1. **Which destination city has the most capacity, in terms of seats, coming from Pittsburgh? Does it also have the most flights? Does it have the largest average flight capacity/seats?**

The destination city with the most capacity in terms of seats coming from Pittsburgh International Airport is New York. It has a count of 26 flights and an average of 81 seats per flight.

However, New York does not have the most flights. The city with the most flights from Pittsburgh International Airport is Chicago, with a count of 13 flights.

In terms of the largest average flight capacity or seats, Orlando has the highest average with 169 seats per flight. This means that, on average, flights to Orlando from Pittsburgh International Airport have the largest capacity in terms of seats.

1. **The Pittsburgh International Airport as it is today was built with the expectation that it would serve as a hub for US Airways. US Airways merged with American Airlines in 2013. How does American Airlines’ activity at Pittsburgh International Airport compare with other major flag carriers, Delta and United in terms of flights, destinations, and capacity?**

American Airlines has a significant presence at Pittsburgh International Airport compared to Delta and United in terms of flights, destinations, and capacity.

* Flights: American Airlines operates 33 flights, which is more than Delta's 25 flights and United's 21 flights. It indicates that American Airlines has a higher frequency of flights at the airport.
* Destinations: American Airlines serves 10 destinations from Pittsburgh International Airport, which is more than Delta's 8 destinations and United's 7 destinations. This suggests that American Airlines offers a wider range of travel options to passengers.
* Capacity: The average number of seats per flight for American Airlines is 107, which falls between Delta's 94 seats and United's 105 seats. While American Airlines may have a slightly lower average seat count, it still indicates a substantial capacity for passengers.

Overall, American Airlines has a greater number of flights, serves more destinations, and maintains a comparable capacity compared to Delta and United at Pittsburgh International Airport. This suggests that American Airlines has a stronger presence and a more extensive operation at the airport, possibly stemming from its historical association with the airport as a former hub for US Airways.

1. **Are there differences in the pattern of departure times for flights to airline hubs versus non-hub destination airports? Explain the relationship.**

we can observe some differences in the pattern of departure times for flights to airline hubs versus non-hub destination airports:

* Peak Departure Times: Flights to hub airports have their peak departure time at 6 AM, while flights to non-hub airports have their peak departure time at 6 PM. This suggests that the most popular time for flights to hub airports is in the morning, possibly catering to business travelers or connecting flights. On the other hand, flights to non-hub airports see more departures in the evening, which might indicate leisure or non-business travel.
* Departure Time Distribution: Flights to hub airports exhibit a relatively consistent number of departures throughout the day, with a gradual decline in the evening. In contrast, flights to non-hub airports show more variation in departure times, with several time slots having no departures. This suggests that flights to hub airports may follow a more structured schedule, whereas flights to non-hub airports may be less frequent and more irregularly timed.

Overall, the data implies that flights to airline hubs follow a more defined pattern with a concentration of departures in the morning, while flights to non-hub airports have a less predictable schedule with a higher number of departures in the evening. These differences likely stem from the different demands, destinations, and flight connections associated with hub versus non-hub airports.

1. **Delta Airlines serves all of its domestic hub airports from Pittsburgh except for Seattle and Salt Lake City. If approaching Delta Airlines about a new flight to serve one of these other hubs, which would you prefer and what time of day would you propose for the departure?**

Delta Airlines serves all of its domestic hub airports from Pittsburgh except for Seattle and Salt Lake City. If approaching Delta Airlines about a new flight to serve one of these other hubs, it would be beneficial to propose a flight to Seattle or Salt Lake City.

For the departure time, it would be ideal to consider the time slots with higher numbers of flights to maximize connectivity options for passengers. Looking at the insight by hub/non-hub, we can see that 7 AM, 10 AM, and 4 PM have relatively higher numbers of flights departing from hub airports.

Considering these factors, a proposal for a new flight from Pittsburgh International Airport to Seattle or Salt Lake City on Delta Airlines could be made for departure at either 7 AM, 10 AM, or 4 PM. This would align with existing flight patterns and provide passengers with convenient departure options for connecting to other destinations within Delta's network.

1. **Pittsburgh is an international airport. On an average weekday, how many international flights depart from Pittsburgh? Of the 14,556 commercial aircraft seats departing from Pittsburgh every day, what percent are going to international destinations?**

To determine the average number of international flights departing from Pittsburgh International Airport on an average weekday, we need to examine the provided insights. From the insights, we can see that the flights are listed with their respective airports, the count of flights, and the average number of seats.

To calculate the average number of international flights departing from Pittsburgh International Airport, we need to sum up the counts of flights for the international destinations.

International flights departing from Pittsburgh International Airport:

* Baltimore/Washington International Thurgood Marshall Airport: 4 flights
* Charleston International Airport: 1 flight
* George Bush Intercontinental Airport: 3 flights
* Harry Reid International Airport: 2 flights
* John F. Kennedy International Airport: 5 flights
* LaGuardia Airport: 14 flights
* Logan International Airport: 6 flights
* Los Angeles International Airport: 1 flight
* Miami International Airport: 1 flight
* Newark Liberty International Airport: 7 flights
* O'Hare International Airport: 8 flights
* San Francisco International Airport: 1 flight
* Seattle-Tacoma International Airport: 2 flights
* Theodore Francis Green Memorial State Airport: 1 flight
* Washington Dulles International Airport: 4 flights

Total count of international flights = 4 + 1 + 3 + 2 + 5 + 14 + 6 + 1 + 1 + 7 + 8 + 1 + 2 + 1 + 4 = 60 flights

Now, to calculate the percentage of international seats out of the total commercial aircraft seats departing from Pittsburgh International Airport, we need to sum up the average number of seats for international flights.

Average number of seats for international flights departing from Pittsburgh International Airport:

* Baltimore/Washington International Thurgood Marshall Airport: 4 flights \* 167 seats = 668 seats
* Charleston International Airport: 1 flight \* 118 seats = 118 seats
* George Bush Intercontinental Airport: 3 flights \* 147 seats = 441 seats
* Harry Reid International Airport: 2 flights \* 179 seats = 358 seats
* John F. Kennedy International Airport: 5 flights \* 76 seats = 380 seats
* LaGuardia Airport: 14 flights \* 75 seats = 1050 seats
* Logan International Airport: 6 flights \* 92 seats = 552 seats
* Los Angeles International Airport: 1 flight \* 182 seats = 182 seats
* Miami International Airport: 1 flight \* 128 seats = 128 seats
* Newark Liberty International Airport: 7 flights \* 96 seats = 672 seats
* O'Hare International Airport: 8 flights \* 118 seats = 944 seats
* San Francisco International Airport: 1 flight \* 179 seats = 179 seats
* Seattle-Tacoma International Airport: 2 flights \* 178 seats = 356 seats
* Theodore Francis Green Memorial State Airport: 1 flight \* 118 seats = 118 seats
* Washington Dulles International Airport: 4 flights \* 68 seats = 272 seats

Total number of seats for international flights = 668 + 118 + 441 + 358 + 380 + 1050 + 552 + 182 + 128 + 672 + 944 + 179 + 356 + 118 + 272 = 6178 seats

Percentage of international seats out of total seats = (6178 seats / 14556 seats) \* 100%

Percentage of international seats = (6178 / 14556) \* 100 ≈ 42.5%

Therefore, on an average weekday, **approximately 42.5%** of the commercial aircraft seats departing from Pittsburgh International Airport are going to international destinations.

1. **Inspect the dataset. Are there any data quality issues (e.g., missing data, incorrect data)? Are there additional variables that would be helpful for investigating daily operations at Pittsburgh International Airport?**

Upon inspecting the dataset, there are a few data quality issues and missing data points:

1. Missing data: There are missing values in the dataset. For example, in some rows, the "Dep Time" column is empty or missing, and in some rows, the "Hub" column is empty or missing.
2. Inconsistent capitalization: The capitalization of the city names and aircraft models is inconsistent. Some city names are capitalized while others are not, and the same applies to aircraft models.
3. Incorrect data: There is a discrepancy in the "Seats" column for the aircraft "Canadair Regional Jet 900." In some rows, it is listed as 70 seats, while in others, it is listed as 76 seats.
4. Lack of additional variables: The dataset lacks additional variables that would be helpful for investigating daily operations at Pittsburgh International Airport. Some relevant variables that could be useful include:

* Flight duration: The duration of each flight, which could provide insights into the efficiency and timing of flights.
* Flight status: Whether the flight was on time, delayed, canceled, or rescheduled.
* Passenger load: The number of passengers on each flight, which could help analyze capacity and demand.
* Origin and destination airports: Including the IATA codes or full names of the airports for better tracking and analysis.
* Airline information: The airline operating each flight, which could provide insights into partnerships, alliances, and specific airline-related patterns.

Overall, the dataset provided is limited in terms of the variables available, and there are some data quality issues that need to be addressed before conducting a comprehensive analysis of daily operations at Pittsburgh International Airport.

1. **One of the visualizations developed was one of your choosing. Explain your thought process behind selecting and specifying the visualization type. Consider how the visualization type suits the included variables, the aggregation of the data (or if variables were disaggregated), the use of color and other marks, and how the visualization complements the others in the workbook. Also, explain the most important or interesting finding in this visualization.**

There are several factors to consider, such as the variables included, data aggregation, use of color and marks, and how the visualization complements the others in the workbook. Let's analyze each visualization and the thought process behind selecting them:

* **Visualization #1: Flight Flow Spider Map at Pittsburgh International Airport**

This visualization type, the Flight Flow Spider Map, is suitable for showcasing the flow of flights between different cities. It allows us to see the connections and the volume of flights between Pittsburgh and other cities. The visualization uses lines to represent the flight routes and the thickness of the lines to indicate the number of flights. The colors of the lines can be used to represent different airlines or flight categories.

The Flight Flow Spider Map complements the other visualizations by providing a geographic perspective on flight connections. It helps to understand the overall network of flights and identify the busiest routes. The most important finding in this visualization could be identifying the key cities with the highest flight volume to and from Pittsburgh International Airport.

* **Visualization #2: City Flight Statistics Table**

This visualization presents flight statistics for various cities, including the count of flights and average seat capacity. It is a tabular representation that provides a concise overview of flight activity to different destinations.

The City Flight Statistics Table complements the other visualizations by providing specific numerical values for the count of flights and average seat capacity. It allows for easy comparison between cities and highlights the most popular destinations based on flight count.

* **Visualization #3: Seats Capacity Density Map**

This visualization, the Seats Capacity Density Map, shows the distribution of seat capacity across different cities. It utilizes color to represent the intensity of seat capacity, allowing for a quick understanding of the busiest and less crowded destinations.

The Seats Capacity Density Map complements the other visualizations by providing insights into the seat capacity distribution across cities. It helps identify cities with high demand and potential overcrowding or cities with lower demand and available seat capacity. The most interesting finding in this visualization could be identifying the cities with the highest seat capacity, which may indicate popular or significant destinations.

* **Visualization #4: Hourly Flight Departure Comparison Chart by Hub / Non-hub - Line Chart**

This visualization type, the Hourly Flight Departure Comparison Chart, presents a line chart comparing the number of flight departures between hub and non-hub airports at different hours of the day. It shows the departure patterns and the difference in flight volumes between hub and non-hub airports.

The Hourly Flight Departure Comparison Chart complements the other visualizations by providing insights into the hourly departure patterns and the distinction between hub and non-hub airports. It helps understand the peak hours of flight activity and whether hub airports have higher departure frequencies compared to non-hub airports.

* **Visualization #5: Which Airline Operates the most Daily Flights from Pittsburgh International Airport?**

This visualization is a simple bar chart displaying the number of daily flights operated by different airlines from Pittsburgh International Airport. It allows for easy comparison and identification of the airline with the highest flight volume.

The bar chart complements the other visualizations by providing information on the airlines operating at Pittsburgh International Airport and their relative flight volumes. It helps identify the dominant airline and their market share based on daily flight operations.

The most important or interesting finding in each visualization would depend on the specific insights gained from analyzing the data. However, some potential interesting findings could include identifying the busiest flight routes, cities with high seat capacity, peak hours of flight activity, and the airline with the highest daily flight volume.

**Filters applied to the dashboard:**

To facilitate the exploration of operations at Pittsburgh International Airport, filters can be applied to the dashboard based on various parameters. Some possible filters include:

* Action Filters
* Airline filter: Users can filter the data based on airlines operating at Pittsburgh International Airport. This enables the analysis of individual airline performance, route distribution, and flight frequencies.

By applying these filters, users can customize the visualizations and delve deeper into specific aspects of the airport's operations, enabling a comprehensive exploration and analysis of the data.