**DAX Measures Analysis**

Formulas used in the analysis.

**I. Basic Counts and Averages**

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| **Measure Name** | **DAX Formula** | **Description** |
| Total Airline | COUNTROWS(VALUES(airlines[IATA\_CODE])) | Counts the distinct number of airlines based on the IATA\_CODE. |
| Total Airport | COUNTROWS(VALUES(airports[AIRPORT])) | Counts the distinct number of airports. |
| Average Air Time | AVERAGE('flights'[ELAPSED\_TIME]) | Calculates the average elapsed time of flights. |
| Average Delay Time | CALCULATE(AVERAGE(flights[DEPARTURE\_DELAY]), flights[DEPARTURE\_DELAY] > 0) | Calculates the average departure delay, considering only delays greater than 0. |
| Average Distance | AVERAGE('flights'[DISTANCE]) | Calculates the average flight distance. |
| Total Air Time | SUM('flights'[ELAPSED\_TIME]) | Calculates the total elapsed time of all flights. |
| Total Delay | SUM('flights'[ARRIVAL\_DELAY]) | Calculates the total arrival delay of all flights. |
| Total Distance | SUM('flights'[DISTANCE]) | Calculates the total distance of all flights. |
| Total Flights | COUNTROWS('flights') | Counts the total number of flights (rows in the flights table). This is the correct way to count all flights. |

**II. Cancellation-Related Measures**

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| **Measure Name** | **DAX Formula** | **Description** |
| Cancellation Reason Description | SWITCH(TRUE(), NOT ISBLANK('flights'[CANCELLATION\_REASON]), SWITCH(TRUE(), 'flights'[CANCELLATION\_REASON] = "A", "Airline/Carrier", 'flights'[CANCELLATION\_REASON] = "B", "Weather", 'flights'[CANCELLATION\_REASON] = "C", "National Air System", 'flights'[CANCELLATION\_REASON] = "D", "Security", "Not Cancelled"), "Not Cancelled") | Creates a descriptive cancellation reason based on the CANCELLATION\_REASON code. Handles blank values as "Not Cancelled". |
| Cancellations Due To Airline/Carrier | CALCULATE(COUNTROWS(flights), flights[Cancellation Reason Description] = "Airline/Carrier") | Counts the number of cancellations due to the airline/carrier. |
| Cancellations Due To Airline/Carrier % | DIVIDE([Cancellations Due To Airline/Carrier], [Flight Volume]) \* 100 | Calculates the percentage of cancellations due to the airline/carrier relative to the total flight volume. |
| Cancellations Due To Weather | CALCULATE(COUNTROWS(flights), flights[Cancellation Reason Description] = "Weather") | Counts the number of cancellations due to weather. |
| Cancellations Due To Weather % | DIVIDE([Cancellations Due To Weather], [Flight Volume]) \* 100 | Calculates the percentage of cancellations due to weather relative to the total flight volume. |
| Cancelled Flights | CALCULATE(COUNTROWS(flights), flights[Cancelled] = TRUE()) | Counts the total number of cancelled flights. |
| Cancelled Flight % | DIVIDE([Cancelled Flights], [Flight Volume], 0) \* 100 | Calculates the percentage of cancelled flights relative to the total flight volume. |
| Delay\_A | CALCULATE(COUNTROWS('flights'), 'flights'[CANCELLATION\_REASON] = "A") | Counts the number of cancellations due to reason "A" (which is mapped to "Airline/Carrier" in the Cancellation Reason Description measure). |
| Delay\_A % (of Cancelled Flights) | DIVIDE([Delay\_A], CALCULATE(COUNTROWS('flights'), NOT(ISBLANK('flights'[cancellation\_reason]))), 0) \* 100 | Calculates the percentage of cancellations due to reason "A" relative to the total number of *cancelled* flights. |
| Overall Cancelled Flight % | CALCULATE(DIVIDE(CALCULATE(COUNTROWS('flights'), NOT ISBLANK('flights'[CANCELLATION\_REASON])), COUNTROWS('flights'), 0), ALL('flights'[AIRLINE])) | Calculates the overall percentage of cancelled flights across all airlines. This is redundant if flights[Cancelled] is equivalent to NOT ISBLANK('flights'[CANCELLATION\_REASON]). Use Cancelled Flight % instead. |

**III. Delay-Related Measures**

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| **Measure Name** | **DAX Formula** | **Description** |
| Delayed Flights | CALCULATE(COUNTROWS('flights'), 'flights'[ARRIVAL\_TIME] > 'flights'[SCHEDULED\_ARRIVAL]) | Counts the number of delayed flights (where arrival time is later than scheduled arrival). |
| Delayed Flight % | DIVIDE(CALCULATE(COUNTROWS('flights'), 'flights'[ARRIVAL\_TIME] > 'flights'[SCHEDULED\_ARRIVAL]), COUNTROWS('flights'), 0) \* 100 | Calculates the percentage of delayed flights relative to the total number of flights. |
| Departure Delays | CALCULATE(COUNT(flights[YEAR]), flights[DEPARTURE\_DELAY] > 0) | Counts the number of flights with a departure delay greater than 0. |
| Departure Delays From Boston | VAR AirportShortCode = CALCULATE(DISTINCT(airports[IATA\_CODE]), airports[CITY] = "Boston") var TotalDelays = CALCULATE(COUNT(flights[YEAR]), flights[DEPARTURE\_DELAY] > 0, flights[ORIGIN\_AIRPORT] = AirportShortCode) RETURN TotalDelays | Counts the number of departure delays from Boston. |
| Departure Delays From Boston % | DIVIDE([Departure Delays From Boston], [Flight Volume]) | Calculates the percentage of departure delays from Boston relative to total flight volume. |
| Overall Delayed Flight % | CALCULATE(DIVIDE(CALCULATE(COUNTROWS('flights'), 'flights'[ARRIVAL\_TIME] > 'flights'[SCHEDULED\_ARRIVAL]), COUNTROWS('flights'), 0), ALL('flights'[AIRLINE])) | Calculates the overall percentage of delayed flights across all airlines. This is redundant. Use Delayed Flight % if you are not filtering by airline, or create a separate measure that removes the month filter if that's the desired context. |
| Overall Delayed Flight % by Month | CALCULATE(DIVIDE(CALCULATE(COUNTROWS('flights'), 'flights'[ARRIVAL\_TIME] > 'flights'[SCHEDULED\_ARRIVAL]), COUNTROWS('flights'), 0), ALL('flights'[AIRLINE])) | Effectively the same as Overall Delayed Flight % as the airline filter is removed. Only the month context is preserved. Redundant if you only want the overall percentage. |