

Simulation Case Study

Airline Check-In Counter

Concepts Introduced

- Discrete event simulation
 - Random distributions
 - Staffing allocation
 - Wait time optimization
 - Capacity planning
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Introduction

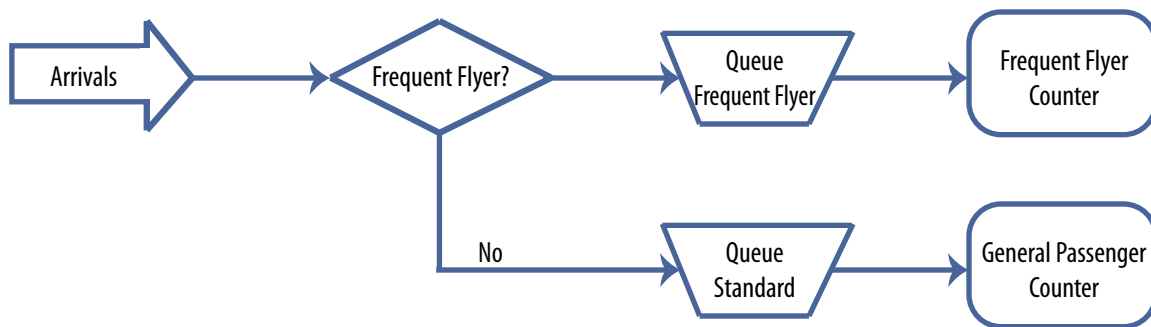
At the foot of the Great Smoky Mountains, there is an airport frequently used by business travelers and vacationers alike. The airport is distinctly decorated with artifacts and memorabilia from the surrounding area. It is an efficiently run transportation hub with a welcoming southern ambience. When one steps into the terminal, it is like hiking one of the national forest's many trails with its lush trees and vegetation serving as a backdrop for the wild animals on display.

Lilly, the manager at the *SkyReliance Airlines* ticket counter, is trying to improve customer service by minimizing passenger check-in wait times. She understands that the best way to approach this task is by building a simulation model of the process and then testing the proposed changes. Lilly feels certain that adding staff will reduce passenger wait times, but she does not know by how much and whether the reduction is worth the cost of the additional staff.

Current Process

The SkyReliance passengers arrive randomly at the ticketing counter from 5 am until 9 pm. each day. Their arrival is a poisson arrival process and can be modeled using an exponential distribution function with a mean of 0.5 minutes between arrivals.

As passengers arrive, an agent greets them and directs them to the appropriate ticket counter line. SkyReliance Frequent Flyer passengers, who make up 20% of the airline’s travelers, have a separate line with ticketing agents dedicated to serving only them. All other passengers go to the general passenger ticket counter line. The current process is illustrated in the following flow chart:



Once passengers progress through the line to the counter, they present their Identification to the ticketing agent who checks them in and prints their boarding passes. If a passenger has baggage to be checked, the agent weighs, tags, and places it on the baggage carousel. About 50% of passengers, both Frequent Flyer and general passengers, have checked baggage.

The amount of time it takes to check-in each passenger type is listed in this table.

Amount of Time to Check-In per Passenger Type		
Passenger Type	No Checked Baggage	Checked Baggage
Frequent Flyer	Triangular(1.0, 2.0, 1.5)	Triangular(2.0, 3.0, 2.5)
General Passenger	Triangular(1.0, 3.0, 2.0)	Triangular(2.0, 4.0, 3.0)

Lilly wants to know what the appropriate number of staff is needed to accommodate both the Frequent Flyer and the general passenger ticket counters. She thinks the best way to answer this question is by using a simulation model.

As a possible follow up study outside of the scope of this case study, Lilly also wants to know how the wait time would be affected if the ticketing agents would process passengers from the other check-in counter when their own queue is empty. This is not necessarily part of this case study, but would be interesting to know.