Group 20: Application Description

***“In submitting this Assignment 2.1, I confirm that the work I am submitting is the exclusive work of the students in my group, and that I made an equal contribution to the work of the group. I confirm that my conduct during this Assignment 2.1 adheres to the Code of Behaviour on Academic Matters. I confirm that I did NOT act in such a way that would constitute cheating, misrepresentation, or unfairness, including but not limited to, using unauthorized aids and assistance, impersonating another person, and committing plagiarism. I pledge upon my honour that I have not violated the Faculty of Applied Science & Engineering’s Honour Code during this assessment.”***

An airline has decided that they want to improve their business model by both developing a more informed market strategy and understanding the internal workings of their company better. We have been hired to organize and connect data from across the business using a database management system. This is the data that we have chosen to include and the logic behind how our choices will best serve the airline in their areas of focus.

The top priority for any airline is the passengers they serve. Collecting information relating to name, age, and email are all important pieces of data for viewing demographics and reaching out to passengers directly. Each passenger can be uniquely identified by their passport number. However, for privacy reasons, we have created a corresponding passenger ID to use as a separate identifier for any administrative use.

To help you advertise flights that are most relevant to a given client (i.e. based on where they live), our database will link each passenger to their primary residence’s accessible airports. This link includes important information including city, country, and region for the airport and the postal code and languages spoken by the passenger.

To track your airline’s membership options, we included a start date, unique ID and points for each membership. This ID was necessary because adult passengers may share a membership with their children (i.e. share a single membership ID). Through extensive travel, a passenger can achieve premium status which comes with premium points that are tracked separately. To check if a passenger ever was a member, but is no longer, we track their prior membership status with a true/false flag. We also record the set of rewards that premium members have redeemed. Using our model, you will be able to evaluate the effectiveness of your different promotions and adjust accordingly.

Each booking contains a unique combination of a passenger, flight, and seat. An individual seat can be booked once per flight or multiple times across different flights. A single flight may have many bookings. Passengers can create multiple bookings. The date of each booking will be collected, helping you determine higher demand flight times and seats (which will likely be booked farther in advance) and adjust prices accordingly. We also know that there may be interest in partnering with credit card companies, especially those with their own promotions like air miles are already in place. To accommodate this, we save the card type used for each booking.

On a plane, there are different physical locations (middle, aisle, window, etc.) and service options (first class, economy, business, etc.). Our database model attaches these different factors to its associated seat code. Every seat must have an associated airplane (i.e. cannot be identified without its airplane). Not every airplane will have seats.

Every flight in our database model has its own flight ID and date when the flight will leave. Each flight is linked to the single airplane which will be used. New planes may have zero flights, but over their lifetime they may participate in many. Planes are identified by their unique airplane ID, and information about the airplane model is also recorded.

Of course, not all airplanes are made equal; some are used for passengers, some are private, and some are used by the military. Since your industry focuses on commercial flights, we narrowed down the airplane entity to only commercial flights (recording their specific brand) and their various subtypes.

Your airline owns only two subtypes of commercial airplanes: passenger planes and cargo planes. For passenger planes, we include information about the set of safety features that are offered for passengers (for example, the types of life vests, masks, etc.). For cargo planes, we record the capacities of commercial cargo they can carry. Planes can act as both cargo planes and passenger planes at the same time (i.e. carry cargo in addition to passengers).

Your airline has several fleets which can be identified by a unique fleet ID. If your airplanes belong to a fleet, they have been uniquely assigned to both that fleet and its corresponding manager. Using this combination of fleet ID and airplane ID, we track each plane’s engine type, fuel consumption, start date in the fleet, and its number within the fleet, ordered by how long they’ve been part of that fleet. One fleet will have many airplanes. If a fleet is small enough, it may have a single manager. Conversely, a bigger fleet may require several managers. Overall, fleet data can be used for coaching and management decisions; the airline can identify successful managers and encourage other managers to adopt the same tactics.

In the regular life cycle of a plane, a plane must be serviced. Each fleet can be serviced at multiple airports (if any), with different sets of available services and corresponding costs, overseen by a lead technician and their assistant. Our data model links each fleet to their corresponding servicing airport to help with the management of maintenance schedules. If you need more information about how a plane is serviced, you can contact the leading technician, whose names we have recorded.

Finally, our database includes information about the airports you use. Each airport has a unique airport ID that is associated with its IATA code. We are also tracking movements between airports by the unique combination of flight ID, departure airport and arrival airport (each flight will have a single corresponding departure and arrival airport). For these movements, we track the arrival time, departure time, time zone of each flight’s destination and the time of the first meal offered on the flight. Each airport can participate in no flights or many flights from your planes. This may help inform decisions for planning flight routes better, thus decreasing your costs.

We hope our database modelling system has simplified the ins and outs of air travel by streamlining your expansive data. Through informed marketing and business decisions, you will be able to lower costs and increase profits. We hope that the framework we’ve presented makes you feel more comfortable with the complexities of your industry, and allows you to more easily make the crucial decisions for the future of your company.