



NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY

School of Electrical Engineering and Computer Sciences

Web Engineering (CS-344)

Assignment # 1

Title of the assignment: Website Proposal

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1. Purpose of the Website

The purpose of our website is to create a digital treatment management platform that connects doctors with their patients and streamlines the entire treatment journey.

Currently, many clinics rely on paper-based records or fragmented systems that make it difficult for doctors to track patient history, progress, and special requirements. Patients often do not have visibility of their treatment plans and are unaware of how much progress they have made.

Our proposed website solves these problems by:

- Allowing doctors to digitally record patient information, medical history, and special conditions.
- Generating personalized treatment plans for each patient.
- Tracking progress automatically and displaying it in percentage form.
- Giving patients access to their profiles so they can see past treatments, next steps, and doctor remarks.

This system is needed because it improves efficiency, ensures personalized care (especially for patients with conditions like ADHD, autism, or anxiety), and enhances communication between doctors and patients.

2. Goals & Objectives

Our project has the following goals and objectives:

- Doctor Management:** Provide doctors with a secure dashboard to add, view, and manage their patients.
- Patient Profiling:** Collect detailed information about patients, including questionnaires that capture medical and behavioral conditions.
- Treatment Planning:** Enable doctors to create customized, step-based treatment plans.
- Progress Tracking:** Show treatment progress in percentages, automatically calculated as steps are completed.
- Patient Engagement:** Allow patients to log in and view their progress, doctor remarks, and upcoming treatments.

- f. **Improved Care:** Help doctors provide better care by considering individual differences such as sensitivity, anxiety levels, or special needs

3. Target Audience

Our target audience includes two groups:

a. Doctors

- Age Group: 25–60
- Background: Dentists, oral surgeons, paediatric dentists, general practitioner
- Location: Initially local/national, but scalable internationally
- Skills: Comfortable with computers and web applications

b. Patients

- Age Group: 10–70
- Background: General public seeking dental care
- Skills: Average digital literacy, able to use a simple portal
- Needs: Easy access to treatment history, progress updates, and upcoming plans
- Doctors will use the system daily/weekly to update treatment plans and monitor progress.
- Patients will log in when they want to check their progress or upcoming appointments

4. Information to be Collected

a. Collected from Patients:

- Personal details (name, age, gender, contact info)
- Medical history (allergies, medications, chronic conditions)
- Questionnaire responses (sensitivity, anxiety, ADHD/autism, etc.)

b. Collected from Doctors:

- Treatment plan details (steps, order, expected completion)
- Remarks/notes after each sitting

c. Provided to Users:

- Doctors: Dashboard with patient list, medical history, treatment progress, and remarks section.

- **Patients:** Profile page with treatment history, percentage progress, and upcoming steps.

This information ensures doctors can deliver personalized care while patients remain informed and engaged.

5. Content Strategy

The website will include the following types of content:

- Forms:** Patient registration, medical history, and questionnaires.
- Dashboards:** Doctor view with patient details, progress percentages, and treatment timelines.
- Visual Indicators:** Progress bars clearly show percentage completion.
- Textual Notes:** Doctor remarks and instructions for patients.

Engagement Strategy:

- Patients stay engaged because they can track progress visually.
- Doctors are motivated to keep records updated since the system is quick and user-friendly.
- Content will remain up to date because doctors update patient progress after every treatment sitting.

6. Competitor Websites

a. Dentrux

- **Strengths:** Comprehensive practice management, widely used in dental clinics.
- **Weaknesses:** Expensive, complex, not focused on behavioral/special-needs profiling.

b. CareStack

- **Strengths:** Cloud-based system with billing and scheduling.
- **Weaknesses:** Overly detailed and heavy for academic or small-scale setups.

c. Open Dental

- **Strengths:** Affordable and open-source option for clinics.
- **Weaknesses:** Requires technical knowledge to customize, less patient-facing.

Our Website Difference:

Unlike existing systems, our project focuses on simplicity, personalization, and patient engagement. It introduces treatment progress tracking (percentage completion) and consideration of special conditions like ADHD and anxiety, which are often ignored in commercial solutions.

7. Success Criteria

We will measure the success of our website by:

- a. Doctors being able to register/login and manage their own patients securely.
- b. Patients being able to view their treatment progress and upcoming plans without confusion.
- c. Automatic calculation of treatment progress is based on completed steps.
- d. Positive feedback from test users (doctors and patients) on usability

8. Group Coordination & Task Delegation

- a. **Communication Tools:** WhatsApp group for instant communication and Google Meet for weekly check-ins.
- b. **Collaboration Tools:** GitHub will be used for version control and code collaboration. Each team member will work on separate branches and pull requests will be reviewed before merging to the main branch. This ensures smooth teamwork, prevents code conflicts, and provides a clear history of contributions.
- c. **Task Delegation:**
 - **Backend Developer:** Set up authentication, database schema, and treatment plan logic.
 - **Frontend Developer:** Build forms, dashboards, and progress bars.
 - **Documentation Lead:** Prepare reports, diagrams, and testing documents.
- d. **Fair Participation:** Each member will maintain a weekly progress log. Tasks will rotate if one area becomes overloaded, and GitHub commits will be reviewed to ensure accountability.

Software Requirements Specification (SRS)

1. Introduction

1.1. Purpose of the System

The proposed system is a comprehensive web application that provides dentists with a platform to automate dental treatment plan generation. The system leverages patient-specific inputs such as psychological factors, age, medical disorders, and personal health history to create structured, adaptive treatment strategies. Dentists can manage patient records, monitor progress, upload treatment documents, and record remarks, while patients gain access to questionnaires, their treatment plans, and progress dashboards. Administrators oversee user management, platform stability, and compliance.

The primary purpose is to reduce manual workload for dentists, standardize treatment planning, and improve patient engagement in their own dental care.

1.2. Scope of the System

The system is designed as a role-based SaaS platform supporting three categories of users

- **Admin:** Responsible for managing the overall platform, including adding/removing users (dentists and patients), monitoring platform usage, and ensuring data security.
- **Dentist:** Provides professional care by registering patients, generating and editing treatment plans, reviewing questionnaires, tracking patient progress, and uploading case documentation
- **Patient:** Participates in the treatment process by completing questionnaires, reviewing their treatment plans, tracking their progress, and accessing files and remarks shared by their dentist.

The system offers a secure login, personalized dashboards, automated workflows, and an intuitive interface. It is built with a modern stack: **Next.js for the frontend, Node.js with Express for the backend, and MongoDB for database management.**

1.3. Definitions, Acronyms, Abbreviations

- **SRS:** Software Requirements Specification
- **SaaS:** Software as a Service
- **UI:** User Interface

- **DB:** Database
- **Next.js:** React-based framework used for frontend development, providing server-side rendering and scalability
- **Node.js / Express.js:** Backend runtime and framework for handling API requests and business logic
- **MongoDB:** NoSQL database system for storing users, patients, and treatment-related documents
- **HIPAA/GDPR:** Standards for protecting healthcare and personal data

2. Overall Description

2.1. User Needs and Characteristics

- **Admin:** Needs visibility into user activity, ability to suspend or approve accounts, generate usage reports, and monitor compliance with regulations.
- **Dentist:** Requires efficiency in patient record management, accurate treatment plan suggestions, and tools for progress tracking. Dentists may not be highly technical, so UI simplicity and workflow automation are critical.
- **Patient:** Needs a straightforward interface with minimal steps to fill out questionnaires, track progress, and access their treatment data. Patients may vary widely in digital literacy.

2.2. Assumptions and Dependencies

- Users have reliable internet access and modern browsers.
- All users have unique, secure accounts.
- Dentists and patients can interact asynchronously (data is saved and available later).
- System depends on cloud-based infrastructure for scalability and secure data storage.
- Integration with third-party services may be required for secure file storage (e.g., X-rays, medical reports).
- Core stack:
 - **Frontend:** Next.js for dynamic rendering and responsive UI.
 - **Backend:** Node.js/Express for REST API and authentication.
 - **Database:** MongoDB for structured/unstructured healthcare data.

3. Functional Requirements

3.1. Authentication and Authorization

- Role-based login/register for Admin, Dentist, and Patient.
- Email verification and password reset functionality.
- Two-factor authentication for security (optional future enhancement).

3.2. Admin Features

- Manage dentist and patient accounts (approve, suspend, delete).
- Generate reports on system activity and usage.
- Monitor compliance and enforce security policies.
- Access audit logs of platform operations.

3.3. Doctor Dashboard

- Overview of patient count, recent updates, and pending questionnaires.
- Notifications for patient-submitted data requiring review

3.4. Doctor Profile

- Editable professional details including qualifications, clinic hours, and specialization

3.5. Patient Management

- Add new patients with demographic and medical details.
- Remove patients when inactive or requested.
- View a searchable/sortable patient list.
- Open detailed patient profiles

3.6. Patient Profile

- Demographic details (age, gender, medical history).
- Questionnaire responses.
- List of treatment plans.
- Progress timeline.
- Uploaded files (X-rays, reports).

3.7. Questionnaire

- Filled by patients: lifestyle, habits, symptoms, psychological concerns.
- Filled by dentists: clinical observations, medical history, test results.
- Stored in the patient's profile for reference

3.8. Treatment Plan Generation

- Automated suggestion engine based on questionnaire and history.
- Dentists can customize before saving.
- Versioning to track changes over time

3.9. Treatment Progress Marker

- Dentists mark milestones (completed appointments, procedures).
- Patients view progress as a timeline or percentage

3.10. Doctor Remarks

- Comments/feedback tied to specific treatment stages.
- Visible to patients in their dashboard

3.11. Case/Treatment Plan Uploading

- Comments/feedback tied to specific treatment stages.
- Visible to patients in their dashboard

3.12. Patient Dashboard

- Comments/feedback tied to specific treatment stages.
- Visible to patients in their dashboard

3.13. Notification System

- Comments/feedback tied to specific treatment stages.
- Visible to patients in their dashboard

3.14. Support and Help Section

- Comments/feedback tied to specific treatment stages.
- Visible to patients in their dashboard

4. Non-Functional Requirements

4.1. Performance Requirements

- Must handle 1000+ concurrent users.
- Treatment plan generation response under 3 seconds.
- File uploads supported up to 50MB per file

4.2. Usability Requirements

- Fully responsive UI (desktop, tablet, mobile).
- Simple, intuitive navigation across dashboards.

- Color-coded progress markers for clarity

4.3. Security Considerations

- HTTPS for all communication.
- Role-based access control.
- Data encryption in transit and at rest.
- Compliance with healthcare data protection standards.
- Admin-only access to audit logs

5. Preliminary Sitemap / Page List

5.1. Public Pages

- Home
- About (explaining system purpose)
- Contact
- Login / Register
- Help / FAQ

5.2. Admin Dashboard

- Overview
- Manage Users
 - Dentists
 - Patients
- Reports and Logs
- Security and Compliance

5.3. Dentist Dashboard

- Overview
- Profile
- Notifications
- Patient Management
 - Add Patient
 - Patient List
 - Patient Profile
 - Demographics

- Questionnaire
- Treatment Plans
- Progress Marker
- Remarks
- Case Uploads
- Reports (generate/export patient summaries)

5.4. Patient Dashboard

- Overview
- Profile
- Notifications
- Questionnaires (Pending, Completed)
- Treatment Plan (Current, History)
- Progress Tracker
- Doctor Remarks
- Uploaded Files
- Support

5.5. Sitemap Diagram (Textual)



