Use Case Specification: Book Appointment

Basic Information

Field	Value
Use Case ID	UC-APP-01
Use Case Name	Book Appointment
Primary Actor	Patient, Nurse, Administrator
Secondary Actors	Doctor, System (Notification Service, Calendar Service)
Brief Description	Allows an authenticated user to schedule a new appointment with a doctor, selecting from available time slots based on date, doctor, and appointment type.
Priority	High (Core functionality for patient engagement)
Status	Proposed / In Analysis
Module	Appointment Scheduling
Related Requirements	REQ-APP-001, REQ-APP-002, REQ-APP-003, REQ-APP-004, REQ-APP-006, REQ-APP-007, REQ-APP-010

Preconditions

1. The user (Patient, Nurse, or Administrator) is **logged in** and authenticated.
2. The user has appropriate permissions:
    - o Patient: can book for themselves.
    - o Nurse/Administrator: can book for any patient.
3. Doctor exists in the system and has defined availability.
4. Internet connection is available.
5. Calendar and notification services are operational.

Postconditions

1. A new appointment is created in the system with status "Scheduled".
2. Appointment is linked to patient, doctor, date, time, type, and duration.
3. Patient receives a confirmation notification (email/SMS).
4. Doctor is notified of the new appointment (within 1 hour).
5. Appointment appears in the user's and doctor's calendar views.
6. Audit log records the booking action.

Main Success Scenario (Basic Flow)

Step	Actor	System
1	—	User navigates to "Book Appointment" page.
2	User	Selects doctor, preferred date, and appointment type (e.g., consultation, follow-up).
3	System	Retrieves and displays available time slots in real-time (REQ-APP-008).

4	User	Selects a valid time slot.
5	User	Confirms appointment details.
6	System	Validates: - Doctor is available at selected time (REQ-APP-004) - No double-booking (REQ-APP-002) - Patient has no overlapping appointment (REQ-APP-003)
7	System	Creates appointment record with status "Scheduled".
8	System	Links appointment to patient, doctor, and user who booked it.
9	System	Sends confirmation: - Email to patient - SMS reminder scheduled (24h prior) - Notification to doctor (within 1 hour) (REQ-APP-010, REQ-APP-011, REQ-APP-012)
10	System	Logs booking event in audit trail.
11	System	Displays success message: "Appointment confirmed for [date] at [time]."
12	System	Updates doctor's calendar in real-time.

Alternative Flows

A1 – No Available Time Slots

- **Trigger**: Step 3 – No slots available for selected date/doctor.
- **Steps**:
    1. System displays message: "No availability found. Please try another date or doctor."
    2. Offers "Suggest Nearby Slots" option (e.g., ±1 day).
- **Resume**: User adjusts selection and retries.

A2 – Nurse or Admin Books for Patient

- **Trigger**: Actor is Nurse or Administrator.
- **Modification**:
    o Step 2: User selects patient from a searchable list.
    o Step 6: System validates patient's eligibility (active account, no no-show history if policy applies).
    o Step 9: Confirmation sent to patient (not actor).

Exception Flows

E1 – Doctor Unavailable at Selected Time

- **Trigger**: Step 6 – Doctor marked as unavailable (e.g., emergency, vacation).
- **Steps**:
    1. System blocks booking.
    2. Displays: "Doctor is no longer available at this time. Please select another slot."
    3. Refreshes availability.
- **End**: User selects new slot or cancels.

E2 – Overlapping Appointment Detected

-

- **Trigger**: Step 6 – Patient already has an appointment at the same time.
- **Steps**:
    1. System blocks booking.
    2. Displays: "You have another appointment at this time. Please choose a different slot."
    3. Highlights conflicting appointment.
- **Resume**: User selects new time.

E3 – Notification Service Failure

- **Trigger**: Step 9 – Email or SMS service is down.
- **Steps**:
    1. System logs error.
    2. Proceeds with appointment creation.
    3. Flags notification for retry.
    4. Displays: "Appointment confirmed. Notification may be delayed."
- **Note**: Audit log records partial failure.

Business Rules

- **BR-APP-01**: Appointments can be 15, 30, 45, or 60 minutes.
- **BR-APP-02**: Appointment types: consultation, follow-up, examination.
- **BR-APP-03**: Patients cannot book overlapping appointments.
- **BR-APP-04**: Doctors cannot be double-booked at the same time (REQ-APP-002).
- **BR-APP-05**: Only authenticated users can book appointments.
- **BR-APP-06**: Nurses and admins can book on behalf of patients.

Non-Functional Requirements

ID	Requirement
REQ-PERF-002	Page loads in less than 2 seconds; calendar renders in <1s.
REQ-USE-002	Interface responsive on desktop, tablet, and mobile.
REQ-APP-011	Appointment reminders sent: 48h (email), 24h (SMS).
REQ-APP-012	Doctor notified of new appointment within 1 hour.
REQ-SEC-003	All booking actions logged in audit trail.

Data Dictionary (Key Fields)

Field	Type	Required	Validation
Patient	UUID	Yes	Must be active patient
Doctor	UUID	Yes	Must be active and available
Date	Date	Yes	Future date only
Time	Time	Yes	Must match available slot
Appointment Type	Enum	Yes	consultation, follow-up, examination
Duration	Integer (min)	Yes	15, 30, 45, 60
Status	String	Auto-set	Scheduled (default)

Notes and Open Issues

- Future enhancement: Allow rescheduling during booking (if slot is free).
- Patients can cancel up to 24 hours in advance (covered in UC-APP-02_Cancel_Appointment).
- Mobile view: Critical functions (view, book) must be accessible on smaller screens.