HW-6

Responses & Summary

Question 13.2

- 2-way method used for 1st scenario to decide the queue
- Scenario 1:
  - 1 Server checking ID and Passports
  - 2 Queue's for security clearance
  - In this case the wait time was >15mins

- N-way method used for making decision to assign the ID checker and Queues
- Scenario 2:
  - 2 Server checking ID and Passports
  - 3 Queue's for security clearance
  - In this case the average wait time was > 15mins

Complete Repository available on GitHub:

https://github.com/Hizzyth/GTX_Introduction-to-Analytics-Modelling

Airport_Security_Simulation_Scenario1

Replication 1 Start Time: 0.00 Stop Time: 57.00

Queue Detail Summary

Time

	Waiting Time
IDCheck1.Queue	18.58
SC1.Queue	0.31
SC2.Queue	0.41

Other

	Number Waiting
IDCheck1.Queue	63.78
SC1.Queue	0.31
SC2.Queue	0.13

Airport_Security_Simulation_Scenario2 Replications: 1

Replication 1 Start Time: 0.00 Stop Time: 64.00 Time Units: Minutes

Queue Detail Summary

Time

	Waiting Time
IDCheck1.Queue	18.71
IDCheck2.Queue	15.90
SC1.Queue	0.42
SC2.Queue	0.27
SC3.Queue	0.13

Other

	Number Waiting
IDCheck1.Queue	37.04
IDCheck2.Queue	36.34
SC1.Queue	0.56
SC2.Queue	0.21
SC3.Queue	0.03

Question 13.2

- Scenario 3:
  - 3 Server checking ID and Passports
  - 3 Queue's for security clearance
  - In this case the wait time was < 15mins
- Scenario 5: (Extreme Case)
  - 4 Server checking ID and Passports
  - 4 Queue's for security clearance
  - In this case the average wait time was < 15mins
  - I explored this option just to see how much difference it makes

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Airport_Security_Simulation_Scenario3 Replications: 1

Replication 1 Start Time: 0.00 Stop Time: 121.00 Time Units: Minutes

Queue Detail Summary

Time

	Waiting Time
IDCheck1.Queue	10.24
IDCheck2.Queue	9.57
IDCheck3.Queue	11.58
SC1.Queue	4.79
SC2.Queue	5.01
SC3.Queue	5.21

Other

	Number Waiting
IDCheck1.Queue	17.31
IDCheck2.Queue	16.82
IDCheck3.Queue	16.64
SC1.Queue	6.89
SC2.Queue	6.60
SC3.Queue	6.25

Airport_Security_Simulation_Scenario5

Replication 1 Start Time: 0.00 Stop Time:

Queue Detail Summary

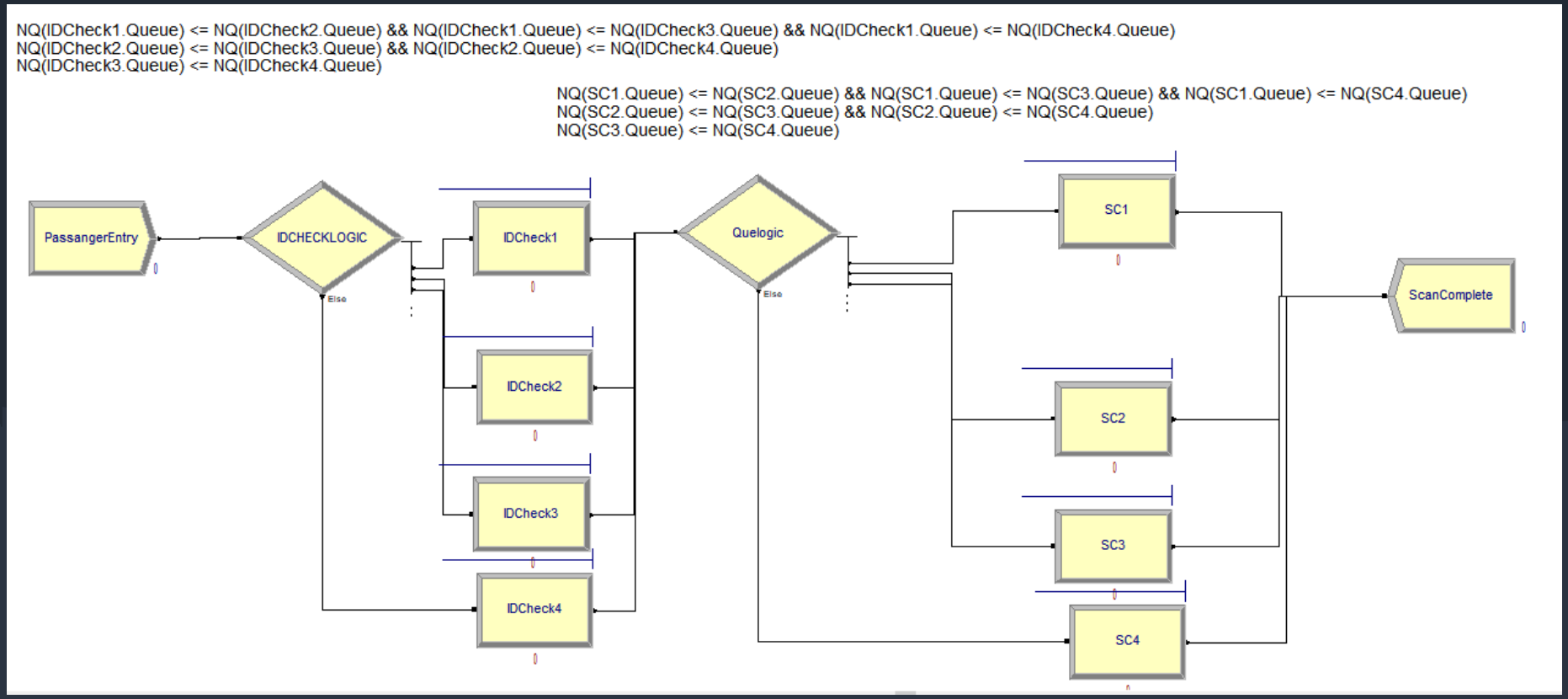
Time

	Waiting Time
IDCheck1.Queue	5.85
IDCheck2.Queue	5.99
IDCheck3.Queue	5.70
IDCheck4.Queue	5.89
SC1.Queue	2.24
SC2.Queue	2.09
SC3.Queue	2.13
SC4.Queue	2.21

Other

	Number Waiting
IDCheck1.Queue	7.73
IDCheck2.Queue	7.52
IDCheck3.Queue	7.21
IDCheck4.Queue	7.07
SC1.Queue	2.97
SC2.Queue	2.73
SC3.Queue	2.49
SC4.Queue	2.26

Question 13.2



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Question 14.1

Conclusions:

- **Model accuracy** improves with clean data, apart from that all other methods provide the accuracy in very close range (92.8-95.7%)
- **Mode approach is not very accurate** as it assigns all missing values to be 1, whereas with every other method the values were varying above 1
- **With perturbation some negative values were introduced**, those had to set to 1 (minimum in the acceptable range of 1~9)

Complete Repository available on GitHub:

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QUESTION 15.1 : Optimization

Question: Describe a situation or problem from your job, everyday life, current events, etc., for which optimization would be appropriate. What data would you need?

Answer:

Optimization model will be applicable to travel planning. To determine which local attractions/activities to cover during trip.

Variables	Constraints	Objective Function
Time spent on each attraction/activity	Number of days	Experience Quality (Function of time and money spent)
Cost of activity/admission for attraction	Total Budget for Trip	
Average waiting time for admission (if applicable)		