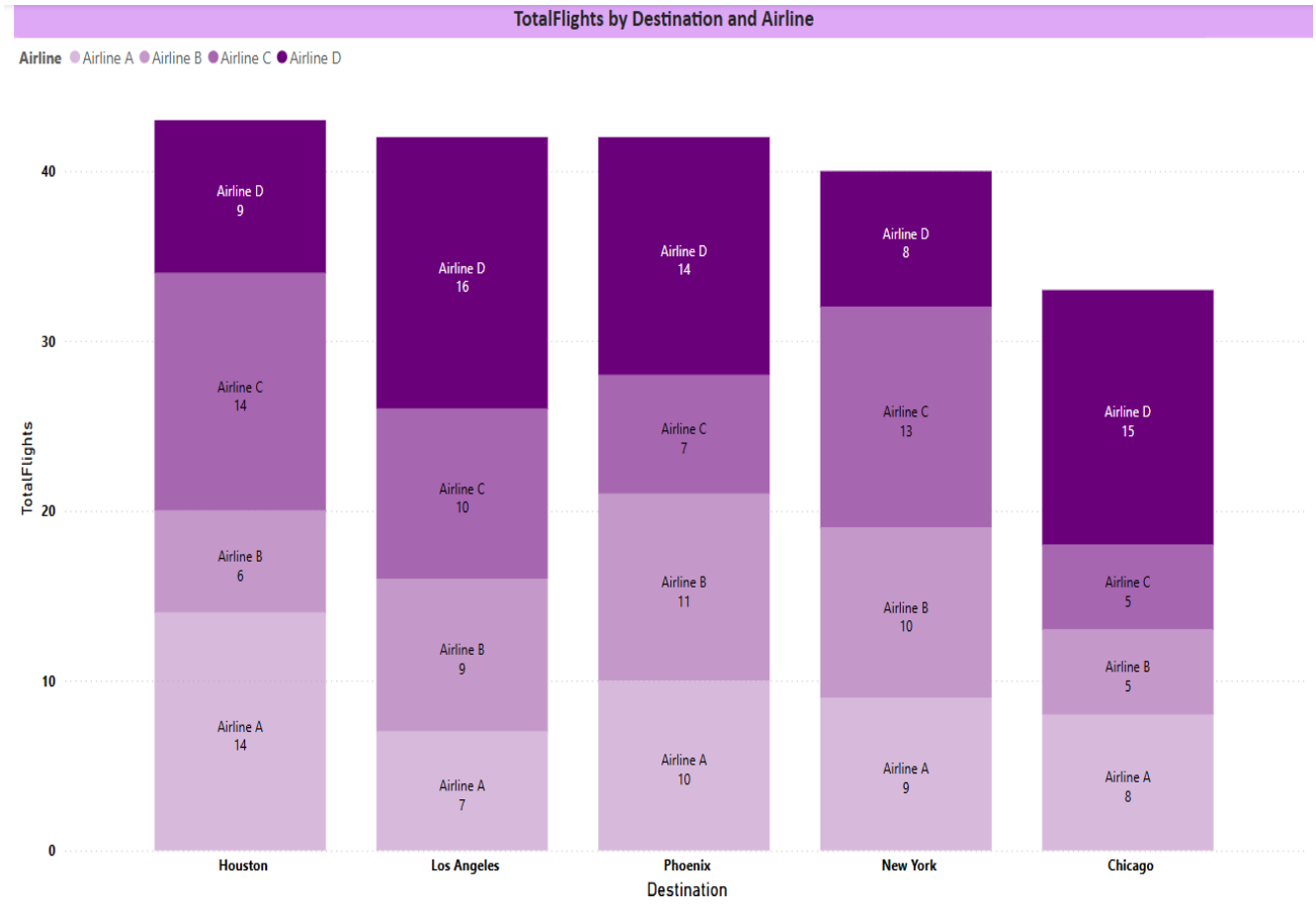
- Flights by airline and destination.

Formula: TotalFlights = DISTINCTCOUNT(flight_information[FlightID])





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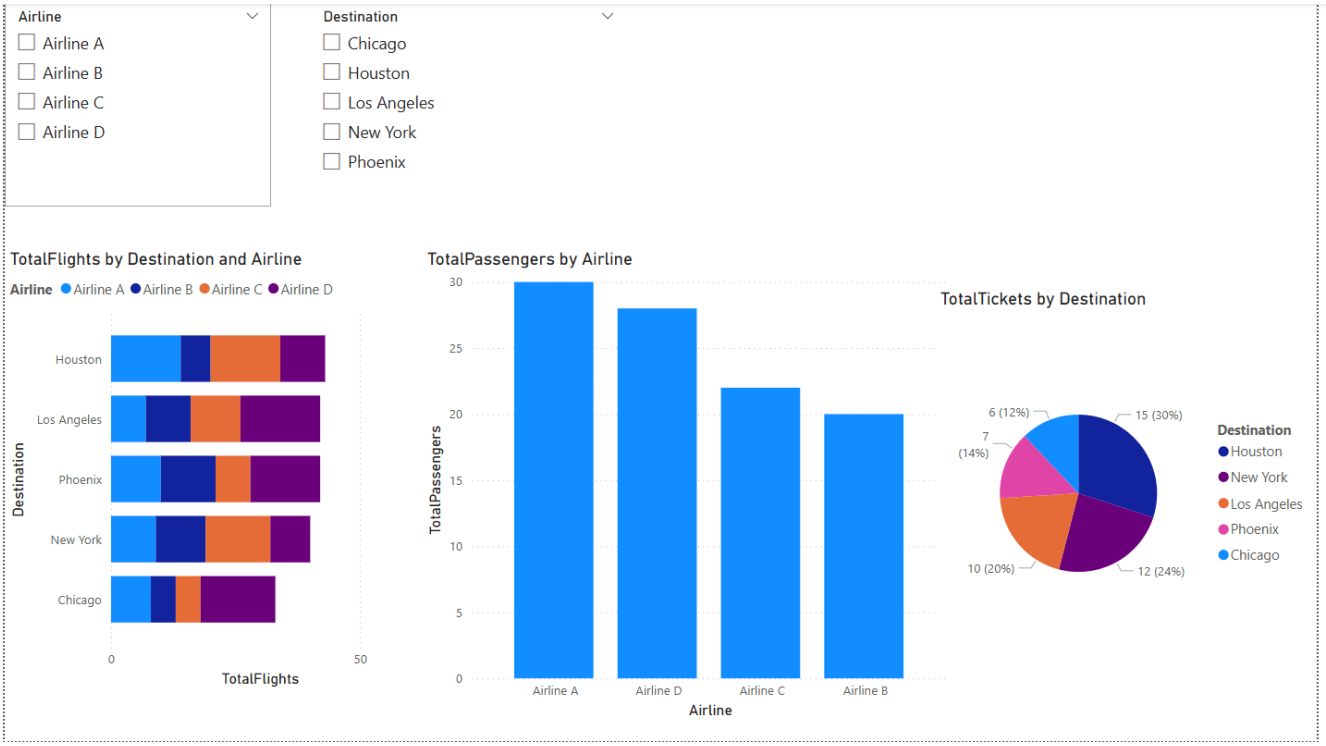
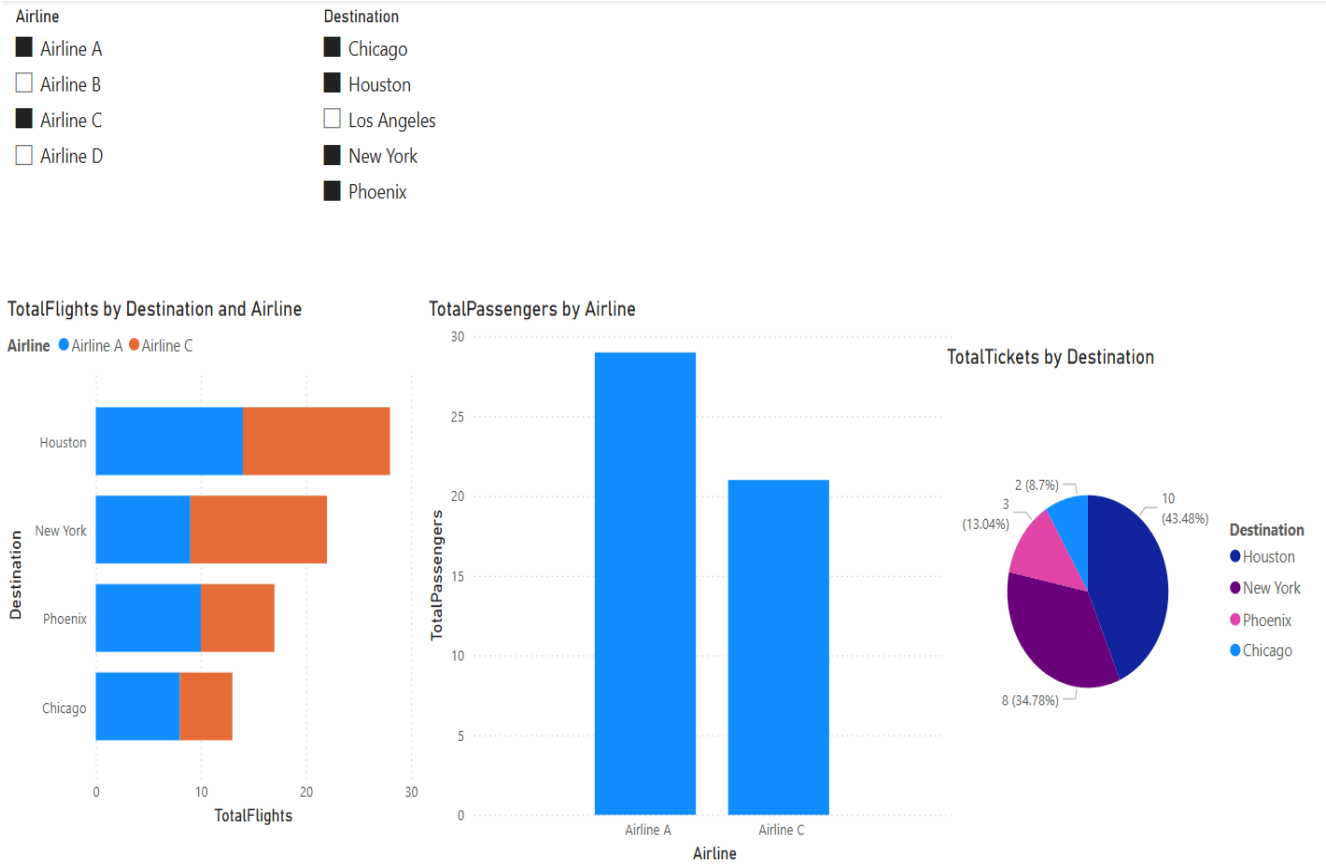
- Destination and Airline.





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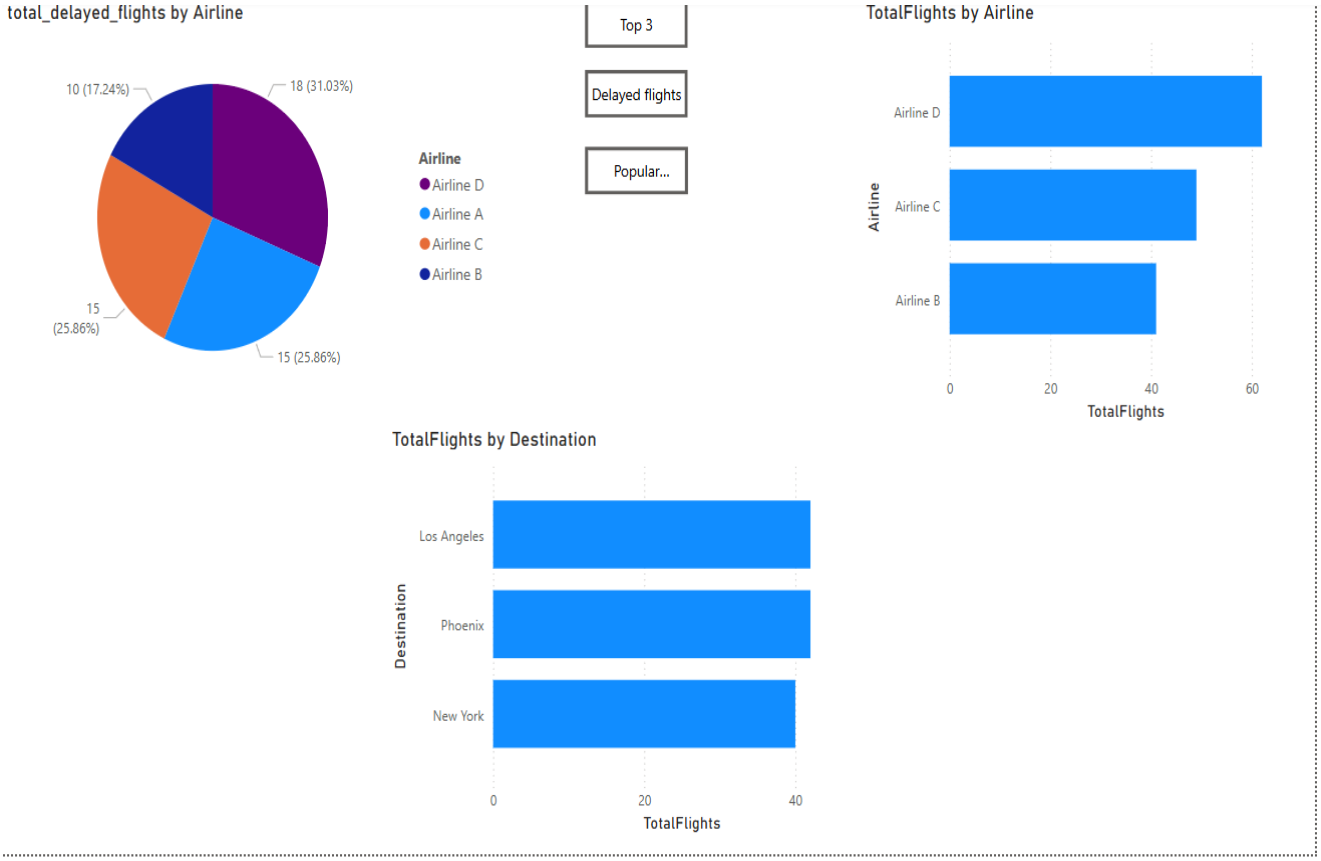
- Quick views.



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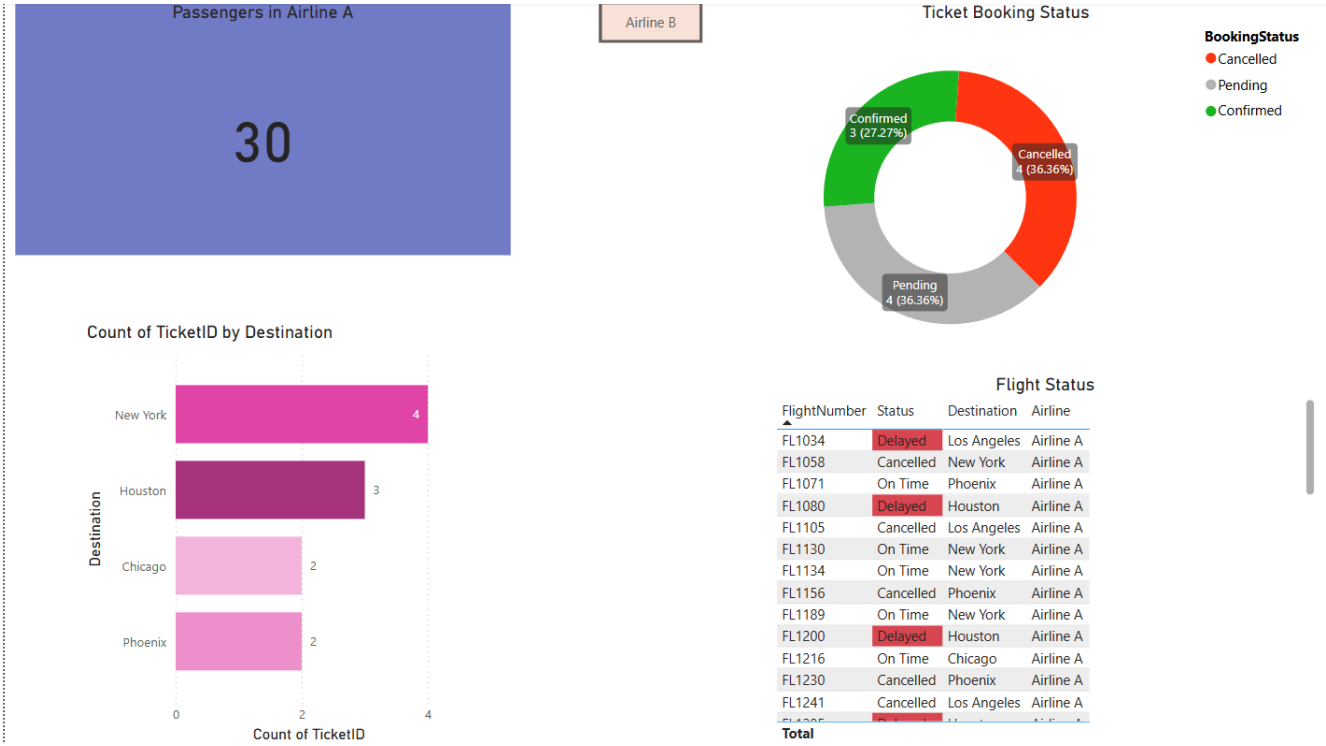
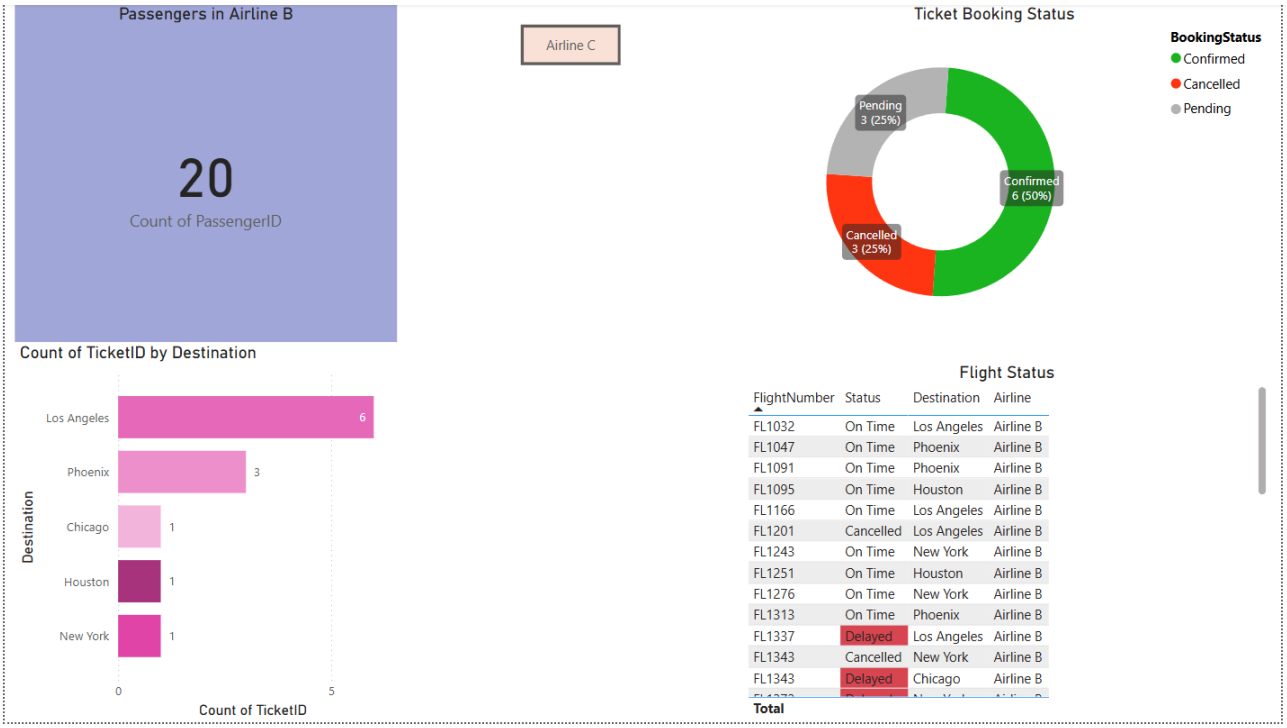
- Airline-specific pages.

Airline A



Airline B



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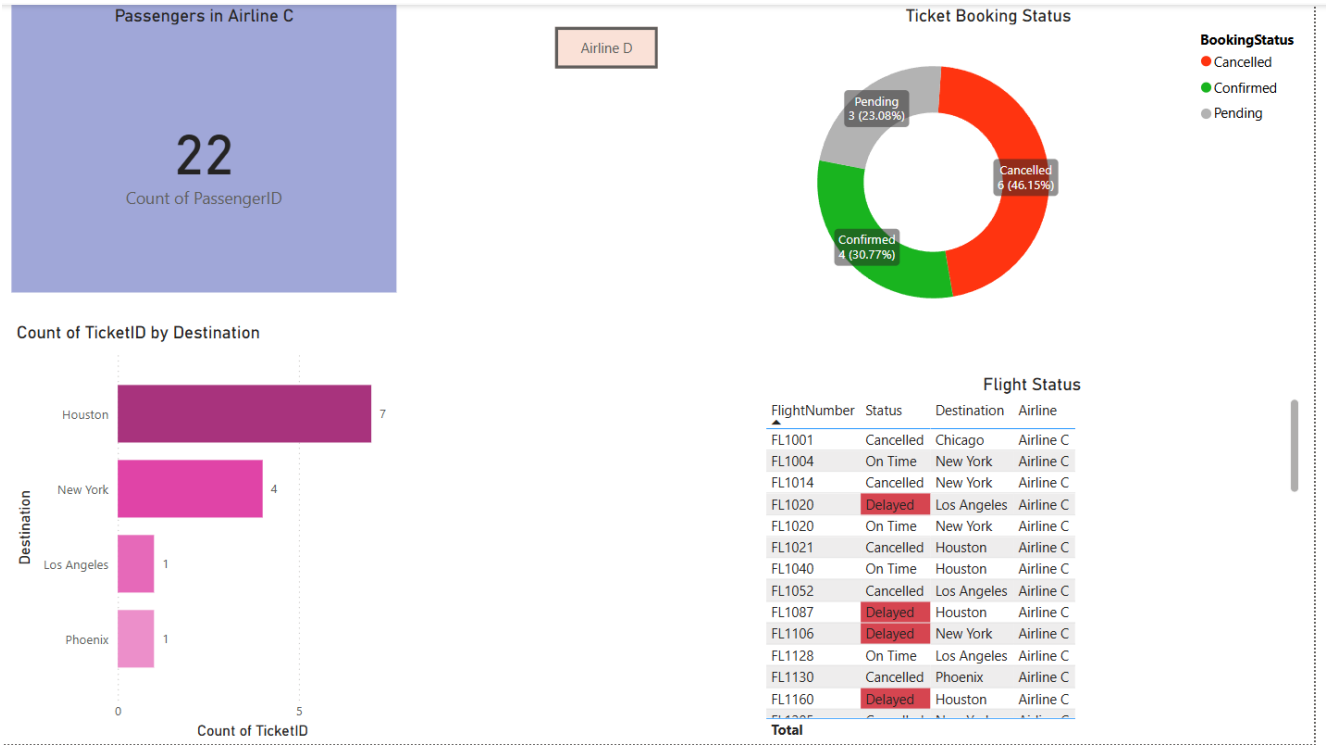
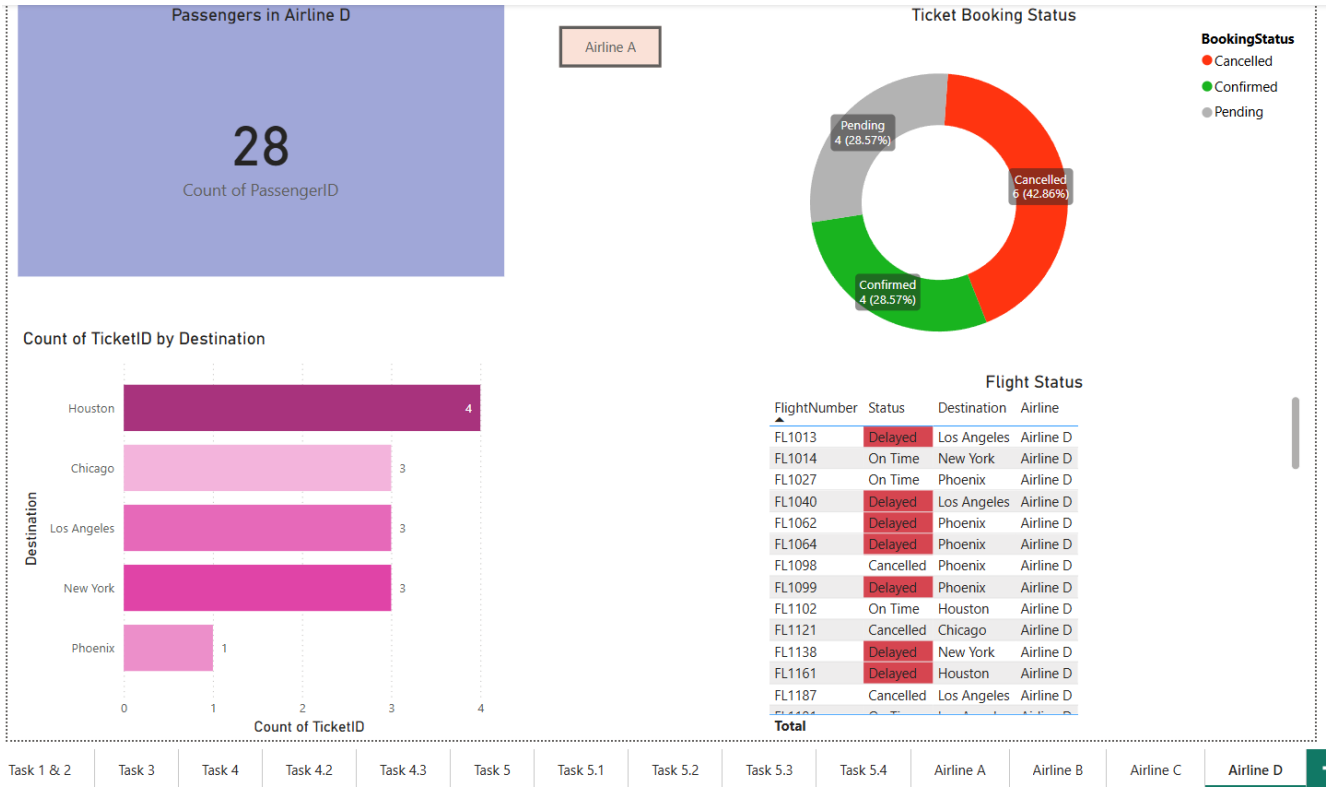
Airline C



Airline D



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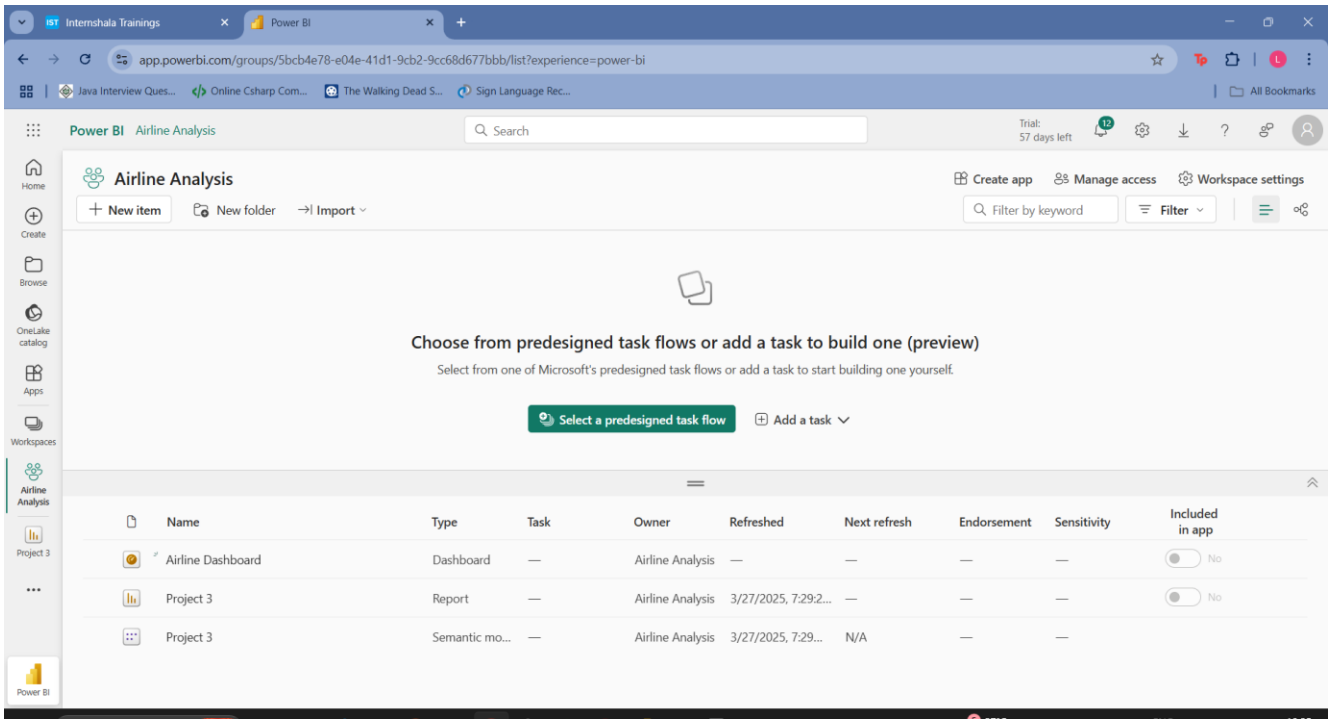
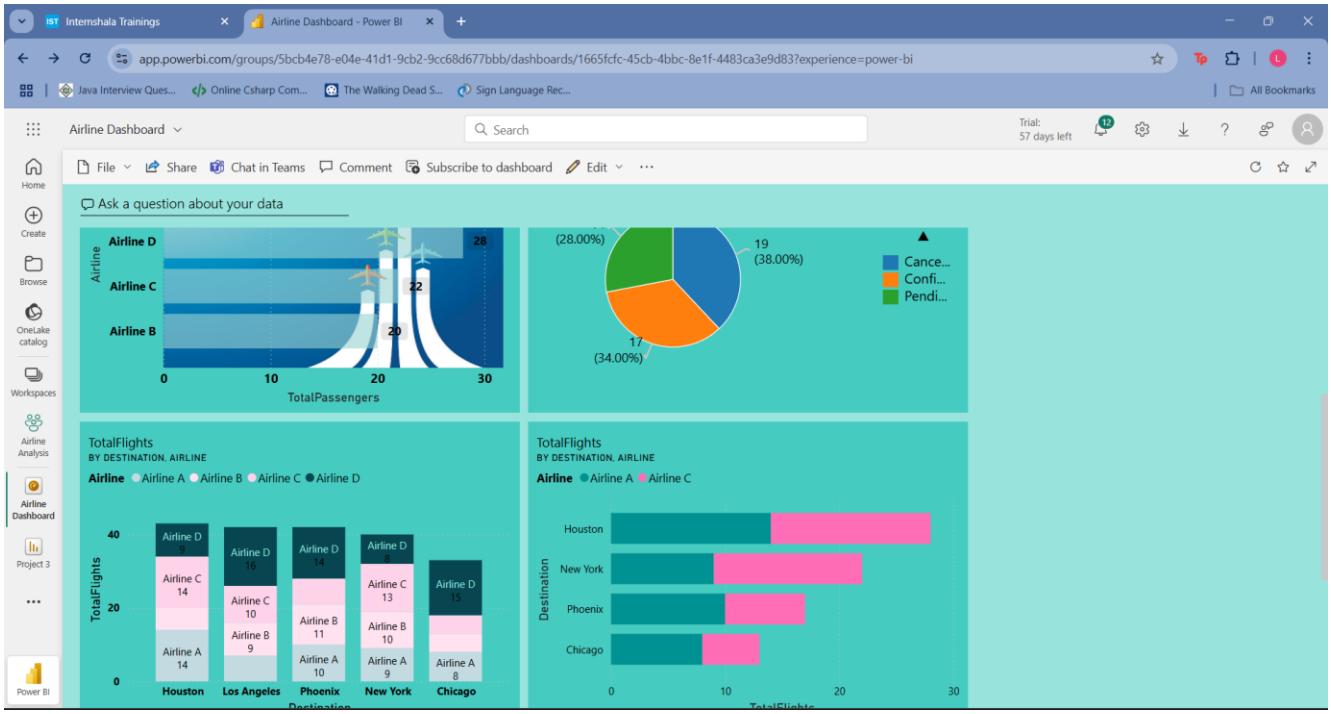
6. Final Dashboard and Power BI Service





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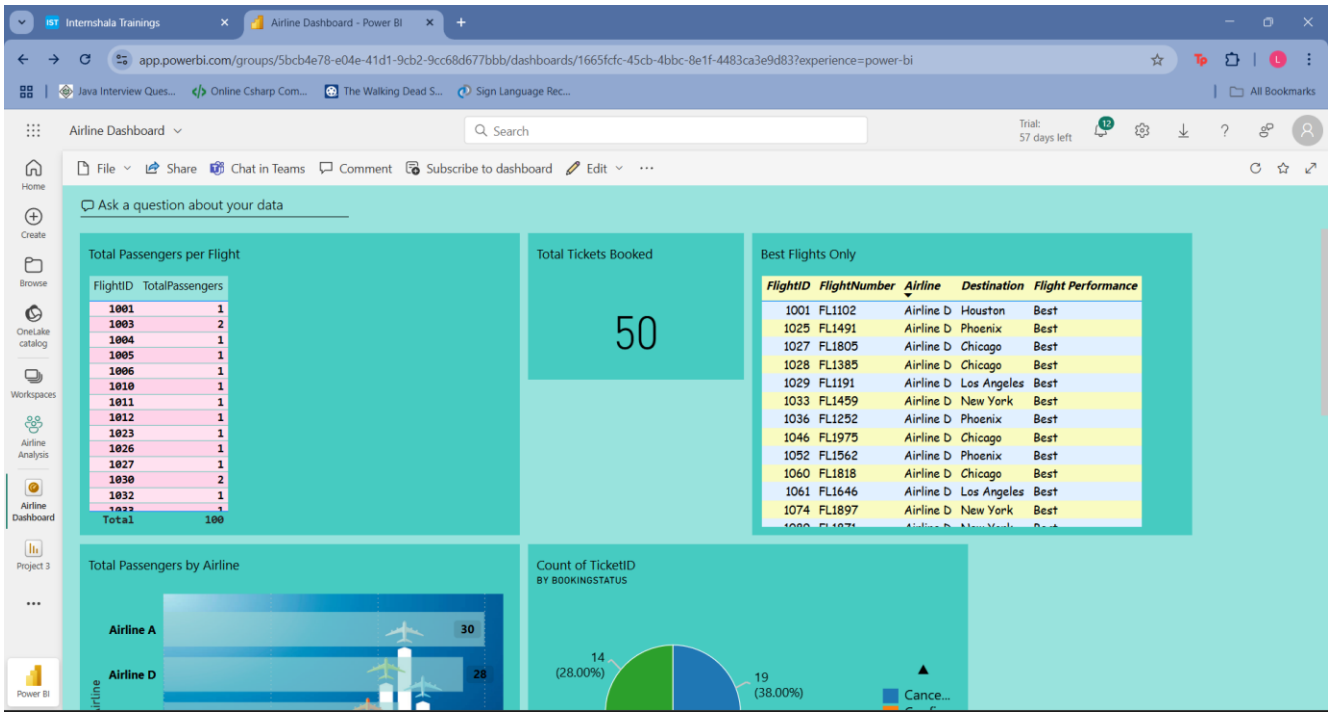
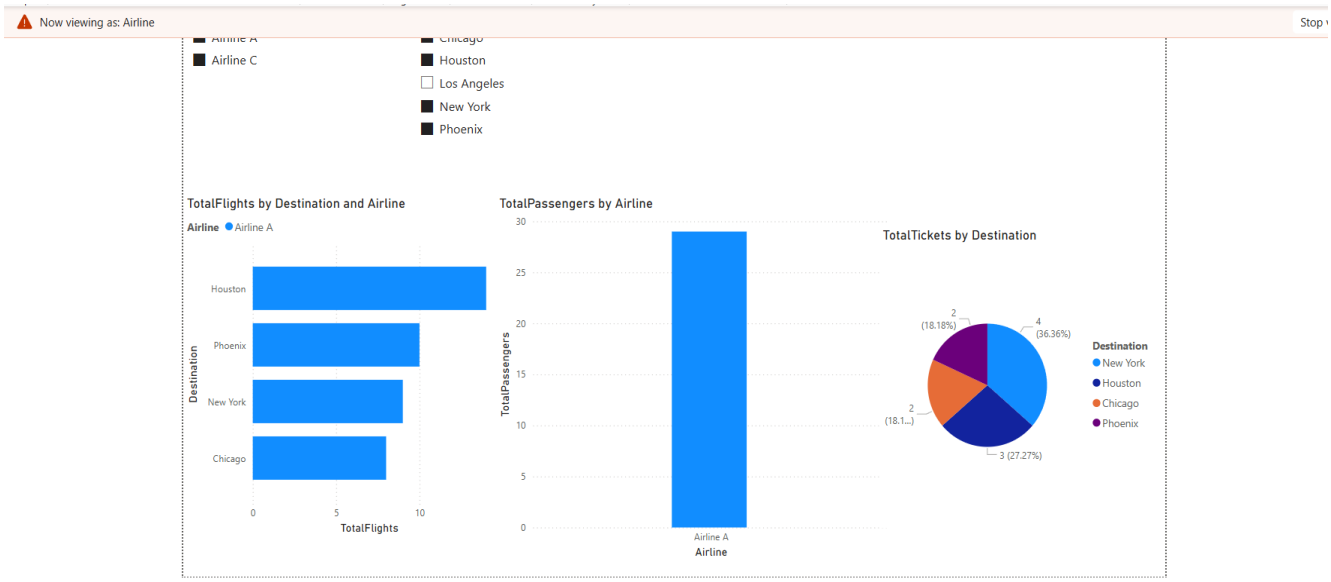


Row-Level Security for Airline A data



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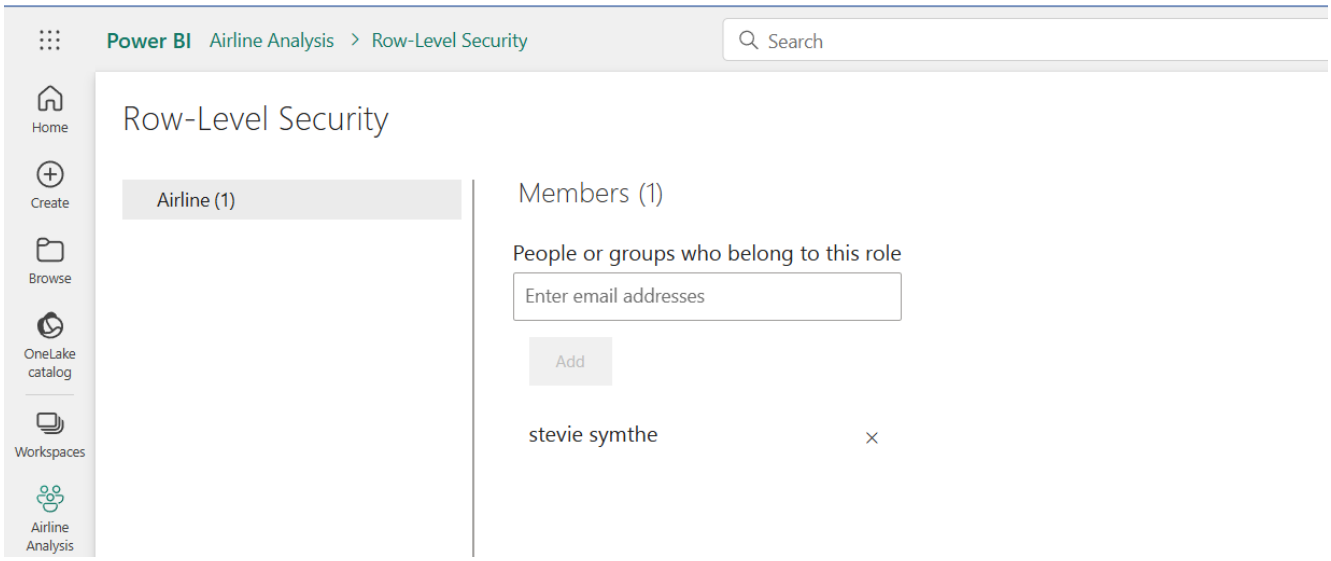

Set up a schedule refresh at 5 PM daily