Software Requirement Specification (SRS) Of SmartClinic 2.0 Project

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1. Purpose

The purpose of this SRS is to document the requirements for **SmartClinic 2.0**, a web/mobile Appointment & Patient Management System designed to replace the clinic's existing paper-based workflows. The system will provide appointment booking and rescheduling, patient record management, automated reminders, real-time calendars, and reporting while ensuring data security, reliability, and ease of use for receptionists, doctors, and patients.

2. Scope

SmartClinic 2.0 will support:

Patient registration and profile management (demographics, contact, history).

Appointment booking, rescheduling, cancellation (by receptionist, patient, or doctor).

Doctor availability management and real-time calendar.

Automated reminders (SMS / email) and in-app notifications.

Queue & waiting-room status and check-in.

Secure access control for roles (Receptionist, Doctor, Admin, Patient).

Audit logging, backup & recovery, and basic analytics/reporting (no-show rates, peak hours).
Boundaries / out of scope:

Full Electronic Medical Records (advanced clinical notes, imaging storage) beyond basic visit history (can be integrated later).

Billing/payment processing (may be added as an integration).

Complex third-party EHR integrations (out of scope for initial release, but supported via API).

3. Definitions / Glossary

Appointment: A scheduled meeting between a patient and a doctor at a date/time and clinic location.

Slot: A discrete time interval available for booking (e.g., 10 minutes).

Patient Profile: Stored information about a patient (name, contact, DOB, history).

Receptionist: Clinic staff who manages front-desk operations and bookings.

Doctor: Medical staff who sets availability and reviews patient records.

Admin: User with system configuration privileges.

No-show: A patient who does not attend a scheduled appointment.

Reminder: SMS/email/in-app message sent ahead of appointment.

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4. Functional Requirements (FR)

Each requirement has an ID, short description, actor(s), priority, and acceptance criteria.

FR-01 — Patient Registration & Profile Management

Description: Create, read, update, delete (CRUD) patient profiles with demographics and contact.

Actors: Receptionist, Patient (self-registration), Admin.

Priority: High

Acceptance Criteria: Receptionist can create and update patient record; patient can register via a public form; duplicate detection flag shown for same phone/email.

FR-02 — Appointment Booking

Description: Book new appointments by selecting doctor, date, time slot, purpose, and patient.

Actors: Receptionist, Patient, Doctor (for referrals).

Priority: High

Acceptance Criteria: System prevents double-booking; booking confirmation issued (SMS/email/in-app); booking reflected on doctor calendar immediately.

FR-03 — Appointment Rescheduling & Cancellation

Description: Reschedule or cancel appointments with automatic update to calendar and notifications to patient/doctor.

Actors: Receptionist, Patient, Doctor.

Priority: High

Acceptance Criteria: Original slot freed; updated notification sent; audit log entry created for the change.

FR-04 — Doctor Availability & Leave Management

Description: Doctors set available working slots, block off leave/time-off, and define default slot durations.

Actors: Doctor, Admin.

Priority: High

Acceptance Criteria: Changes are visible in real-time; system prevents bookings during blocked/off times.

FR-05 — Automated Reminders & Notifications

Description: Send configurable reminders via SMS/email/in-app at predefined intervals (e.g., 48h, 24h, 2h) before appointments.

Actors: System (automated), Admin (configure).

Priority: High

Acceptance Criteria: Reminders sent according to configured schedule; delivery status logged; retries for failed SMS/email attempted.

FR-06 — Real-Time Appointment Calendar & Day View

Description: Provide interactive calendar (day/week/month) for each doctor including status (confirmed, checked-in, no-show).

Actors: Receptionist, Doctor.

Priority: High

Acceptance Criteria: Calendar updates within 5 seconds of any booking change; color/label legend present for statuses.

FR-07 — Check-in / Queue Management

Description: Allow reception to mark patient as “arrived/checked-in” and show queue order; notify doctor of next patient.

Actors: Receptionist, Doctor.

Priority: Medium

Acceptance Criteria: Queue view shows waiting time estimates, current patient, and next up; doctor receives a notification when patient is checked-in.

FR-08 — Patient Medical History (basic)

Description: Store visit notes, diagnoses, prescriptions (text), and follow-up recommendations linked to appointments.

Actors: Doctor, Receptionist.

Priority: Medium

Acceptance Criteria: Doctors can add/edit visit notes; history accessible by authorized users; access audited.

FR-09 — Follow-up Scheduling

Description: After a visit, doctor can flag patient for follow-up and create follow-up appointments with reminders.

Actors: Doctor, Receptionist.

Priority: Medium

Acceptance Criteria: Follow-up recorded in the patient timeline; reminders scheduled and sent.

FR-10 — Search & Filter

Description: Fast search for patients, appointments, and records by name, phone, ID, or date range.

Actors: Receptionist, Doctor, Admin.

Priority: High

Acceptance Criteria: Search returns results within 2 seconds for datasets up to X (specify expected scale—see NFRs); filter options available.

FR-11 — Notifications to Staff (delay/cancellation)

Description: Notify doctors and reception if appointment delayed, canceled, or high-priority alerts arise.

Actors: System, Receptionist.

Priority: Medium

Acceptance Criteria: Notifications delivered in-app and optionally via SMS/email.

FR-12 — Activity Logging & Audit Trail

Description: Log major actions (book/reschedule/cancel/login/data changes) with timestamp and user.

Actors: System.

Priority: High

Acceptance Criteria: Audit log queryable by Admin; exportable CSV for period.

FR-13 — Reporting & Analytics (basic)

Description: Provide reports: daily appointments, no-shows, peak hours, doctor utilization.

Actors: Admin, Clinic Manager.

Priority: Medium

Acceptance Criteria: Reports exportable and viewable for selected date ranges.

FR-14 — Role-Based Access Control (RBAC) & Authentication

Description: Define roles (Admin, Receptionist, Doctor, Patient) with appropriate permissions; secure authentication with password + optional 2FA.

Actors: All users.

Priority: High

Acceptance Criteria: Unauthorized access is denied; users see only permitted views/actions.

FR-15 — External Integrations (SMS/Email Provider API)

Description: Integrate with at least one SMS and one Email provider for notifications; provide abstraction for swapping providers.

Actors: System, Admin.

Priority: High

Acceptance Criteria: Node/HTTP integration successful; send/receive callbacks handled; provider failures logged and retried.

Notes: FR list contains 15 items (≥10 requested). Each FR can be expanded into use cases or UI mockups during design.

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5. Non-Functional Requirements (NFR)

(Each NFR includes target/measure when applicable.)

NFR-01 — Performance

Pages must render within **2 seconds** under normal load (up to 50 concurrent users). API responses for search should be under 1 second.

NFR-02 — Availability

99% uptime monthly SLA for clinic hours (exceptions for scheduled maintenance with 48-hour notice).

NFR-03 — Security & Data Protection

Data at rest must be encrypted (AES-256); transport must use TLS 1.2+. Role-based access control must be enforced. System must support account lockout after configurable failed login attempts.

NFR-04 — Privacy & Compliance

System must support compliance with applicable healthcare data regulations (e.g., HIPAA/GDPR equivalents) — provide data export and deletion features to meet legal requests.

NFR-05 — Usability

System shall be usable by non-technical staff after ⩽**2 hours** of training. Key workflows (book, reschedule, check-in) must be accomplishable in ⩽3 clicks.

NFR-06 — Mobile Compatibility/Responsiveness

UI must be responsive and usable on phones/tablets (modern browsers, Android/iOS). Key flows available via mobile web (or light-weight app).

NFR-07 — Scalability

The system should support horizontal scaling to handle future growth (target initial dataset: 50k patient records, 100k appointments).

NFR-08 — Backup & Recovery

Automated daily backups and point-in-time restores; RPO $\leqslant$ 24 hours; RTO $\leqslant$ 4 hours for critical data.

NFR-09 — Reliability & Fault Tolerance

Retry logic for failed external notifications; graceful degradation (read-only mode) if backend services fail.

NFR-10 — Auditability & Logging

All security and business-critical events must be logged and retained per retention policy (e.g., logs for minimum 1 year).

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6. Inputs

Typical inputs required by the system (fields & validation notes):

User credentials: username, password, 2FA token (optional).

Patient details: full name, DOB, gender, phone, email, address, emergency contact, patient ID. (Phone/email validation required).

Appointment details: patient ID, doctor ID, date, slot start/end time, appointment type (consultation, follow-up), notes.

Doctor availability: working days, slot length, blocked times, leave dates.

Visit notes: text entries for diagnosis, treatment, prescriptions.

Notification settings: preferred channels, reminder schedule.

Admin settings: SMS/email provider credentials, clinic hours, slot duration defaults.

7. Outputs

System outputs and artifacts:

Booking confirmation: on-screen receipt + SMS/email with appointment details and unique appointment ID.

Calendar views: day/week/month views with status indicators.

Reminders/notifications: SMS/email/in-app reminder messages.

Reports: PDF/CSV exports for appointments, no-shows, utilization.

Audit logs: downloadable activity logs.

Error messages & validation notices: clear, actionable messages for users.

Patient visit summary: printable summary after visit.

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8. Constraints

Clinic hours: bookings must respect configured clinic working hours unless explicitly overridden.

Slot granularity: minimum slot length is configurable, default 10 minutes.

Authentication: all users require authenticated login; some sensitive operations require elevated role.

Offline dependency: primary system requires internet connectivity; an offline-lite check-in fallback (manual entry) may be available but will sync when online.

Third-party limits: SMS gateway character limits and rate limits apply; system must handle provider rate limiting.

Data retention & privacy laws: patient data retention must comply with local legislation; deletion requests must be honored per policy.

Storage & capacity: initial deployment sized for up to 50k patients and 100k appointments unless scaled.