FSD Assignment 05

Aim: Develop a responsive web design using Express Framework to perform CRUD operations and deploy with Node Js. use Mongo DB.

Objectives:
- Develop a Full Stack Web Application
- Demonstrate Backend Development and Deployment Proficiency.

Theory:

1) What is the role of Express Js as a web frame for Node.js

→ Simplifies Server Creation.
- Express.js provides an easy and minimal way to create and manage web servers on top of Node.js

Routing:
- Offers a powerful routing mechanism to handle different HTTP requests (GET, POST, PUT, DELETE) and URLs efficiently.

Middleware Support:
- Allows use of middleware functions to process requests such as authentication, logging and data parsing.

Template Engine Integration:
- Supports template engines like EJs, Pug or Handle bars to render dynamic HTML pages.

API Development
- commonly used to build Restful API's making it ideal for backend development in full-stack web applications.

2) Explain the concept of CRUD operations in the context of a web application.

→ CRUD stands for Create, Read, Update, Delete which are the four basic operations used to manage data in a web application.

Create - Adds new data or records to the database (e.g. adding a new user or product).

Read - Retrieves or displays existing data from the database

Update - Modifies or edits existing records in the database.

3) Why is Mongo DB suitable choice for this project?

→ i) Document - Oriented Storage:
- Stores data in JSON-like documents, making it easy to work with Java Script and Node.JS
ii) Flexible Schema:
- Allows dynamic and evolving data structures suitable for web applications.
iii) Seamless Integration with Node.js
- works efficiently with Express.js using libraries like Mongoose for CRUD operations.

iv) High performance and scalibility:
- Supports fast read/write operations can scale easily for growing applications.

4) What steps are involved in deploying a Node.js and Express application?

→ Steps to Deploy a Node.js and Express Application

i) Prepare the application:
- Ensure all dependencies are listed in package.json
- Test the app locally to confirm it runs without errors.

ii) Choose a Hosting Platform:
- Options include Heroku, Render, Vercel and AWS

iii) Set up the Environment:
- Configure environment variable (e.g. database URI, API keys)
- Set the PORT variable for the server.

iv) Install Dependencies on Server:
- Use npm install on the server to install required packages

v) Start the Application:
- Use node app.js or process managers like PM2 to run the app continuosly.

vi) Connect to Database:
- Ensure the deployed app connects to the MongoDB database.

vii) Test the Deployment
- Verify all routes, APIS and frontend features are working as expected.

viii) Optional - Set up Domain and SSL
- configure a custom domain and secure it with HTTPs for production use.

Problem Statement

Project: A Simple E commerce Product Catalog Design and build a responsive web page that acts as a product catalog. The Express back end will handle all product data. The front end will display products in a grid. An admin panel (or separate web page) will allow an administrator to add new products, view a list of all products, modify a products details and remove products. The product information will be stored in a MongoDB collection