

Project Title: **Customer Wait Time Simulation for Café Staffing Optimization**

Project Scope

This project simulates customer arrivals and wait times at a café throughout the day, based on employee scheduling during 20-minute time blocks. It uses statistical distributions to model real-world behavior and provides insights into how staffing levels affect customer experience and labor costs.

Objectives:

Ghassan Al Sarmi

- Learn to apply Poisson and Exponential distributions in a real-world simulation.
- Understand the impact of employee scheduling on customer wait times.
- Gain confidence in writing modular and clean Python code.
- Lead team coordination and final report writing.

Gabriel Atun

- Led the technical development of the project, including the full simulation engine and data flow.
- Designed and implemented the employee scheduling input and cost calculations. Refined the performance logic and optimized the simulation runtime.
- Supported debugging, documentation, and GitHub version control throughout the project.

Team Objectives

- Simulate customer wait times based on staffing and peak demand.
- Integrate labor cost analysis for operational decision-making.
- Produce well-documented and reusable code in Python.
- Create a clear, informative presentation of results and share all deliverables on GitHub.

Technologies and Tools

- **Programming Language:** Python
- **Libraries:** NumPy (for simulation), Matplotlib (optional for visualization maybe)
- **Tools:** GitHub, Visual Studio Code, Google Docs, Canva (for diagrams)

Project Timeline

Date Range	Task
Feb 7 – Feb 11	Define project scope and objectives
Feb 12 – Feb 18	Collect and organize historical data
Feb 19 – Feb 25	Design system structure & input/output plan
Feb 26 – Mar 10	Develop simulation logic + employee inputs
Mar 11 – Mar 17	Add staffing cost + peak hour functionality
Mar 18 – Mar 28	Run simulations & analyze results
Mar 29 – Apr 2	Build final presentation + visuals
Apr 3 – Apr 5	Finalize PDF, push to GitHub, and submit