Queue It!

Team 14:FedUp

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The Situation

Why are we doing this?

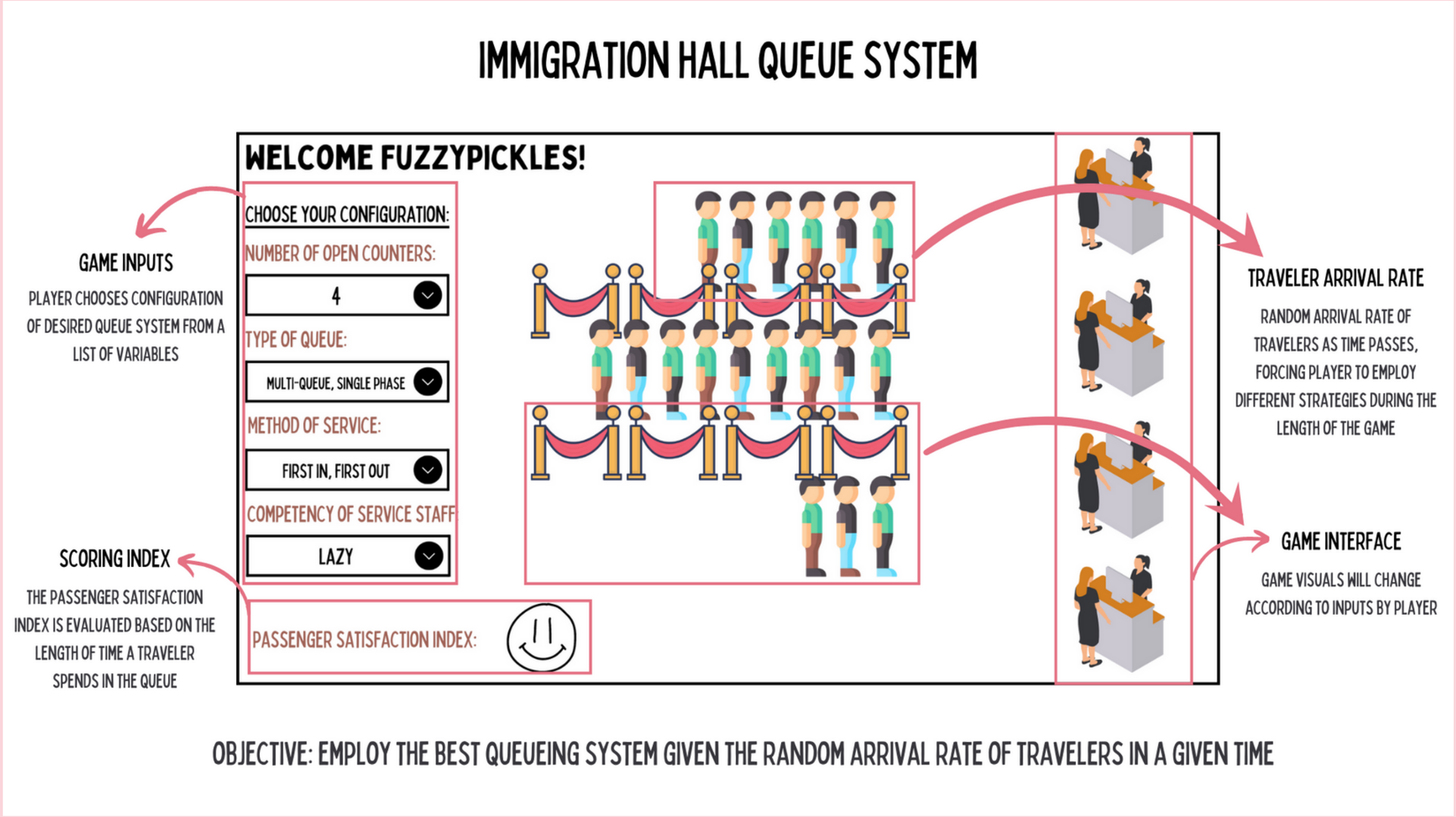
Have you ever had to spend an unnecessary amount of time at the Immigration hall?

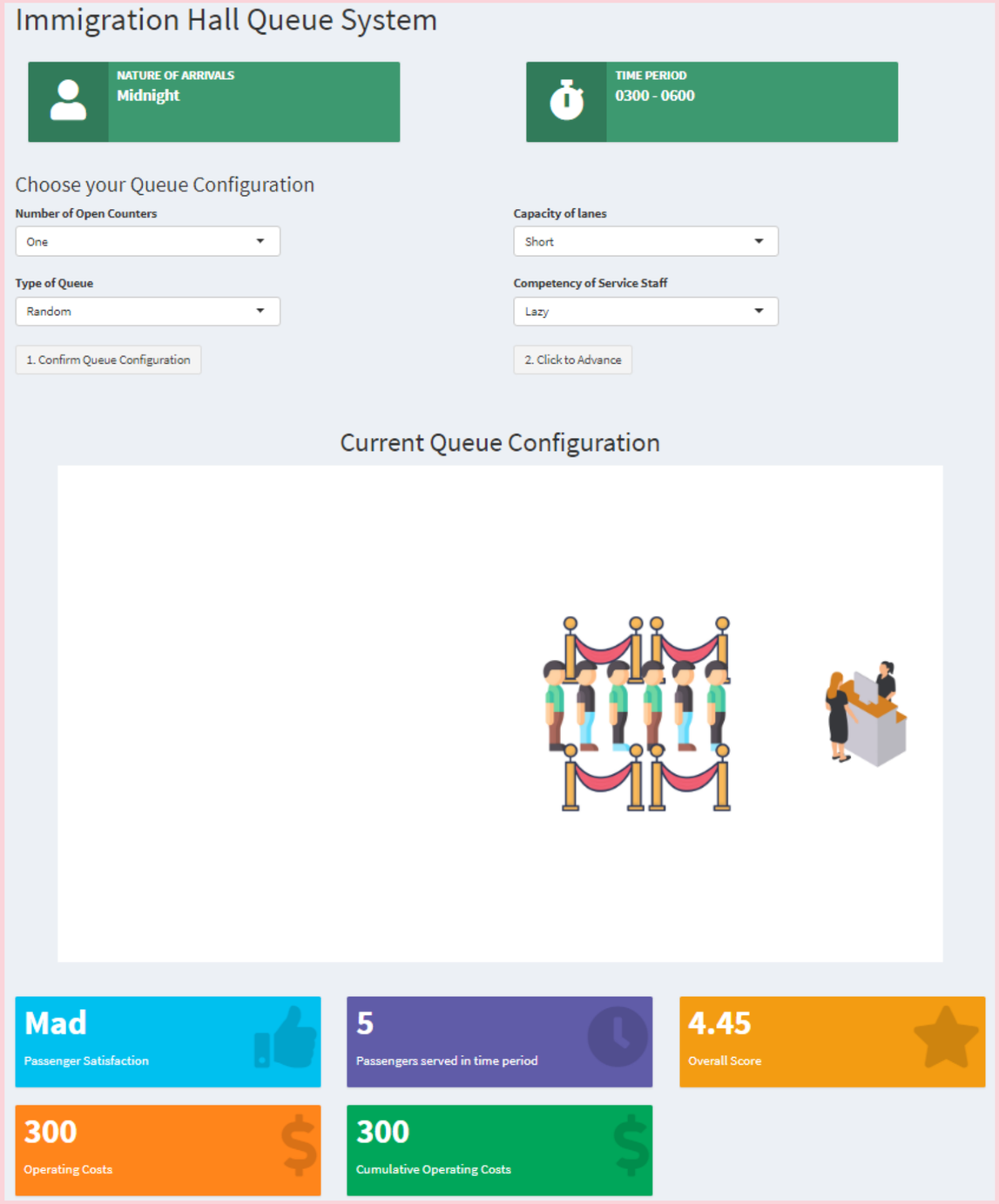
Do you wish to understand how the queueing system works?

Problem Statement

Decide on an immigration hall queue system by choosing how many counters to open and the queue system to adopt, given the frequency of the incoming passengers

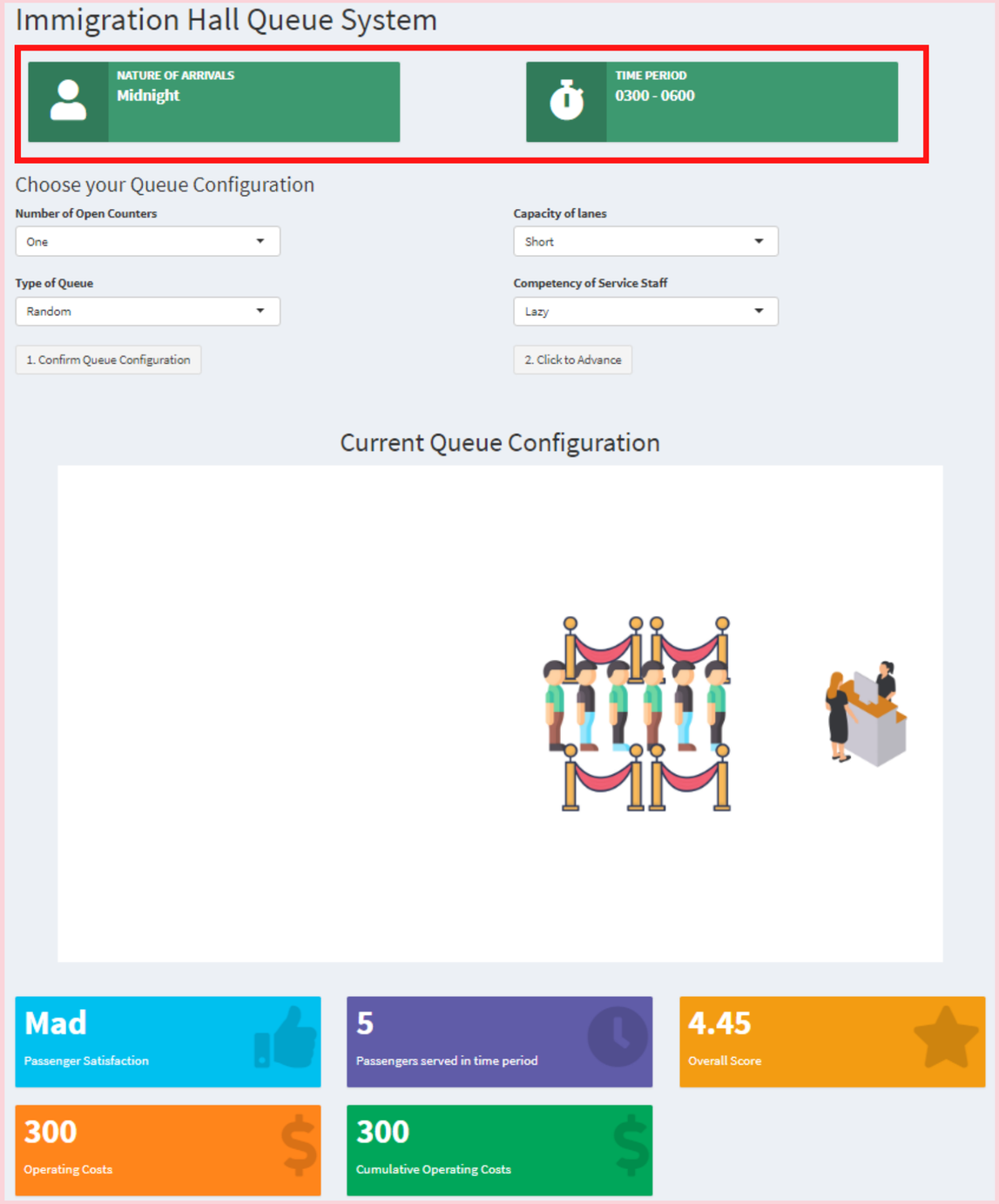
Concept Diagram





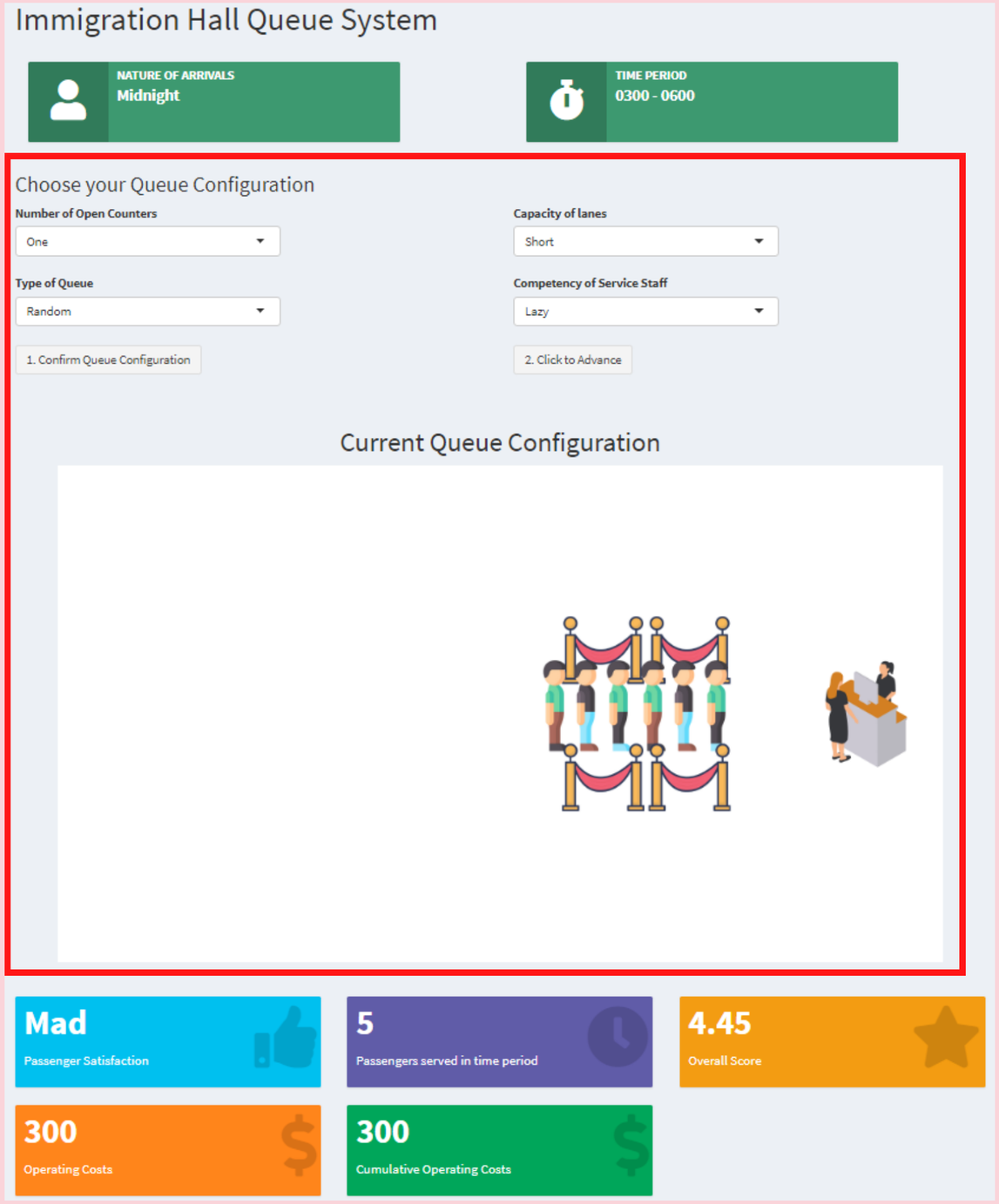
Queue It!

You are the Immigration Hall Duty Manager who wants to find the best queue configuration while keeping operating costs low



Game Inputs

Random arrival of passengers according to the time period



User Inputs

NUMBER OF OPEN COUNTERS

CAPACITY OF EACH LANE

TYPE OF QUEUE

COMPETENCY OF SERVICE STAFF

Immigration Hall Queue System

NATURE OF ARRIVALS
Midnight

TIME PERIOD
0300 - 0600

Choose your Queue Configuration

Number of Open Counters
One

Capacity of lanes
Short

Type of Queue
Random

Competency of Service Staff
Lazy

1. Confirm Queue Configuration

2. Click to Advance

Current Queue Configuration

Mad
Passenger Satisfaction

5
Passengers served in time period

4.45
Overall Score

300
Operating Costs

300
Cumulative Operating Costs

Performance Indicators

PASSENGER SATISFACTION

NO. OF PASSENGERS SERVED

OPERATING COSTS

OVERALL SCORE

MSO Concepts

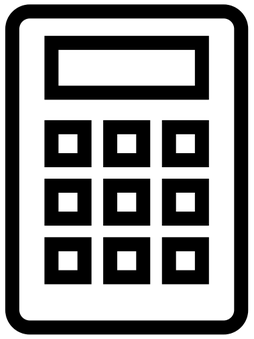
- **Queueing Theory:**

Assesses the arrival process, service rate, customer flow, and other components of the waiting experience.

- **Little's Law:**

Determines the average waiting time for people in a queueing system, as well as other statistics used in this game.

Calculations of Game Statistics



No of Arrival Passengers (at each open counter):

Random generation & Normal distribution (*/*arge*)

Variables used:

No of Open Counters,

Time of the day (Arrival rate - λ),

Type of Queue

Little's Law Statistics: (L, W, Wq)

Calculation functions based on formulas

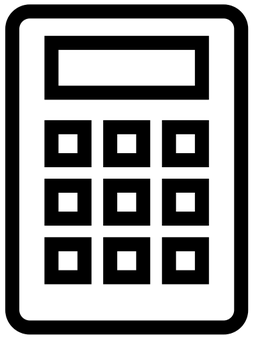
Variables used:

Time of the day (Arrival rate - λ),

Staff Competency (μ),

*Capacity of each lane (≈ Ave. No of people in queue, Lq)

Calculations of User Performance



Passenger Satisfaction Index:

Average time that travellers stay in the system

Evaluating method: W (total time), Wq (queueing time)

Operating Costs:

Costs of running the immigration hall during three hours

Variables used: Counters, Capacity (Lq), Competency (μ)

Service Rate:

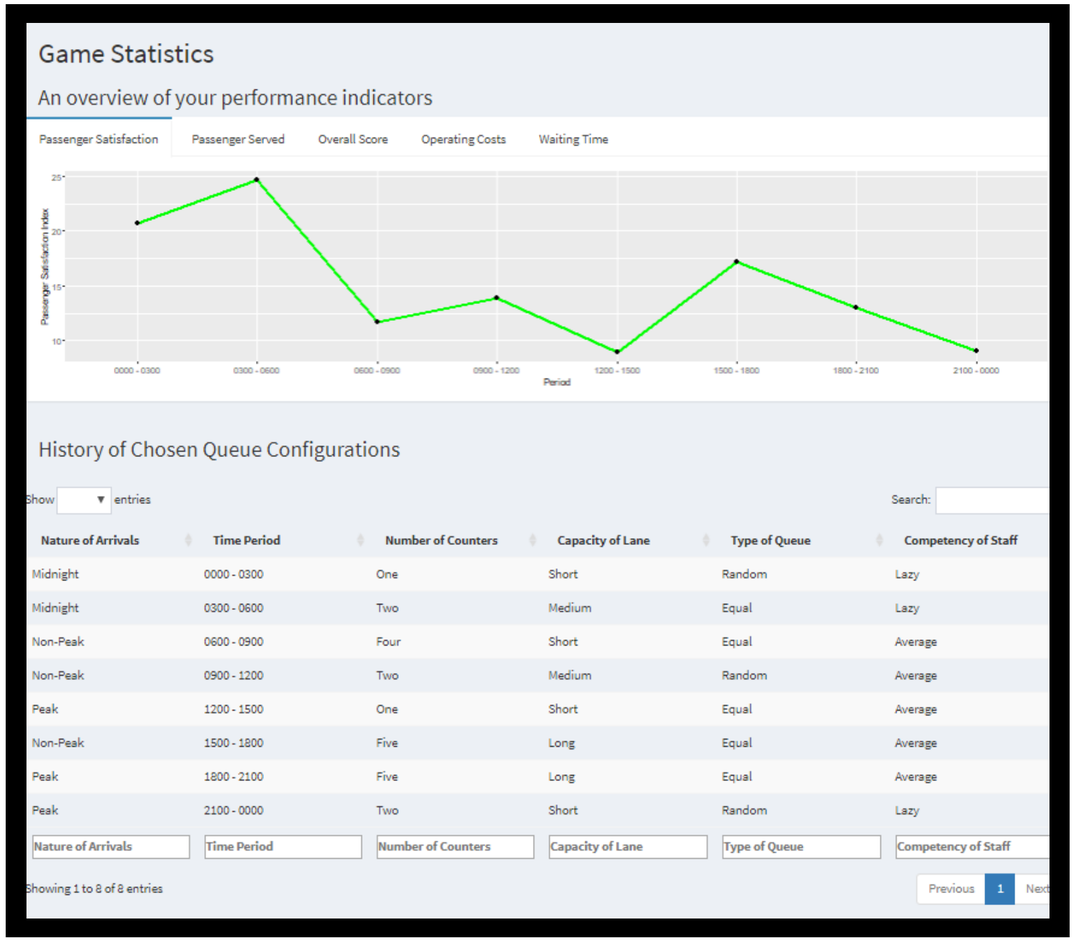
Proportion of passengers served during three hour

Variables used: Ave. waiting time (Wq), No of Arrival Pax

Overall Score (for each round, 0~10 scale):

Weighted rating for the round, determined by Satisfaction Index (30%), Operating Costs (30%), Service Rate (40%)

Analysis of Game Data



YEAR: **2025**

STATUS:
- Upcoming
- Finalizing
- Done

Passenger Satisfaction

Passengers Served

Overall Score

Operating Costs

Waiting Time

Input History

Game Insights

- **Optimisation**

The game is a real-life example of optimization

- **The obvious solution may not be the best solution**

More is not better :(

- **Don't Cut Queue!**

Players could learn something ethical from the game

Are you ready to manage your own Immigration Hall?

Queue It!

Thank you (:

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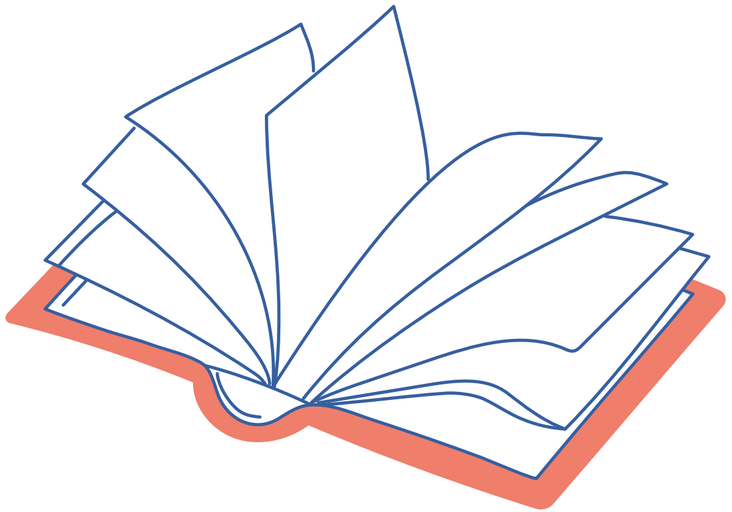
References



Shiny dashboard reference
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Dashboard icons
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Icons library
https://fontawesome.com/icons

Function to add multiple line breaks
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How to change the title of the game
https://mastering-shiny.org/action-graphics.html

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https://shiny.rstudio.com/articles/datatables.html

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