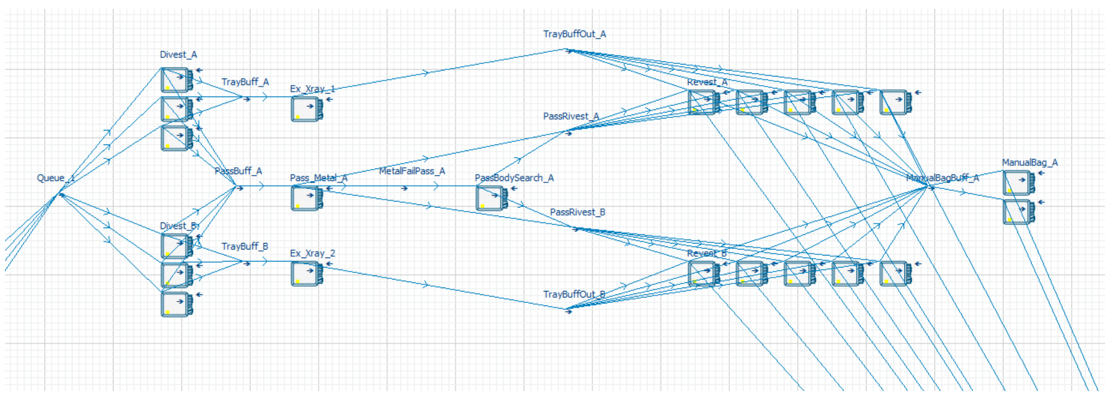
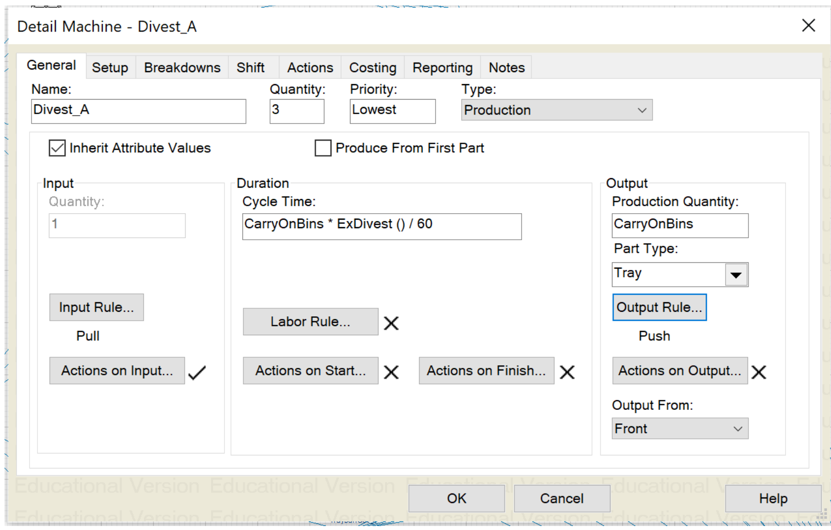
Conceptual Model Design

- From the data given, we can find out the passenger arrival for 10 min time window. We can also get the passenger arrival by month defined by the month factor and same as we can get the day factor which defined by the passenger arrive in a day. With use of arrival data, month factor and day factor, we can get the number of passengers coming to the system.
- Once passenger set in 10 min time period enter in the system, we can use the production machine to get passenger and we can assign different attributes to the passengers.

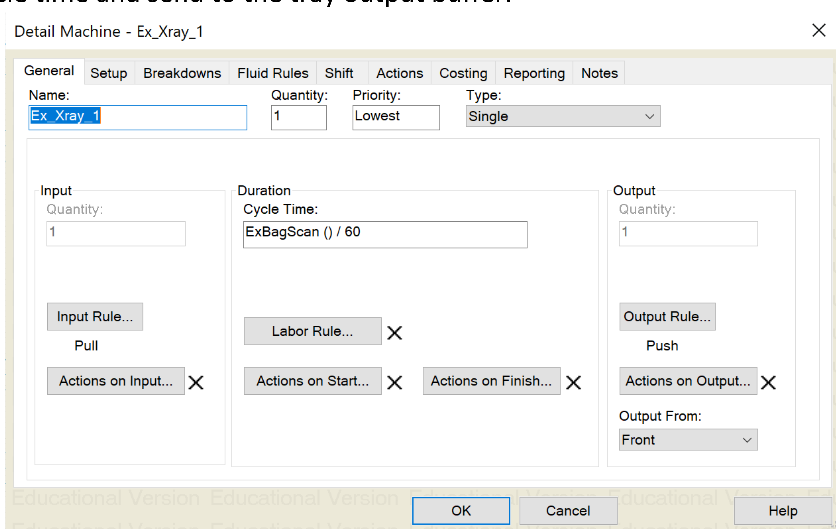
1. The Security Lane Process from Passenger Divest, Bag X-ray Scan, Passenger Metal Detector Scan, Manual Passenger Search, and Passenger Revest.



- Passenger Divest Station:
  As given in project description, each X-ray bag scanner have three divesting station. Divest machine is defined as production machine which produce trays equivalent to carry on bins passenger have. From given data, we can define the cycle time for the divesting machine, and we can multiply with the number of carry-on bins to get final cycle time of the divesting process.
  Passenger assign a variable at passenger enter the divest machine. It used for diverting the passenger to revest machine where they can find their carry-on bins.
  Divest machine send Trays to the Tray buffer from which trays goes to the X-ray bag scanner and passenger goes to the metal detector machine buffer.

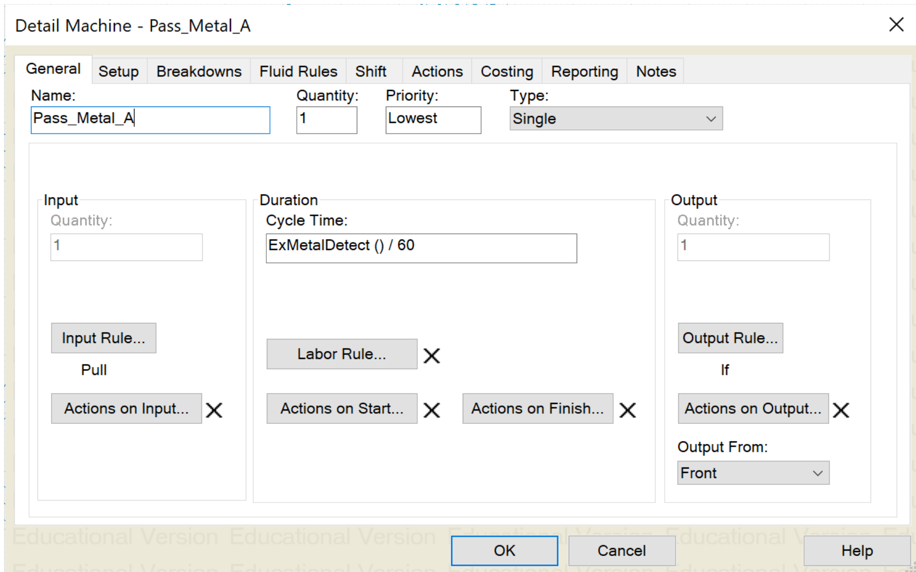


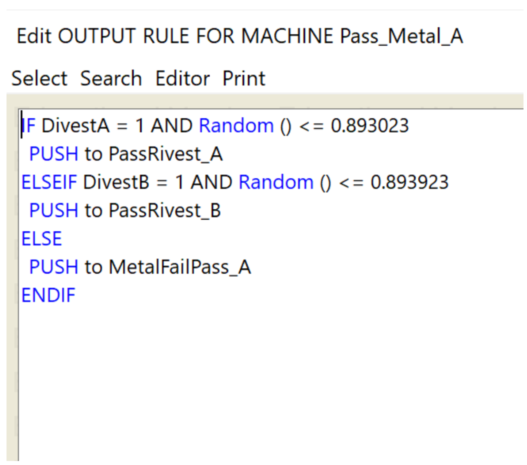
- X-ray Bag Scan:
  X-ray scan machine is single machine with cycle time define from the distribution for time taken for bag scanning. X-ray bag scanner pull the trays from the tray buffer and scan it for defined cycle time and send to the tray output buffer.



- Passenger Metal Detector:
  Passenger came out from the divesting machine goes to the passenger metal detector buffer, from which metal detector machine pulls the passenger. Passenger metal detector is also a single machine with cycle time defined by the distribution from given data. Once passenger pass through the metal detector machine, is he pass the process, passenger diverted to the revesting buffer according to attribute assign in the divesting machine and if passenger fail to pass the metal detector machine, passenger goes to the buffer for the manual body search machine.
  Manual body search machine is also single machine with cycle time defend by the distribution. Once passenger pass the manual body search process, they diverted to the revest buffer according to the attribute assigned to them.

From the given data, in expedited screening area, approximately 11% passenger fail in the metal detector and goes to the manual body search station. And in the standard screening area, about 13% passenger fail in the metal detector and goes to the manual body search station.



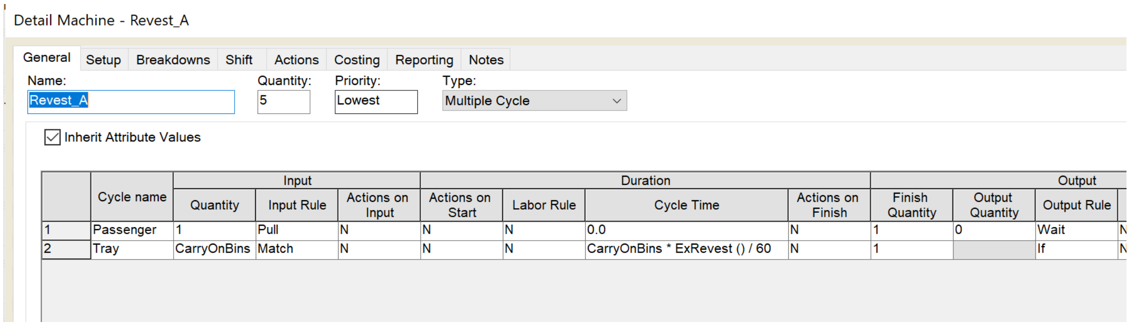


- Revesting machine:

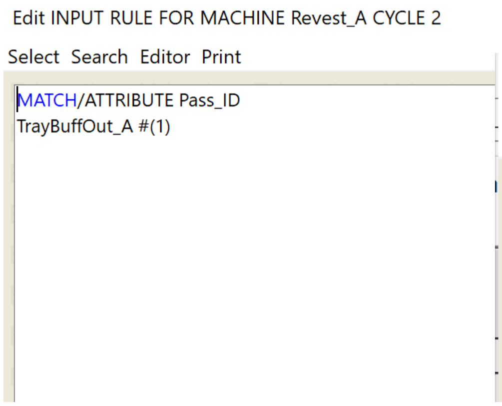
  There are 5 revesting station for each x-ray bag scanner. In this model, revesting machine is multi cycle machine, which has two cycle, one for passenger and one for trays. Revest machine pulls the passenger from the revesting buffer with cycle time of 0 min and in the other machine cycle revesting machine pull the trays from the tray output buffer according the attribute assign to the passenger.

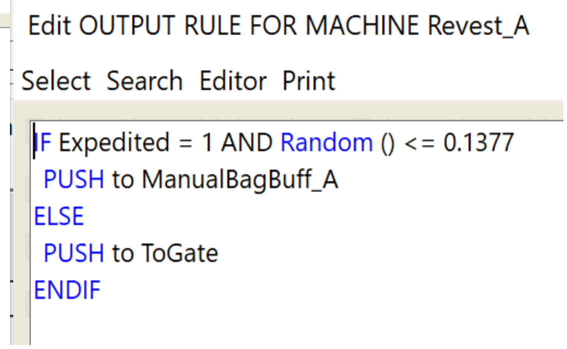
  After passenger get their carry-on bags, passenger goes to the terminal gate and if manual bag search needed, passenger goes to the manual bag search machine.

  From the data, around 13% passenger needed manual bag search in expedited area and in the standard screening area, around 11% passenger needed manual bag search. Manual bag search machine is also single machine with cycle time defend by the distribution from the given data. After manual bag search operation, passenger goes to the terminal gate.



	Cycle name	Input			Duration				Output			
		Quantity	Input Rule	Actions on Input	Actions on Start	Labor Rule	Cycle Time	Actions on Finish	Finish Quantity	Output Quantity	Output Rule	
1	Passenger	1	Pull	N	N	N	0.0	N	1	0	Wait	N
2	Tray	CarryOnBins	Match	N	N	N	CarryOnBins * ExRevest () / 60	N	1		If	N

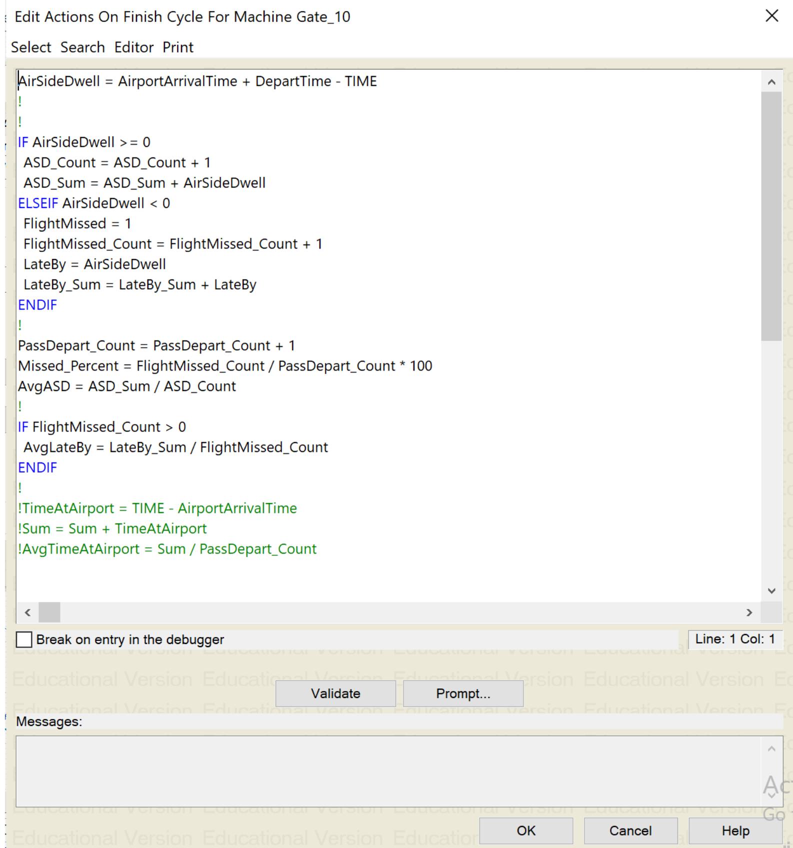




2. How Air Side Dwell Time and % Missed Flight statistics were calculated in the model
   - Air Side Dwell Time:
     Air side dwell time defines by the time passenger waiting at the terminal gate after they reached the gate.
     We can assign arrival time to the passenger by TIME inbuilt witness function. It will give a time value to the passenger. We can also define a depart time from the data given in the project description. In witness model, passenger carries those time value in system.
     We can define the air side dwell time when passenger reach to the gate.
     Air Side Dwell time = TIME (time when passenger reached the gate)- (Arrival time + departure time)
     We can get sum of all passenger's air side dwell time and from the passenger count, we can get the average air side dwell time.
   - % Missed Flight:
     Passenger missed the flight when air side dwell time is zero or less then zero, which means passenger was not able arrive at the gate before departure time. We can assign variable in the system which increases by one unit for every passenger if their air side dwell time is zero or less than zero. If air side dwell time is positive or greater than zero, which means passenger is departed. We can count the departed passenger count by assigning the variable. We can

divide this variable value with the variable which contain value of number of passenger total departed.

%Missed flight = (Missed flight passenger/total passenger departed) * 100



Preliminary Experiment Design

What single Performance Measure do you plan to maximize or minimize to identify the best set of allowable capital purchases SRA should make?

- The single performance measure I'm planning to minimize is %missed flight.

1. Write a mathematical expression that represents the cost constraint that is limiting this project solution.
   - #check in counter*price +
     #self-kiosk machine * Price +
     #bag drop machine * price +
     #x-ray bag scanner * price +
     #adv imagine scanner * price +
     #adv imaging body scanner * price +
     #Stacking Mount * price +
     #Bag Conveyance System * price +
     #std metal detector * price +

#Divesting Conveyor * price +
#revesting Con. * price +
#body search * price +
#bag search * price +
#side walk type * price <= $1000000

2. Write a mathematical expression that represents the new TSA Labor Limits that have been added to the project. Note: Labor was not explicitly modeled in the simulation (with the exception of a set of shared TSA agents used to conduct all secondary bag and passenger inspections). In the proposed mathematical expression use items modeled in the simulation. For example, we are told that two (2) TSA agents are required to operate each Bag Scanner used by the airport. To represent the labor implications of the number of Bag Scanners we include in our final design, we could write, "2*# of Bag Scanners".

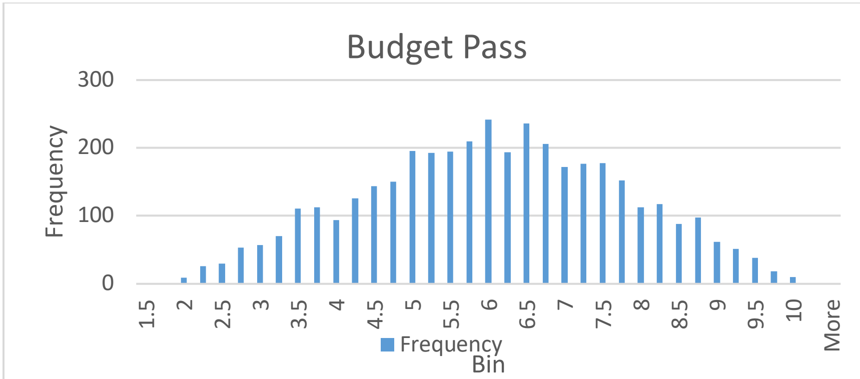
Model Input Data Preparation

1. What walking speed data did you use in your model? Please provide your answer in terms of both miles per hour (MPH) and feet per minute units.
   - I use walking speed as 3.1 mile/hr. or 4.54 feet/sec with standard deviation of 0.66 feet/sec

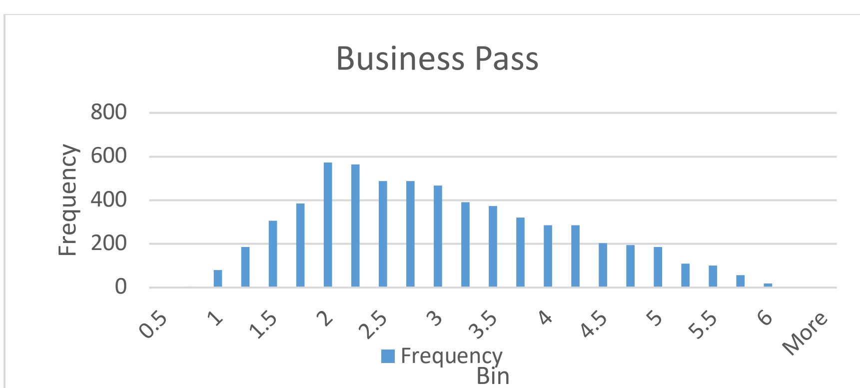
2. Provide a specific reference for where you obtained this information. If you obtained it from a book or scientific paper, please provide a full citation with page numbers. If you found it on the web provide the full URL to the information. If I cannot easily access the same information, you will not get the points.
   - In witness model walking speed is defined by the normal distribution given below.
     Walking Speed = Normal (4.67,0.66)
   - https://www.ncbi.nlm.nih.gov/pubmed/14962157
     https://en.wikipedia.org/wiki/Walking

3. Describe from the raw data to the fully specified simulation distribution(s) you used to model the "As-Is" Check In process.
   - For check-in process, data is given in the Check in process time study dataset. There are two type of passenger goes to the check in process budget and business. The data is given for both budget and business passenger in minutes to do the check in process.

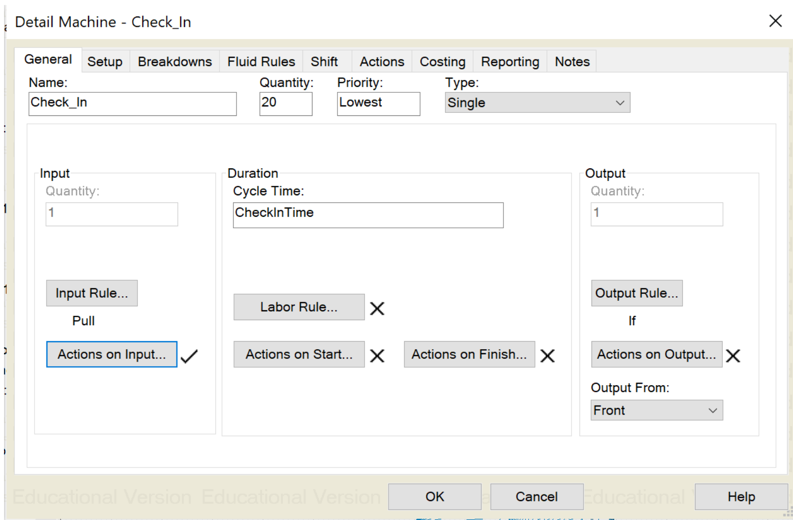
     The below histogram shows the distribution for the check in time for the budget passenger. I have assigned the real distribution to use for the cycle time in the check in counter machine. We can use this histogram information to define the budget check in time distribution and then we can use that distribution as cycle time in the machine.

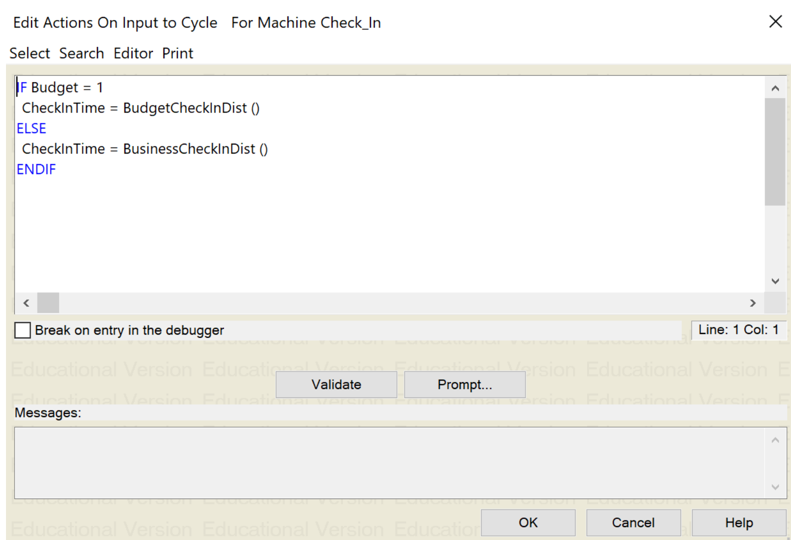


Same as the budget passenger, below histogram shows the check in time distribution for business passenger.



Same as the budget check in time distribution, we can define distribution for business passenger check in time and use in the model.

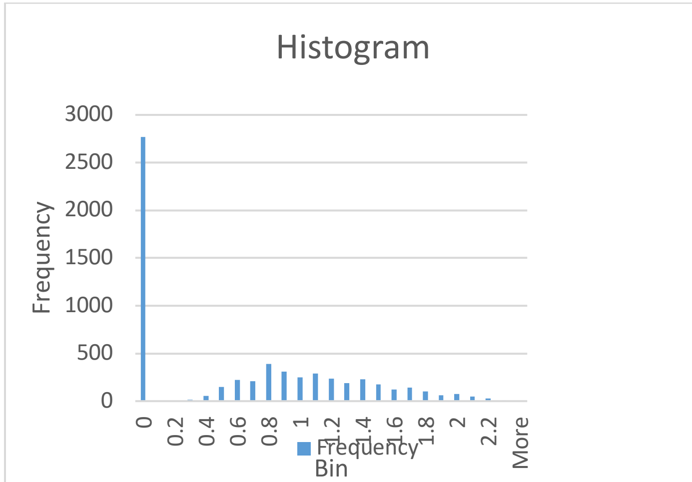




After defining the distribution for both budget and business passenger, we can assign the cycle time for check in machine accordingly.

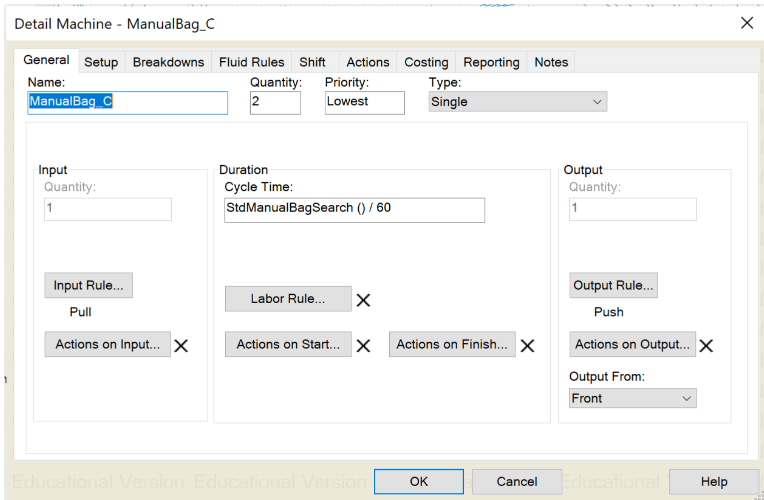
4. Describe from the raw data to the fully specified simulation distribution you used to model the "As-Is" Bag Drop process.
   - Time taken for bag drop process is given in the Bag Drop Processing time dataset. The data is given in the minute and if value is 0 min which means passenger does not have any bag with them.
   - From the dataset, we can analyze that the approximately 55% passenger have bags, so that after check in process, they need to go to bag drop counter. Out of 6070 data points, 2766 passenger does not have any bags.
     %With bag = (3304/6070)*100 = 54.45%

- Below histogram shows the distribution for bag drop process time and we can use this distribution in witness model to define the cycle time for the bag drop machine.



5. Describe from the raw data to the fully specified simulation distribution you used to model the Standard Secondary Manual Bag Inspection process.
    - Data for security are in both standard screening and expedited screening is given in the Security time Study dataset.
    - For Manual bag search in standard screening area, out of total 2229 data point given, 1963 people do not need to do manual bag search process which is around 88%. The below table shows the distribution for the manual bag search in second. We can use this data in the witness model to define the real distribution for the manual bag search cycle time.

StdManualBagSearch	Count
0	1963
2	0
4	0
6	0
8	0
10	0
12	0
14	1
16	2
18	10
20	6
22	10
24	11
26	23
28	22
30	16
32	21
34	15
36	27
38	19
40	19
42	13
44	10
46	11
48	9
50	6
52	7
54	6
56	1
58	1



Model Translation

- From the model statistic, we can say that the accuracy of model output is good. In As-Is model, for year factor =1.0, passenger comes into the system is Total Passenger in One year: 1136626
  Number of Passenger from Data given: 1133953
  We can see that 2673 more passengers are arriving at the airport from the actual value. So, percentage error is calculated below.
  Percent error = 0.00235%
  From this value, we can say that the passenger arriving in our model is performing well and the error is too small.

  As-Is model need more works in standard security area where average time in buffer is comparatively high.

a) The number of passengers that completed service in an equivalent 365 day, 24 hours / day period. (Please Scale your output values if you need to) **1136626**

b) The Passenger Total Time in System value, from Arrival into the model to leaving the model at the gates (minutes) **30min**

c) The % Missed Flights **2.4%**

d) The Average Air Side Dwell Time for all passengers that made their flights (minutes) **52.9 min**

e) The time required to walk from the parking lot to the entrance of the Departure Hall (minutes).
   a. Average Time **6.57 min**
   b. Minimum Time **2.32 min**
   c. Maximum Time **26.19 min**

f) Provide the following performance data related to the Check In Area:
   a. The average utilization of the Check In Stations **27.39%**
   b. The average processing time (minutes) at the Check In Stations **4.08 min**
   c. The minimum processing time at the Check In Stations **N/A**
   d. The maximum processing time at the Check In Stations **N/A**
   e. The average number in queue in front of the Check In Stations **2.21**
   f. The maximum number in queue in front of the Check In Stations **159**
   g. The average time (minutes) in queue in front of the Check In Stations **2.04 min**
   h. The maximum time (minutes) in queue in front of the Check In Stations **40.90 min**

g) Provide the following performance data related to the Bag Drop Area:
   a. The average utilization of the Bag Drop Stations **23.56%**
   b. The average processing time (minutes) at the Bag Drop Stations **1.07 min**
   c. The minimum processing time at the Bag Drop Stations **N/A**
   d. The maximum processing time at the Bag Drop Stations **N/A**
   e. The average number in queue in front of the Bag Drop Stations **0.14**
   f. The maximum number in queue in front of the Bag Drop Stations **21**
   g. The average time (minutes) in queue in front of the Bag Drop Stations **0.21 min**
   h. The maximum time (minutes) in queue in front of the Bag Drop Stations **7.91 min**

h) Provide the following performance data related to the Standard Revest Area:
   a. The average utilization of the Standard Revest Stations **15.77%**
   b. The average processing time (seconds) at the Standard Revest Stations **0.64 min**
   c. The minimum processing time at the Standard Revest Stations **N/A**
   d. The maximum processing time at the Standard Revest Stations **N/A**
   e. The average number of passengers in queue in front of the Standard Revest Stations **0.02**
   f. The maximum number of passengers in queue in front of the Standard Revest Stations **9**
   g. The average time (seconds) of passengers in queue in front of the Standard Revest Stations **0.09 min**
   h. The maximum time (seconds) of passengers in queue in front of the Standard Revest Stations **5.45 min**

Final Experimental Design

1. Given that the 2021 Input Passenger quantity levels and arrival patterns are set, what two things can we change to improve the key performance measure of the SRA system?
   a. We can focus on time passenger spend in queue for machine in the system.
      Check In process: We can see from the statistic in As Is model that average size of queue in check in process counter is high and process time is also high.

   b. We can focus on processing time of the machine in the system.
      We can make change in security area for standard screening area as average time for x-rag bag scanner machine and revesting time is high.

2. Why did the course instructor suggest that you evaluate potential improvement options sequentially from the beginning (up-stream) of the system to the end (down-stream) of the system?

- If we improve our model from beginning to the end of the system, we can see the effect of the changes made in the beginning of the system on the system at the down-stream.
- It could be possible that changes made in the upstream have major performance improvement in the model.

3. What information contained in the "As-Is" system model performance statistics provide a good indication of potential improvement areas that should be investigated due to the transient high peak demand of their associated system resources?

- From the As-Is model, we can get the statistic related to the machine utilization, length of the queue in front of each machine, time taken by the machine to process, average length of the queue in front of machine, people who missed the flight, total time spend in the airport.
- Two main things we can get from the statistic is the average, minimum and maximum time passenger spend in queue and from that we can improve the down stream process and machine cycle time from which we can see improvement option like increase the capacity of the machine or buy advance machine.
- From this statistic, we can determine the processes which is slow and have major impact on overall performance of the model.

4. Why was the course instructor so insistent that we make sure that if we purchase the new technology that we "force" as many of our simulated passengers to use it as possible?
    - New technology provides less processing time as given in the project description. If we use new technology in the system and passenger processes through it, it takes less time to process and passenger does not to wait longer in the queue.
    - In this model advance bag imaging machine improve the three processes together i.e. scanning time, divesting and revesting of the passenger. Self-check in kiosk machine also operates with less time. So, it would be better to force the passenger to use the new technology in the system.

5. How long will you run your simulation for each experiment trial (Minutes / Hours / Days)?
    - I would run my simulation model for one year which is 525600 mins.

6. Why did you select this time period?
    - I have selected this time period as data given in flight forecasting schedule is for one entire year for three year i.e. 2019-20-21. Passenger arrival rate at the airport in different month is different. If we run our model for one year, we can see the result of the model according to the different arrival rate in the different time in the year.

7. What Passenger Load data source did you use for your experiments?
    - I used data source file provided in the project module and Dr. Huff in As-Is model.

- I used passenger arrival for year of 2019.

8. If you are using a simulation run length shorter than nine months, how are you making sure that you are exposing your system configurations to the maximum passenger loads expected in 2021?
   - From data analysis, we can see that highest rate of passenger arrival is in the august month. In august around month factor is 1.18 which means 18% more passenger arrives in the system which is high compare to other month in the year.
   - Compare to year 2019, in 2021 around 27% more passenger coming into the system. If we run our model for nine months, we are going to expose for the maximum passenger load because in august month factor is higher compare to other months.

9. The class instructor highly recommends that you only add (or subtract) one item at a time to the model in each experiment. He highly discourages adding different types of items together at the same time. He feels that adding multiples of several different types of items at the same time is a disaster! Why?
   - If we add different types of machine or item together at the same time in the system, we might not have enough budget to improve other process or machine in the system.
   - It is possible that using only one item in the process can make improvement rather than using two items.
   - If we add multiple of several different type of machine or items at same time, it may have small impact of the overall performance of the system as it only improving that particular part of the system with all new type of machines same kind of several machines. So that we cannot improve the other system which may be important to the overall performance measure of the system.

Experimentation

1. Please tell me what you are using as your "As-Is" Model starting conditions:
   a. Are you using your own model or the instructor's model as your starting point? (NOTE: There is no GRADE advantage either way. I just need to know)
   My Own As-Is Model
   b. How many passengers entered your system? **<u>1454482</u>**

   c. What is your starting Average Passenger Time In System (minutes)? **<u>25 min</u>**

   d. What is your starting % Missed Flights? **<u>4.2%</u>**

   e. What is your starting Air Side Dwell Time (minutes)? **<u>51.8 min</u>**

Experiment 1

1. What Change are you making to your Model for this new experiment?
    - 10 Self-Kiosk Machine
    - 2 Bag drop machine
    - 10 Stacking Mount
    - 10 X-ray Bag scan
    - Set priority level for kiosk to 1
2. What is the total amount of money you have spent on the system so far? **$950000**

3. What is your new Average Passenger Time-In-System (minutes)? **35 min**

4. What is your new % Missed Flights? **1.3 %**

5. What is your new Air Side Dwell Time? **54.7 min**

6. Did any wait times in Buffers Change? If so, In which buffer? **Check In Buffer**

    a. Starting Average # in Queue **9.30**

    b. Starting Max # in Queue **309**

    c. Starting Average Wait Time (minutes) **6.72 min**

    d. Starting Maximum Wait Time (minutes) **78.24 min**

    e. New Average # in Queue **0.09**

    f. New Max # in Queue **61**

    g. New Average Wait Time (minutes) **0.06**

    h. New Maximum Wait Time (minutes) **8.14**

7. Will you keep this model addition or "Sell it back so you try something else"?
   Sell it back so I can try something else to improve model.

Experiment 2

1. What Change are you making to your Model for this new experiment?
    - 2 Self Check in Kiosk
    - 1 Bag Drop
    - 6 Advance Bag Scanner
    - Set priority level for advance bag scan to 1 and for self-kiosk to 1
2. What is the total amount of money you have spent on the system so far? **$990000**

3. What is your new Average Passenger Time-In-System (minutes)? **35 min**

4. What is your new % Missed Flights? **1.8 %**

5. What is your new Air Side Dwell Time? **55.2 min**

6. Did any wait times in Buffers Change? If so, In which buffer? **X-ray buffer in standard screening area**

    a. Starting Average # in Queue **0.09**

    b. Starting Max # in Queue **8**

    c. Starting Average Wait Time (minutes) **0.12 min**

    d. Starting Maximum Wait Time (minutes) **1.45 min**

    e. New Average # in Queue **0.06**

    f. New Max # in Queue **8**

    g. New Average Wait Time (minutes) **0.08 min**

    h. New Maximum Wait Time (minutes) **0.67 min**

7. Wil you keep this model addition or "Sell it back so you try something else"
   Sell it back so I can try something else to improve model.

Experiment 3

10. What Change are you making to your Model for this new experiment?
    - 5 Self Check in Kiosk
    - 6 Advance Bag Scanner
    - Set priority level to 1 for both
8. What is the total amount of money you have spent on the system so far? **$1000000**

9. What is your new Average Passenger Time-In-System (minutes)? **37 min**

10. What is your new % Missed Flights? **1.4 %**

11. What is your new Air Side Dwell Time? **55.8 min**

12. Did any wait times in Buffers Change? If so, In which buffer? **Check in Buffer**

    a. Starting Average # in Queue **4.26**

    b. Starting Max # in Queue **237**

c. Starting Average Wait Time (minutes) **3.08 min**

d. Starting Maximum Wait Time (minutes) **50.23 min**

e. New Average # in Queue **1.05 min**

f. New Max # in Queue **156**

g. New Average Wait Time (minutes) **0.76 min**

h. New Maximum Wait Time (minutes) **23.13 min**

13. Wil you keep this model addition or "Sell it back so you try something else"
    Sell it back so I can try something else to improve model.

Experiment 4

11. What Change are you making to your Model for this new experiment?
    - 6 Self Check in Kiosk
    - 1 Bag Drop
    - 4 Advance Bag Scanner
    - 2 Stacking Mount
    - 2 X ray Bag Scanner
    - 2 500ft sidewalk
    - Set priority level to 1 for advance bag scam, kiosk
14. What is the total amount of money you have spent on the system so far? **$1000000**

15. What is your new Average Passenger Time-In-System (minutes)? **39 min**

16. What is your new % Missed Flights? **0.9 %**

17. What is your new Air Side Dwell Time? **56.5 min**

18. Did any wait times in Buffers Change? If so, In which buffer? **Walk To terminal**

    a. Starting Average # in Queue **4.87**

    b. Starting Max # in Queue **43**

    c. Starting Average Wait Time (minutes) **3.69 min**

    d. Starting Maximum Wait Time (minutes) **9.44 min**

    e. New Average # in Queue **2.44**

    f. New Max # in Queue **27**

g. New Average Wait Time (minutes) **1.85 min**

h. New Maximum Wait Time (minutes) **4.72 min**

19. Wil you keep this model addition or "Sell it back so you try something else"
Sell it back so I can try something else to improve model.

Experiment 5

12. What Change are you making to your Model for this new experiment?
    - 5 Self Check in Kiosk
    - 1 Bag Drop
    - 4 Advance Bag Scanner
    - 2 Stacking Mount
    - 2 X-ray Bag Scanner
    - 2 900ft sidewalk
    - Set priority level to 1 for the security lane which has advance security bag scanner
    - Set priority level to 1 for the security lane which has 2 x-ray bag scanners
    - Set priority level for self-check in kiosk to 1
20. What is the total amount of money you have spent on the system so far? **$1000000**

21. What is your new Average Passenger Time-In-System (minutes)? **40 min**

22. What is your new % Missed Flights? **0.8 %**

23. What is your new Air Side Dwell Time? **57 min**

24. Will you keep this model addition or "Sell it back so you try something else"
Sell it back so I can try something else to improve model.

Experiment 6

13. What Change are you making to your Model for this new experiment?
    - 8 Self Check in Kiosk
    - 1 Bag Drop
    - 3 Advance Bag Scanner
    - 5 Stacking Mount
    - 3 X ray Bag Scanner
    - Set priority level to 1 for the security lane which has advance security bag scanner
    - Set priority level to 1 for the security lane which has 2 x-ray bag scanners
    - Set priority level for self-check in kiosk to 1
25. What is the total amount of money you have spent on the system so far? **$985000**

26. What is your new Average Passenger Time-In-System (minutes)? **45 min**

27. What is your new % Missed Flights? **0.3 %**

28. What is your new Air Side Dwell Time? **59.2 min**

29. Did any wait times in Buffers Change? If so, In which buffer? **Standard screening x ray buffer, x ray buffer output , Expedited Screening x-ray buffer**

    Standard Screening:

    a. Starting Average # in Queue **0.19**
    b. Starting Max # in Queue **8**
    c. Starting Average Wait Time (minutes) **0.36 min**
    d. Starting Maximum Wait Time (minutes) **2.80 min**
    e. New Average # in Queue **0.10**
    f. New Max # in Queue **8**
    g. New Average Wait Time (minutes) **0.11 min**
    h. New Maximum Wait Time (minutes) **1.36 min**

    Expedited Screening:

    i. Starting Average # in Queue **0.08**
    j. Starting Max # in Queue **8**
    k. Starting Average Wait Time (minutes) **0.12 min**
    l. Starting Maximum Wait Time (minutes) **1.43 min**
    m. New Average # in Queue **0.16**
    n. New Max # in Queue **8**
    o. New Average Wait Time (minutes) **0.11 min**
    p. New Maximum Wait Time (minutes) **0.67 min**

Analysis

1. What is your final Average Passenger Time In System (minutes)? **<u>45 min</u>**
2. What is your final % Missed Flights? **<u>0.3%</u>**
3. What is your final Air Side Dwell Time (minutes)? **<u>59.2 min</u>**

Implementation and Documentation

For the processing time for different machine and station in the system, we can define the distribution in the system from the given data and we can use this distribution in the machine for processing time. We can see the machine utilization and make decision accordingly to improve the system. 20 check in counter is less for the passenger flow as processing time for the check in counter is more and length in front of the check in counter is also big. So, one option should be improving the check in process. Security area should be arranging such a way that passenger does not have wait in the queue and wait time in the queue should be less. If passenger in the queue at any station or front of any machine is high or more, improving option is processing time for the machine which means we can increase the machine capacity, or we can put the advance system to decreases the processing time. From the experimentation step, it is concluded that using sidewalk is not making major impact in performance of the system. For evaluating the system performance, we can compare the total passenger input in the system with the passenger in the given dataset. We can also consider airside dwell time and percentage pf passenger who missed their flight.

- Process time for check in counter is more and passenger waiting time in the queue is also high, so that SRA should purchase 8 self-check-in kiosk machine to increase the efficiency of the check-in process.
- For bag drop process, passenger waiting time in the queue is also high so that we can add 1 bad drop station.
- For expedited security screening process, we can add 2 x-ray bag scanner each in the security lane with stacking mount. Use of stacking mount avoid construction of another security lane or avoid purchasing of devest/revest conveyance system.
- For standard screening, SRA should operate 3 advance imaging bag scanners for each security lane and 3 extra bag scanners for other security lane with the stacking mount. As passenger flow to the standard screening area is more, wait time in the queue is high and also machine processing time is also low. By making approvement suggested above, make security area more efficient to handle. Passenger should use new machine or technology in the system if added.
- From the experimentation step, we can clearly see that adding sidewalk to the terminal is not making much improvement. Adding sidewalk only improve system by small fraction so, rather spending money in sidewalk, we can spend that money in other area to make improvements.
- We don’t need to use any extra manual bag search; body search and advance imaging body search machine as wait time in the queue in front of this process is low and processing time is also low.
- In the expedited screening area, passenger waiting at the revesting station is not much. And in the standard screening area we are using advance bag scanner so, processing time for this machine is low so passenger does not have to wait much in the queue and we do not need to add any divesting or revesting station.

- If SRA is using 2 x-ray scanners in the security area, it should be stacked. Without stacking, we must spend $50000 for conveyance system. And revesting process can keep up with the bag scanning process if we are using 2 x-ray bag scanners. So, we do not need to add any revesting lane and we do not need to spend any money for space also.
- For making all this improvements, SRA need to spend $9850000 to improve the system which gives percent missed flight 0.3%, air side dwell 59.2 min and time passenger spent at airport is 45 mins.