Case Study: Emergency Department

Healthcare clients capture patient data in every department and with every process. However, hospitals often struggle with using this data analytically to improve their systems.

In this hospital, the existing Emergency Department (ED) system included the Fast Track and Main ED. The Fast Track area is for the patients who are not very sick and whose needs can typically be met quickly with few if any labs. Fast Track is currently staffed with only 1 nurse and 1 doctor. All the patients who go through the Fast Track area will get discharged to go home.

The Main ED area is for all patient types of course but the sickest patients must go to this area. This treatment area can be staffed with multiple doctors and nurses. A portion of patients going through the Main ED will require labs during the process. At the end of the Main ED process, a portion of the patients will get discharged to go home and the rest will be admitted to the hospital for further treatment. For the patients getting admitted, they will remain in the ED keeping their bed until they can get transferred into the appropriate department at which they will exit the ED system.

The existing system is struggling with its volume of patients. The predicted increase in volume is going to push the existing system past its breaking point. Discuss how simulation can be used to evaluate the system performance and design the appropriate system capacity.

Please sketch out the process flow of the system and identify

    a)   the components of the system
    b)   the input data needed to model the system
    c)   the simulation outputs collected to evaluate the system performance

System	Banking
Entities	Customers
Resources	Counters, bank tellers
Attributes	Type of service, service time
Activity	Making deposits, withdrawals
Events	Arrival, Departure
State variables	Number of customers waiting

e.g. **components** of a physical banking system
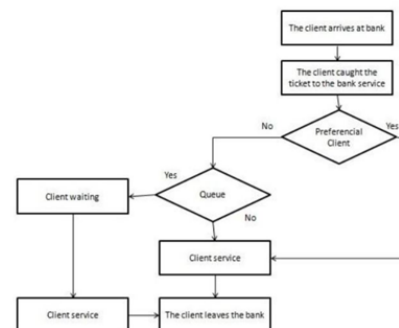
e.g. **process flow** of a physical banking system

Implement the simulation model in Python e.g. SimPy library and ensure the simulation outputs can be presented for actionable insights.

Submission Instructions:

Create a public git repository e.g., https://github.com/fred/myrepo. You may use any of the publicly available repositories like GitHub, Gitlab, etc.

a)   Add a requirements.txt for Python libraries

b)   Add a README.md file to document the set up and run instructions for your code.

c) Add a writeup on the simulation model algorithm and an explanation how to interpret the simulation outputs.

d) Add your process flow chart