Project Mathematical Simulation 2019-2020

CSA Corporate -> handle consumers and corporate - - 60$/h
CSA Consumers -> handle consumers - - 35$/h

- **Consumers calls** : poisson, average 2/min 3am -> average 0.2/min
- **Consumers service time**: normal, u= 1.2min std= 35s, not less than 25s
- **Corporate calls** : poisson, 8am-6pm -> average 1/min || 6pm-10pm -> average 0.4/min || 10pm-8am -> average 0.1/min
- **Corporate service time**: normal, u= 3.6min std= 1.2min, not less than 45s

CSA work with **3 shifts** (6am – 2pm, 2pm – 10pm, 10pm – 6am)

Performances guarantee:

- **Corporate:**
  - 95% within 3 min
  - 99% within 7 min
- **Consumers:**
  - 90% within 5 min
  - 95% within 10 min

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Decision variables:

- # CSA corporates for shift 1, 2 and 3.
- # CSA consumers for shift 1, 2 and 3.
- Does the CSA corporates take care of the consumers? Yes/No
  - If yes, when? -> mixed strategy: when the # CSA corporate exceeds a threshold k, the extra ones help the consumers' service

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Task define **3 strategies**

- CSA corporates **do not** take care of the consumers at all
- CSA corporates **do** take care of the consumers
- CSA corporates **do** take care of the consumers under certain **conditions**

Eg. hire 3 CSA corporate for all 3 shifts, 5 CSA consumers and CSA corporate do not help the CSA consumers.

? At least one of the strategies has an alternative approach for the latter?

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Strategy **performance measures**

- consumers and corporates average waiting time
- % of customers exceeding the performance bounds
- average number of customers in the system
- total costs

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- 95% t-confidence interval to check of the assumptions are met
- Compare the different scenarios and choose the best one based on one output measure of choice

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Goals: Minimize costs while respecting all the constraints