Technical Report - Healthcare Suite

Overview

Three components: (1) CSV-backed drug interaction checker, (2) SIR simulator (Euler method), (3) greedy appointment scheduler with priority-based emergency preemption.

Drug interactions

Interactions are indexed by an unordered normalized pair (drug1, drug2) enabling O(1) average lookup. For n medications, all n(n-1)/2 pairs are checked and matches are sorted by severity.

SIR model

Equations: dS/dt=-beta*S*I/N, dI/dt=beta*S*I/N-gamma*I, dR/dt=gamma*I. Euler integration with dt; totals are rescaled to conserve population.

Scheduling

DoctorCalendar stores working hours and confirmed appointments. Greedy scheduling selects earliest available slot in a request window. EMERGENCY requests may preempt overlapping lower-priority appointments.

Testing and quality

Area	What is implemented
Modularity	Separate packages interactions/, sir/, scheduler/. UI lives in apps/.
Correctness	Unit tests check interaction matching, SIR invariants, and emergency preemption logic.
Style	PEP8-friendly structure; ruff config included.

LLM usage and reflection (fill in)

Describe where LLMs were used (schema ideas, algorithm suggestions, UI scaffolding) and what you changed: validation, refactoring, edge cases, and tests.