

Use-case Diagram & Data Flow Diagram

1) Campus Room Booking

The university wants a lightweight web system where students and lecturers can reserve study rooms across multiple buildings. Users search by (1) date, (2) time, (3) capacity, and (4) equipment (whiteboard, projector). When a user submits a booking request, it is placed in a pending queue visible to department administrators. Administrators approve or reject requests; approvals immediately appear on a public schedule board that anyone on campus can view without signing in.

A user may cancel their own upcoming booking. Administrators can override and cancel any booking, but the system must notify the affected requester by email. Rooms have opening (operating) hours set per building, and bookings outside those hours are not permitted. Double-booking is not allowed: the system must detect clashes before a request is accepted into the queue. The catalog of rooms (name, building, capacity, equipment, maintenance status) changes occasionally; maintenance status temporarily removes a room from search results.

Authentication exists for requesters and administrators. The system keeps booking history for audit for one academic year. The public schedule never shows requester names – only room, date/time, and status.

2) Campus Food Ordering

The campus cafeteria runs a mobile ordering app. Customers browse a live menu with prices and item stock that update throughout the day. A customer builds a cart and places an order for pickup or on-campus delivery. On order placement, the system validates stock, reserves ingredients, and creates a kitchen ticket. Kitchen staff see tickets in sequence and mark them as “prepping,” “ready,” or “out of stock.” If an item is out of stock after reservation (e.g., spoilage), the kitchen can mark a partial shortage and suggest substitutions; customers may accept a substitution or cancel before prep completes.

Payment is processed through an external payment gateway. If payment authorization fails, the order does not proceed and any reserved stock is released. Successful payments create a payment record containing only a token reference – no card data is stored. For delivery orders, a dispatcher assigns an internal courier. The customer can check real-time status updates and receive SMS notifications when the order is accepted, ready, out for delivery, or delivered. If an order is canceled before prep starts, a full refund is initiated; otherwise, cafeteria policy determines partial refunds.

Managers can update the menu, prices, daily specials, and stock levels, and can view order summaries by time window. The system keeps order history for 90 days for customers and 2 years for managerial reporting. The SMS service and the payment gateway are external

systems. Couriers only see pickup/delivery details necessary to complete the job; they never see full payment information.

3) Telehealth & e-Prescription Service

A multi-clinic provider offers both in-person and video consultations. Patients register, manage profiles, and book appointments with specific doctors or the first available slot, choosing in-person or telehealth. Time-zone handling is required for remote patients. Before confirming an appointment, the system checks doctor availability, room availability (for in-person), and telehealth session capacity (for video). Patients may cancel or reschedule subject to clinic policy and cutoff windows.

For telehealth visits, when the appointment time arrives, the system generates a time-limited video session link via an external video platform. Doctors authenticate with stronger security than patients and access a clinical console to review patient records, capture consultation notes, and attach lab results. Doctors can issue an e-prescription; the system checks for drug interactions and controlled-substance rules. Approved e-prescriptions are transmitted electronically to the patient's chosen partner pharmacy. Patients may later request refills; refill rules depend on medication class and past prescription data.

Payments can be handled either via insurance or self-pay. For insured visits, the system prepares a claim package and submits it to the insurer; adjudication results can approve, partially cover, or deny the claim. The patient is notified of any remaining balance and may complete payment through an external processor. For self-pay, the system captures payment at booking or after the consultation, depending on clinic policy.

External systems include: insurance providers (claims), payment processors (transactions), pharmacies (e-prescriptions), lab systems (results), the video platform (telehealth), and a notification service (email/SMS). The system stores patient records, appointments, prescriptions, claims, and payments with audit logging. Personally identifiable and health information must be minimized in notifications, encrypted at rest in core stores, and access-logged. If a video session drops, the doctor can re-issue a session link within the same appointment window; if the insurer denies a claim, the clinic may create an appeal record linked to the original claim.

— THE END —

Màu vàng: Actor

Màu cam: Usecase

Hint:

☰ 01-Quick-Reference-Checklists