International Islamic University Chittagong
Department of Computer Science and Engineering (CSE)
Semester: (Autumn, Year: 2024) , B.Sc in CSE

Project Title: Innovia

Course Title: Software Development I
Course Code: CSE 2340
Section: 3AM

	NAME	ID
01	Md. Jabir Siddique Talim	C233005
02	Masad Rayan	C233007
03	Mashrur Ibne Mamun	C233023
04	Md. Shahriar Islam	C233032

Submitted To:
Mr. Md. Arif Asfe
Adjunct Lecturer
Department of CSE , IIUC

Index

INTRODUCTION:

Innovia is a comprehensive web-based platform designed to simplify the process of building and purchasing personal computers. The primary goal of this project is to cater to both PC enthusiasts and casual users by offering a user-friendly interface to customize their builds or choose from a selection of pre-configured PCs tailored to different needs.

The platform leverages modern web development technologies, including **React** for dynamic and responsive user interfaces, **Bootstrap** for an elegant and consistent design framework, and **Firebase** for secure backend integration, database management, and authentication.

Key features of Innovia include:

- **Custom PC Builder**: Allows users to select components such as processors, GPUs, memory, and storage to create a system that meets their specific requirements.
- **Pre-Built PC Options**: Provides ready-to-purchase systems optimized for various use cases, such as gaming, productivity, and general use.
- **Streamlined Purchase Process**: Ensures a seamless and secure checkout experience.

Innovia is designed with scalability, reliability, and user convenience in mind, making it an ideal solution for anyone looking to build or purchase their next PC. This report delves into the development process, technology stack, and key features of Innovia.

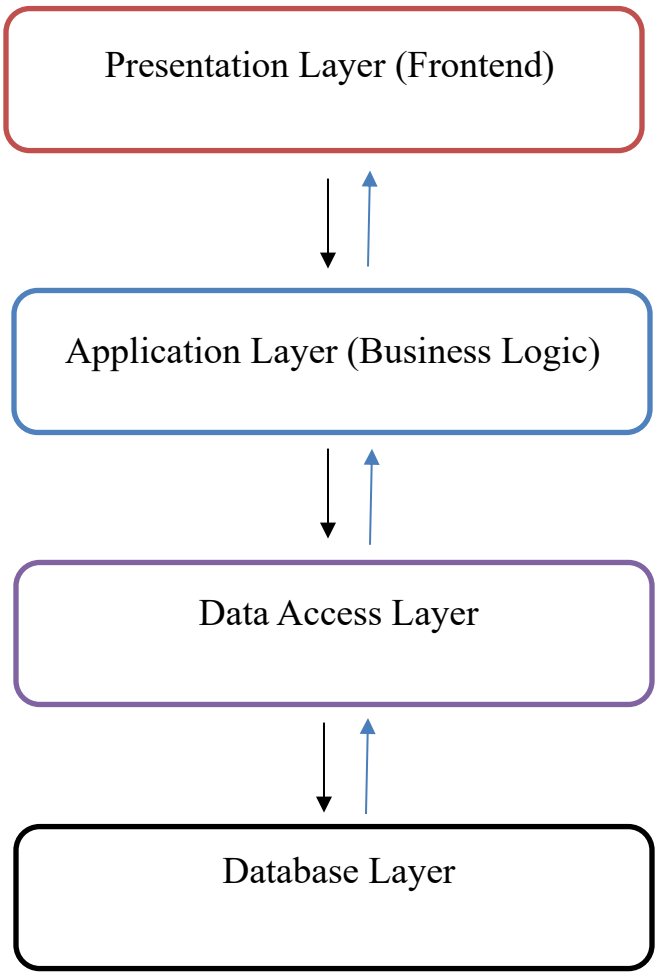
REQUIRED TECHNOLOGY:

- FRONT-END **:** React, Bootstrap
- BACK-END **:** FireBase

DESCRIPTION:

- **FRONT-END TECHNOLOGIES:**
  - **React**: For building the user interface and ensuring a dynamic and responsive experience
  - **Bootstrap**: For designing a visually appealing and mobile-responsive layout.
  - **CSS** and **HTML**: For styling and structuring web pages.
- **BACK-END TECHNOLOGIES:**
  - **Firebase**: For backend services including database management, authentication, and hosting.
  - **Firebase Authentication**: For secure user login and account management.

ARCHITECHTURE:



Presentation Layer:

Responsibilities:

- Displaying the home page with company details, previous builds, and contact information.
- Showcasing the "Build PC" interface where users select components.
- Handling the login/signup popup for user authentication.
- Capturing user input

Technologies:

- HTML/CSS/JavaScript for static content and styling.
- React, Bootstrap

Application Layer (Business Layer):

Responsibilities:

- Ensuring valid component selections.
- Redirecting from "Build PC" to login/signup if the user isn't logged in.
- Integrating with Firebase for user authentication and saving builds.
- Ensuring compatibility between components

Technologies:

- Backend logic written in JavaScript.
- Firebase SDK

Data Access Layer:

Responsibilities:

- Saving user build information to Firebase
- Authenticating users via Firebase Authentication.
- Retrieving user-specific data, such as saved PC builds or profile details.

Technologies:

- Firebase SDK & Auth

Database Layer:

Responsibilities:

- Storing structured data, such as user profiles, selected components, and saved builds.
- Managing user authentication credentials securely.

Technologies:

- Firebase Realtime Database for data storage.
- Firebase Authentication for managing user sessions.

How These Layers Interact:

1.User Journey Example:

- The user visits the **presentation layer** (home page) and clicks "Build PC."
- The **application layer** processes the navigation and loads the PC builder interface.
- The user selects components, and the **application layer** validates the selections.
- If the user tries to save the build:
    - The **application layer** checks for authentication via Firebase.
    - If logged in, the **data access layer** saves the build to Firebase.
    - If not, the **presentation layer** shows the login/signup popup.
- The **data access layer** communicates with the Firebase **database layer** to handle saving or retrieving data.

2. **Authentication Example**:

- The user provides login credentials in the **presentation layer**.
- The **application layer** forwards these credentials to Firebase through the **data access layer**.
- Firebase (**database layer**) verifies the credentials and returns the result.

When this architecture will break :

- **Excessive Database Reads/Writes**:
    - Firebase has quotas and limits. High traffic or frequent database reads/writes (e.g., auto-saving user actions) can quickly exhaust these limits.
- **Inefficient Data Structure**:
    - Storing data inefficiently in Firebase (e.g., flat structures for deeply nested data) can lead to slow performance and high read costs.
- **Concurrent Access Issues**:
    - Simultaneous updates (e.g., two users editing the same build) might cause conflicts if concurrency is not handled properly.
- **Tight coupling or Layer dependency leakage**
    - In our architecture, we noticed an issue with tight coupling between layers. For example, if we make any changes in the Data Access Layer, like modifying how data is stored or retrieved, it requires updates in other layers like the Application and Presentation Layers. This dependency creates a lot of extra work and makes the system harder to maintain and scale**.**

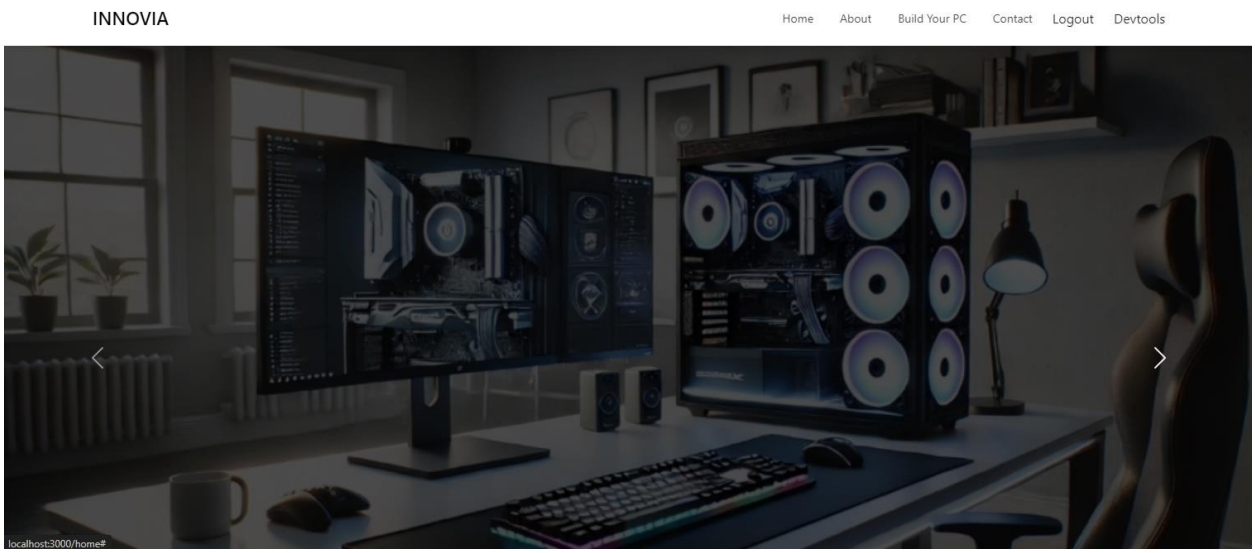
FRONT-END COMPONENTS:

1.**USER END**:

- **1.1 Home Page**:

  The Home Page of *Innovia* serves as the primary interface for welcoming users to the platform. It provides an intuitive and visually appealing introduction to the website's features and services.
  The page highlights the core functionalities of Innovia, including:
  - **Custom PC Building**: A feature enabling users to select individual components and create a personalized PC build.
  - **Pre-Built PCs**: A curated collection of high-quality, ready-to-purchase systems designed for different use cases such as gaming, productivity, and general use.
  - **User-Friendly Navigation**: Easy access to key sections such as **Build Your PC**, **About Us**, **Contact**, and account-related options.

  Used Component: React-Bootstrap(NavBar,Buttons,Container), React-Icon



INNOVIA

Home About Build Your PC Contact Logout Devtools

ABOUT US

- learn more about us -

At Innovia, we're passionate about providing you with only the best hardware for your custom PC builds. Whether you're a gamer, content creator, or power user, we source top-quality components to help you build the ultimate rig. From high-performance CPUs and GPUs to cutting-edge storage and cooling solutions, we offer everything you need to create a reliable, high-powered system tailored to your needs.

We believe that every PC should reflect its builder's vision, and our expert team is here to guide you in choosing the best components for maximum performance, stability, and longevity. When you shop with us, you're not just buying parts—you're investing in quality and expertise.

Start building with Innovia today, and experience the difference that premium hardware can make!

INNOVIA

Home About Build Your PC Contact Logout Devtools

OUR SERVICES

- services we provide -

Customer Support

Need help? At Innovia Our dedicated support team is here to assist you with any questions or concerns. Reach out anytime for expert advice!

Warranty

Shop with confidence—our warranty guarantees peace of mind. We cover defects and assist with replacements to keep your build running smoothly.

FAQs

Got questions? Check out our FAQs for quick answers on product compatibility, building tips, and more!

Troubleshooting

Encountering issues? Our troubleshooting guide and support team are ready to help resolve any problem and get your PC up and running.

Cable Management

Neat and tidy! Explore our cable management tips and accessories to keep your build looking clean and organized for optimal airflow.

Installation Services

Prefer hands-free setup? Our professional installation service ensures every component is installed perfectly, leaving you ready to power on

INNOVIA

Home About Build Your PC Contact Logout Devtools

CONTACT US

- get connected with us -

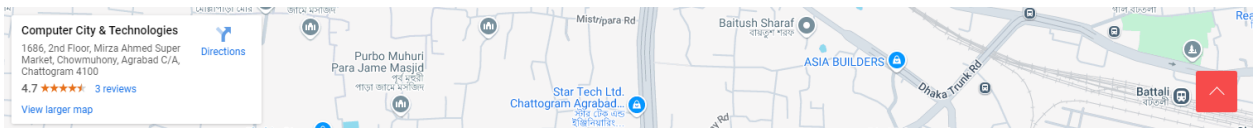
Enter your full name

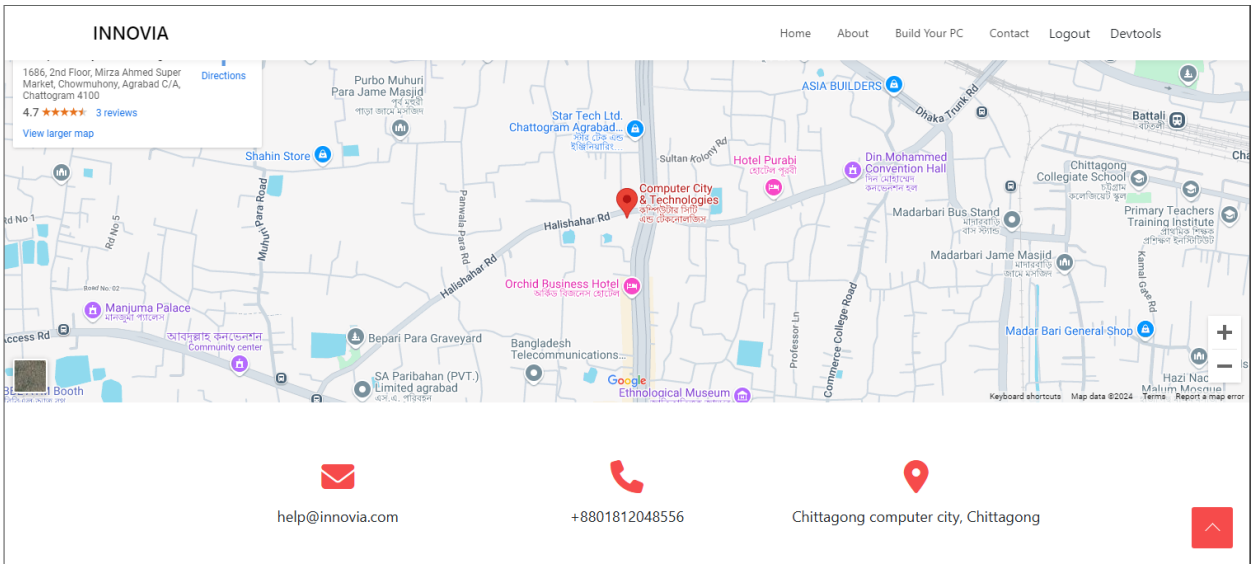
Enter your email address

Enter your contact number

Enter your contact message

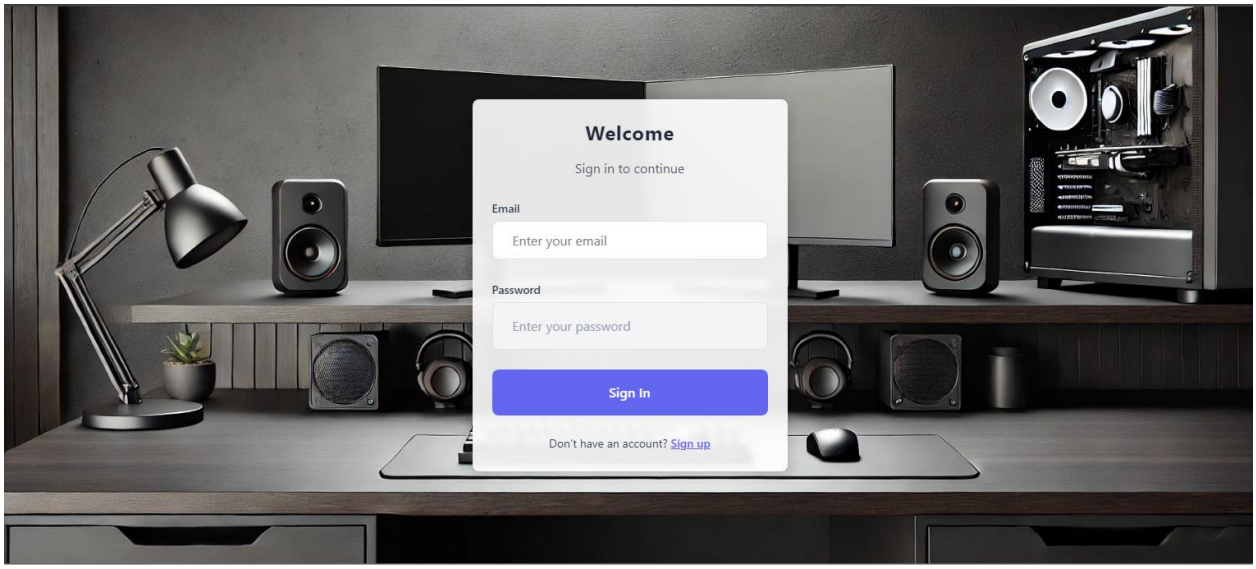
SUBMIT





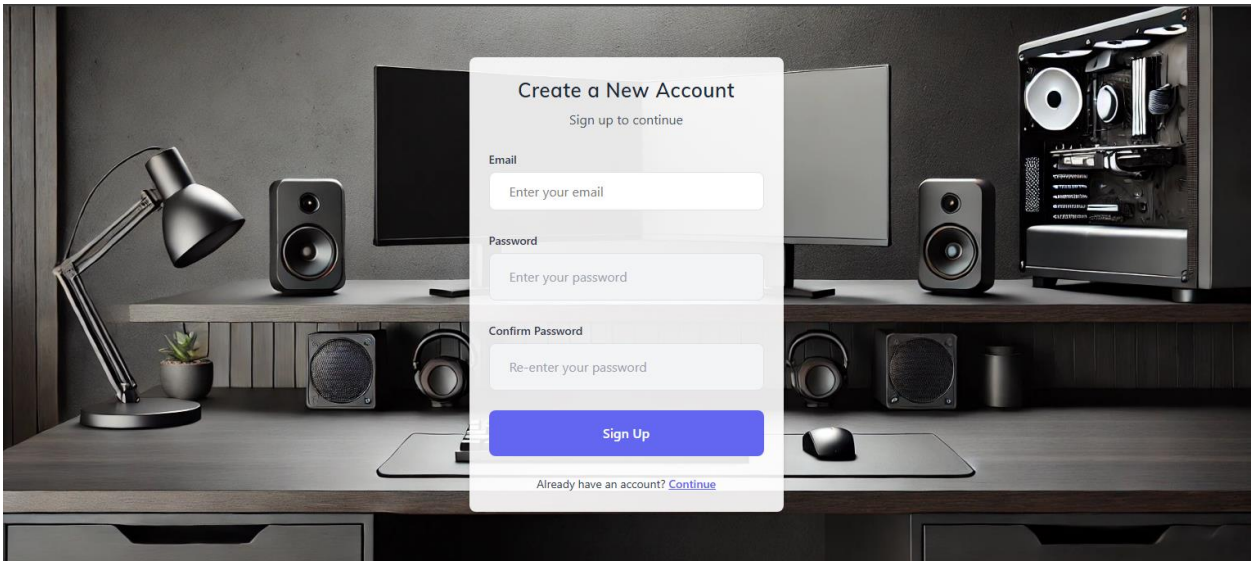
- **1.2 User Login Page:**
  The **Login Page** of *Innovia* provides users with a secure and seamless way to access their accounts. Designed using **HTML** and **Tailwind CSS**, it features a clean, modern, and responsive interface optimized for both desktop and mobile devices.
  Key features of the Login Page include:
  - **User Authentication**: Allows registered users to log in using their email and password securely.
  - **Responsive Design**: Ensures a consistent and user-friendly experience across all screen sizes.
  - **Minimalist Styling**: Leveraging Tailwind CSS for a sleek and professional look with easy customization.

  Used Component: HTML & Tailwind CSS



- **1.3 User Registration Page**:
  The **User Registration Page** of *Innovia* enables new users to create an account and access the platform's features. Built with **HTML** and **Tailwind CSS**, the page is designed to be simple, responsive, and user-friendly.
  Key features include:
    - **User Input Fields**: Collects essential details like email, and password for account creation.
    - **Form Validation**: Ensures accurate and secure data entry with real-time feedback.
    - **Responsive Design**: Provides a consistent experience across devices

  Used Component: HTML & Tailwind CSS



- **1.4 PC Builder**:
  The **PC Builder Page** of *Innovia* is the core feature of the platform, allowing users to create custom PC builds by selecting individual components. Built using **React**, this page delivers a highly interactive and dynamic user experience.
  Key features include:
    - **Component Selection**: Users can choose components like processors, GPUs, RAM, storage, and more from dropdown menus or categorized lists.

- **Real-Time Updates**: Displays the selected components and updates the total cost dynamically as users make changes.
- **Compatibility Checks**: Ensures that selected components are compatible, providing warnings or suggestions if needed.
- **Responsive Design**: Adapts seamlessly to different screen sizes, ensuring usability on both desktops and mobile devices.
- **Save Build** : Saves Build Info

Used Components: React-Bootstrap, Tailwind CSS.

2. Admin Site:

- **2.1 Admin Login**:
  The **Admin Login Page** of *Innovia* is designed to provide secure access for administrators to manage and oversee the platform. Built using **HTML** and **Tailwind CSS**, the page features a streamlined and responsive interface.
  This page serves as a gateway for admins to access management features such as monitoring user activity, managing component listings, and handling orders.
  Key features include:
  - **Admin Authentication**: Allows admins to log in using their credentials (username/email and password) securely.
  - **Form Validation**: Ensures accurate input and security with real-time validation feedback.
  - **Responsive Layout**: Offers a consistent and user-friendly design across various devices.

  Used Component: HTML & Tailwind CSS.

- **2.2 Component Listing**:
  The **Component Listing Page** for admins on *Innovia* allows administrators to manage and view the available PC components in the inventory. Designed with a clean and intuitive layout, this page is built using **React** and **React-Bootstrap** for efficient data display and management. This page enables

admins to efficiently manage the component inventory and ensure the smooth operation of the PC building service.
Key features include:

- **Component Overview**: Displays a list of all available components (e.g., CPUs, GPUs, RAM) with details such as name, price, and stock status.
- **Search and Filter**: Admins can easily search for specific components or filter by category, price range, or availability.
- **Action Buttons**: Includes options to add, edit, or delete components from the inventory.
- **Real-Time Updates**: Any changes to the inventory are reflected instantly, ensuring accurate stock information.

Used Component: React-Bootstrap, Tailwind CSS.

BACK-END Components:

1. **Firebase**
    i. **Firebase Authentication**:
    Used for handling user and admin login. Stores user and admin credential such as email and password.

    Used System: SignInWithEmailAndPassword

    ii. **Firebase RealTime Database**:
    Used for storing component details, user saved builds.

    Used System: Firebase RealTime Database.

USER WALK THROUH:

Step 1: User Selecting PC components

Step 2: User Login if not Logged In

Step 3: Saved Build

Step 4: Admin Listing Components.

Conclusion:

In conclusion, this PC building website offers a seamless and interactive experience for users to select and customize their ideal PC builds. By allowing users to choose components and check compatibility in real-time, the platform ensures an efficient and error-free building process. Additionally, the ability for users to save their builds adds convenience and flexibility. For administrators, the website provides an intuitive interface to manage and update component stock and details. This project successfully integrates user-friendly design with robust backend functionality, offering a comprehensive solution for both PC builders and administrators.