

AGUM JEREMIAH JONES 2024/BIT/178/PS

BIT ONE WEB DESIGN AND DEVELOPMENT  
BIT 1203 - WEB APPLICATION AND DESIGN  
SEMESTER PROJECT DOCUMENT  
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**Comprehensive Project Document**

**Introduction**

In the modern digital age, web-based solutions have become integral to solving real-world problems. This project document outlines three different problems, their corresponding web-based solutions, and a detailed step-by-step process for implementation. These problems are selected from different domains to showcase the application of web technologies in various fields.

**Problem 1: Limited Market Reach for Student-Run Small Businesses**

**Problem Statement**

Many university students run small businesses to support their education and daily expenses. However, they often struggle to reach a wider audience due to a lack of an online presence and limited marketing resources. Traditional methods such as word-of-mouth and posters have a limited reach, making it difficult for students to grow their businesses effectively.

**Proposed Web Solution**

A responsive **Student Business Marketplace Website** that allows student entrepreneurs to showcase and sell their products or services online, connect with potential customers within and outside the university, and manage their businesses more efficiently.

**Implementation Process**

1. **Requirement Analysis:**
   * Conduct surveys among students running businesses to understand their needs and challenges.
   * Identify common product categories such as food delivery, handmade crafts, tutoring services, and digital products.
2. **Technology Stack:**
   * Frontend: **HTML, CSS, JavaScript (React.js), Bootstrap** for mobile responsiveness.
   * Backend: **PHP (Laravel) and MySQL** for handling user data and transactions.
   * Payment Gateway: **Mobile Money API, PayPal** for seamless student payments.
3. **Feature Development:**
   * **Student Registration/Login**: Implement authentication using Laravel Passport.
   * **Business Profile Creation**: Enable students to create digital storefronts with product listings.
   * **Search and Filter System**: Users can find businesses based on categories, location, and popularity.
   * **Order Management & Payment Integration**: Implement an order tracking system and integrate a secure payment gateway.
   * **Review and Rating System**: Allow users to leave feedback on student-run businesses.
   * **Admin Dashboard for Marketplace Management**: University administration can monitor businesses and ensure compliance with policies.
4. **Testing & Debugging:**
   * Conduct usability testing with student entrepreneurs and customers.
   * Debug common issues such as session handling, data validation, and payment security.
5. **Deployment:**
   * Host the website using **Netlify (Frontend)** and **Heroku (Backend)**.
   * Optimize for performance and scalability.
6. **Maintenance:**
   * Implement feedback collection mechanisms to improve user experience.
   * Regularly update security patches and add new features as needed.

**Problem 2: Lack of Accessible Learning Platforms**

**Problem Statement**

Students, especially in rural areas, lack access to educational resources. Traditional learning methods do not provide the flexibility needed for remote learning.

**Proposed Web Solution**

A **Learning Management System (LMS)** that offers online courses, interactive content, and student-teacher engagement features.

**Implementation Process**

1. **Requirement Analysis:**
   * Conduct a survey among students and educators.
   * Identify the most sought-after features in an LMS.
2. **Technology Stack:**
   * Frontend: **HTML, CSS, Bootstrap, JavaScript (Vue.js)**
   * Backend: **Node.js (Express.js) with MongoDB**
   * Authentication: **Firebase Auth**
3. **Feature Development:**
   * **User Authentication (Students & Teachers)**: Role-based access control.
   * **Course Creation & Management**: Teachers can upload content in PDF, video formats.
   * **Video Lectures & Quizzes**: Integrate **Cloudinary API** for media storage.
   * **Discussion Forums & Messaging System**: Use **Socket.io** for real-time messaging.
   * **Progress Tracking & Certification**: Auto-generate completion certificates.
4. **Testing & Debugging:**
   * Beta testing with real students and teachers.
   * Fixing accessibility issues (WCAG compliance).
5. **Deployment:**
   * Frontend hosted on **GitHub Pages**.
   * Backend hosted on **Firebase Functions**.
6. **Maintenance:**
   * Continuous improvement based on analytics and user feedback.
   * Regularly update educational content.

**Problem 3: Inefficient Healthcare System for Mbarara University School of Medicine and Hospital**

**Problem Statement**

Mbarara University School of Medicine and its teaching hospital face challenges in managing medical student rotations, doctor-patient scheduling, and access to medical records. Medical students struggle to keep track of their clinical placements, doctors experience inefficiencies in scheduling patient consultations, and patients face difficulties in booking appointments and accessing their health records.

**Proposed Web Solution**

An **Integrated Healthcare Management System** tailored to Mbarara University School of Medicine and Hospital to ease the work of medical students, doctors, and patients.

**Implementation Process**

1. **Requirement Analysis:**
   * Interview medical students to understand their clinical rotation tracking needs.
   * Discuss with doctors the inefficiencies in patient scheduling.
   * Gather feedback from hospital administrators on medical record management.
2. **Technology Stack:**
   * Frontend: **HTML, CSS, JavaScript (Angular)**
   * Backend: **Django (Python) with PostgreSQL**
   * Notifications: **Twilio API** for SMS and email reminders.
3. **Feature Development:**
   * **Medical Student Portal**: Track clinical rotations, assignments, and schedules.
   * **Doctor Scheduling System**: Doctors can manage appointments and access patient histories.
   * **Online Appointment Booking for Patients**: Patients can select doctors, book slots, and receive confirmations.
   * **Electronic Medical Records (EMR) System**: Secure storage and retrieval of patient records.
   * **Admin Dashboard**: Hospital staff can oversee schedules, patient flow, and record management.
4. **Testing & Debugging:**
   * Conduct usability testing with students, doctors, and administrators.
   * Ensure data security compliance with hospital policies.
5. **Deployment:**
   * Backend hosted on **AWS or DigitalOcean** for scalability.
   * Frontend deployed on **Vercel**.
6. **Maintenance:**
   * Regular security patches and feature updates.
   * Continuous feedback collection to improve the system.

**Research and References**

Project concept is backed by credible sources. References include:

* **Nielsen, J. (2012). Usability Engineering. Morgan Kaufmann.**
* **MDN Web Docs: JavaScript & Frontend Development.** *(*[*https://developer.mozilla.org/*](https://developer.mozilla.org/)*)*
* **Django Official Documentation: Python Web Framework.** *(*[*https://docs.djangoproject.com/*](https://docs.djangoproject.com/)*)*
* **Firebase Documentation for Authentication & Hosting.** *(*[*https://firebase.google.com/docs/*](https://firebase.google.com/docs/)*)*
* **Stripe Developer Guide for Payment Gateway Integration.** *(*[*https://stripe.com/docs/development*](https://stripe.com/docs/development)*)*
* **Twilio API Documentation for SMS & Notifications.** *(*[*https://www.twilio.com/docs/*](https://www.twilio.com/docs/)*)*

**GitHub Repository Requirement**

Each student must create a personal GitHub repository to store and update their project source code. The GitHub link must be included in the conclusion section for verification and career growth.

**Conclusion and Reflection**

This document outlines three web-based solutions addressing critical real-world problems. By following structured development processes, these projects aim to provide practical and scalable solutions. The GitHub repository will serve as proof of work and allow students to contribute to the developer community.

GitHub Repository Link: **[ ]**