

# Technical Report for Group Repo-08 (IGEL): Healthcare Suite

## Overview

This project consists of three components: (1) CSV-based drug interaction checker, (2) SIR epidemiological simulator, and (3) priority-based appointment scheduling system.

## Drug Interactions

Interactions are indexed by an unordered normalized pair (drug1, drug2), enabling constant-time lookup. For each medication list, all  $n(n-1)/2$  pairs are checked and matches are sorted by severity.

## SIR Model

The SIR model is defined using differential equations for susceptible, infected, and recovered populations. Numerical integration is performed using the Euler method with time-step control to conserve population size.

## Scheduling

The scheduling system models clinic working hours and confirmed appointments. A greedy algorithm assigns the earliest available slot within a request window. Emergency requests may preempt lower-priority appointments.

## Testing and Quality

Area	What is Implemented
Modularity	Separate packages for interactions, SIR model, scheduler, and user interfaces
Correctness	Unit tests validate interaction matching, SIR invariants, and emergency scheduling logic
Style	PEP8-compliant structure with clear naming and reduced redundancy

## LLM Usage and Reflection

Large Language Models (LLMs) were used as a supportive tool during the development of this project. They were primarily used to generate initial ideas for system structure, suggest example code snippets, and assist with understanding algorithms such as the SIR epidemiological model and priority-based appointment scheduling.

All generated suggestions were critically reviewed, adapted, and simplified by the author to meet the coursework requirements. Core logic, data structures, and testing were implemented manually to ensure correctness and understanding.

Overall, LLMs were used as an assistive learning tool rather than a replacement for independent problem-solving.