**IS 5201**

**Group Project**

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**Airline Demand Forecasting**

To develop forecast of final demand of a flight on a given departure date, an advance booking forecasting model is developed in function airlineForecast using Python. Advanced booking model can be grouped into additive method and multiplicative method. Our function uses both methods to make the prediction based on historical data and we monitor their performance by comparing their errors.

For given days prior to departure, additive method predicts the final demand by adding current bookings on hand to the expected remaining demand. For ease of implementing the models, days prior to departure are calculated and we obtain the remaining demand of each day prior by subtracting cumulative bookings from final demand. Considering the fact that historical booking patterns vary a lot by departure day of week, we group all remaining demands by days prior and also day of week for more accurate estimation, then use simple average to obtain the forecasted remaining booking demand for each days prior. The cumulative booking on hand is added to the forecasted remaining demand to get the forecast of final demand of a given days prior.

Multiplicative method considers future bookings are proportional to current reservations. Booking rate of each days prior and departure day is obtained first by dividing cumulative bookings over final demand. We then calculate the simple average booking rate by days prior and day of week. Forecast of final demand is obtained by dividing the cumulative booking on hand by the average booking ratio.

To evaluate the accuracy of either model, we calculated MASE which is the total absolute forecast error divided by total absolute naïve error. Our function will pick and return the result of the estimation method with a lower MASE since a lower MASE means less forecasting error compared to naïve forecast, or higher precision.