Backend Intern

Assignment: OPD Token Allocation Engine

Design and implement a token allocation system for hospital OPD that supports elastic capacity management.

Context

Doctors operate in fixed time slots (e.g., 9–10, 10–11). Each slot has a maximum capacity. Tokens are generated from multiple sources:

- Online booking
- Walk-in (OPD desk)
- Paid priority patients
- Follow-up patients

The system must dynamically handle real-world variability such as delays, cancellations, and emergency insertions.

Task

- Design an algorithm that:
  - Enforces per-slot hard limits
  - Dynamically reallocates tokens when conditions change
  - Prioritizes between different token sources
  - Handles cancellations, no-shows, and emergency additions
- Build the core logic as an API-based service

Deliverables

- API design (endpoints + data schema)
- Implementation of the token allocation algorithm
- Documentation explaining:
  - Prioritization logic
  - Edge cases
  - Failure handling
- A simulation of one OPD day with at least 3 doctors

Evaluation Criteria

- Quality of algorithm design
- Handling of real-world edge cases
- Code structure and clarity
- Practical reasoning and trade-offs