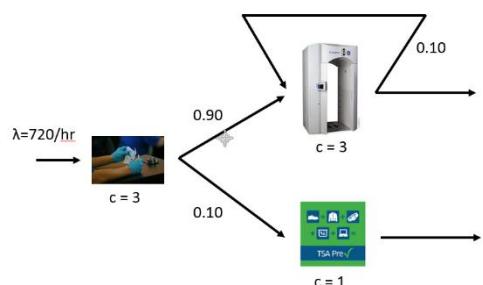


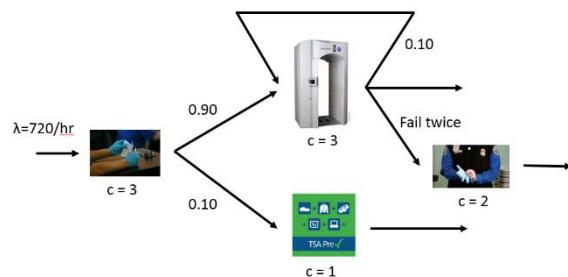
# Entity Routing

In this lab, we will discuss different types of routing logics and how to implement them in Simio. More specifically, we will consider using the *Selection Weight* property to support probabilistic, conditional, and compound (i.e., probabilistic and conditional) routings. We show how to use *Node Lists* to implement dynamic routing logics in Simio. We will also revisit Simio *Sequence Table* to implement routing sequences for different entity types. And finally, we will discuss entity *Free-space travel*. We will develop the following four models based on the operation of an airport check-in and security checkpoint processes (all service times are set to the default expression):

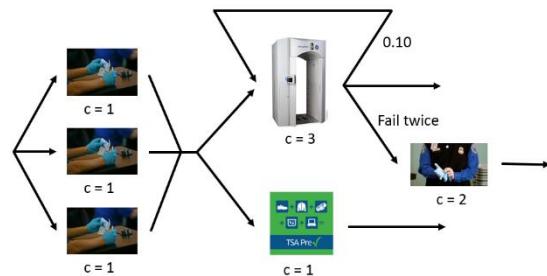
**Model 1: Airport Security Check**



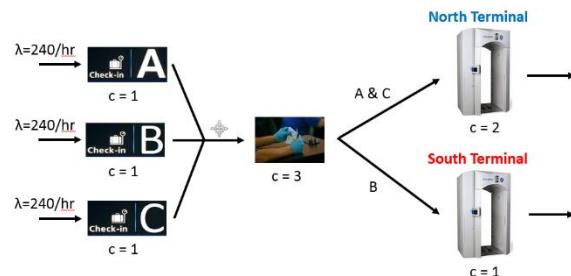
**Model 2: Airport Security Check with Screening Limit**



**Model 3: Airport Security Check with Screening Limit (dynamic routing)**



**Model 4: Airport with Multiple Airlines and Terminals**



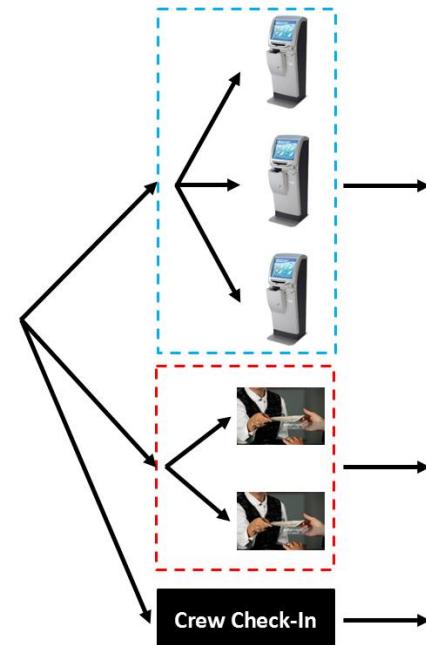
The videos will guide you through:

1. Probabilistic, conditional, and compound expressions for the *Selection Weight* property on links
2. Using a *Node List* to implement different dynamic routing decisions
3. Routing using a separate sequence table for each entity type
4. Defining a *data table* and a single related *sequence table* for all entity types

## Assignments

1. Use a static queueing model to verify Model 1. Provide a clear description of the different steps that you perform during your verification process (including figures and tables) in your report document. **Hint:** You may need to make modifications to your simulation model to make it consistent with the assumptions of your queueing analysis. You will also need to define different *responses* and use the resulting SMORE plots to determine the correctness of your model and whether you have run “enough”.
2. Suppose that TSA policy requires pat-down of passengers that fail the screening process for the second time (so these passengers will not be screened using the AIT machine for a third time). Modify Model 2 to implement this new screening policy. You should provide screenshots of different components of the modified routing logic in your report document and explain how you verified your model.
3. Develop a Simio model the following airport check-in process for an airline as shown in the figure below (we do not consider the security checkpoint in this model). The arrival rate is 70/hour and there are two types of entities with the following mix: passengers (95%); and, crewmembers (5%). While airline crewmembers go through a different process (single server) to obtain their flight documents, passengers have two options to check in for their flight by either going to the airline agents at the counter or using a self-check-in kiosk. There are two agents and three self-check-in kiosks. We assume that 60% of passengers use kiosks while the remaining 40% will see an agent (regardless of the line in the self-check-in area or in front of the airline counter). However, once passengers arrive at their intended check-in area, they will pick the shortest line. In your report, you should provide screenshots of different model components and clearly explain how you implemented and verified your model.

Server	Processing Time (Minutes)
Self-Check-In Kiosk	Triangular (2, 3, 4)
Airline Agent	Triangular (2, 4, 6)
Crew Check-In	Triangular (5, 10, 15)



## Submission Requirements

The deliverables for the lab include the following:

1. A single word document that includes the “solutions” to the assignment problems, i.e., screenshots of your simulation models and their different components, tables/figures of simulation results (such as SMORE plots), analysis of simulation outputs/recommendations, description of your verification analysis (if applicable), and specific deliverables specified in the for the above problems. The report is the primary component of your submission that is graded and all other files (such as Excel or Simio models) are just supporting material so make sure your report document is complete by itself and do not simply refer the reader to other files in your submission.
2. All related Simio models developed as part of the assignments.

***All of the files should be zipped together and submitted via Canvas. Make sure you do not submit any other file types such as “.rar”.***

***If you work in a team of 2, make sure that you both submit the exact same zip file and indicate the name of your partner as a comment.***