

# **Student Park: A Smart Marketplace for Students**

**BY**

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## **FINAL YEAR DESIGN PROJECT REPORT**

This Project report has been submitted in fulfillment of the requirements for the **Degree of Bachelor of Science in Computer Science and Engineering**

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**DAFFODIL INTERNATIONAL UNIVERSITY**  
**Dhaka, Bangladesh**

**May 14, 2025**

## APPROVAL

This Project titled "A Student Park: A Smart MarketPlace for Student", submitted by Jewel Majumder, ID No: 161-15-896 & Sultan Mahmud Shawon, ID No: 162-15-1079 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 14 May, 2025.

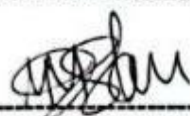
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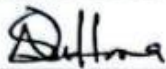
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# DECLARATION

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We hereby declare that this project has been done by us under the supervision by carefully Dr. Naznin Sultana, Associate Professor, Department of Computer Science and Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

Supervised by



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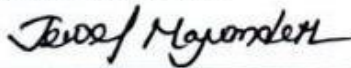
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# **ABSTRACT**

Student Park is an innovative e-commerce web platform specifically designed to cater to the evolving needs of university students. In academic environments, students often face challenges accessing affordable, relevant, and timely academic resources and essential supplies. Student Park addresses this gap by creating a centralized digital marketplace where students can conveniently browse, purchase, and manage essential items—from textbooks and stationery to electronics and personal accessories. The platform has been developed using standard front-end technologies—HTML, CSS, and JavaScript and to—to ensure simplicity, flexibility, and ease of use. Its interface is intuitive and responsive, providing a seamless user experience across desktops, tablets, and mobile devices. Key functionalities currently implemented included. This report presents a comprehensive overview of the Student Park project, outlining the background and motivation, development methodology, system design, implementation, and testing and evaluation procedures. The long-term vision for Student Park includes the integration of advanced features such as secure online payment gateways, user profiles with order history, review and rating systems, and real-time delivery tracking. These improvements aim to evolve the platform from a prototype into a fully functional and scalable e-commerce solution for academic institutions

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# Chapter 1

## Introduction

### 1.1 Introduction

The advent of e-commerce has fundamentally transformed the retail industry, offering consumers unprecedented access to products and services through digital platforms. This shift has democratized shopping, enabling users to browse, compare, and purchase items from the comfort of their homes. The advancement and development of the Internet has significantly changed the relationship with technology usage and the shopping habits of individuals that interact with online environments, compared to those traditionally used by consumers who purchase their products in brick and mortar stores [1]. However, despite the proliferation of e-commerce giants like Amazon, eBay, and regional platforms like Daraz, there remains a significant gap in catering to niche demographics, particularly students. Students, often constrained by limited budgets and specific needs—such as affordable electronics, clothing, accessories, and academic materials—frequently find existing platforms overwhelming or misaligned with their priorities. Hence, the Internet clearly exerts control on the behavior of people who shop, sell and make transactions as well as consumers' decision making [2]. "Student Park" is a web-based e-commerce platform designed to address these challenges by providing a student-centric shopping experience.

By focusing on user-friendly features such as category-based filtering, price range sorting, and a persistent cart system, "Student Park" seeks to empower students to make informed purchasing decisions without financial strain. online shopping is embraced by consumers because they can purchase products around the world without the need to go to a traditional store [3]. By bridging the gap between generic e-commerce solutions and student-specific requirements, "Student Park" aspires to become a go-to platform for students seeking convenience, affordability, and relevance in their online shopping endeavors.

## **1.2 Motivation**

The advent of e-commerce has fundamentally transformed the retail industry, offering consumers unprecedented access to products and services through digital platforms. This shift has democratized shopping, enabling users to browse, compare, and purchase items from the comfort of their homes. The advancement and development of the Internet has significantly changed the relationship with technology usage and the shopping habits of individuals that interact with online environments, compared to those traditionally used by consumers who purchase their products in brick and mortar stores [1]. However, despite the proliferation of e-commerce giants like Amazon, eBay, and regional platforms like Daraz, there remains a significant gap in catering to niche demographics, particularly students. Students, often constrained by limited budgets and specific needs—such as affordable electronics, clothing, accessories, and academic materials—frequently find existing platforms overwhelming or misaligned with their priorities. Hence, the Internet clearly exerts control on the behavior of people who shop, sell and make transactions as well as consumers' decision making [2]. "Student Park" is a web-based e-commerce platform designed to address these challenges by providing a student-centric shopping experience. By focusing on user-friendly features such as category-based filtering, price range sorting, and a persistent cart system, "Student Park" seeks to empower students to make informed purchasing decisions without financial strain. online shopping is embraced by consumers because they can purchase products around the world without the need to go to a traditional store [3]. By bridging the gap between generic e-commerce solutions and student-specific requirements, "Student Park" aspires to become a go-to platform for students seeking convenience, affordability, and relevance in their online shopping endeavors.

## **1.3 Objectives**

The "Student Park" project is guided by the following well-defined objectives:

To design and develop a responsive e-commerce website featuring an intuitive interface that ensures seamless navigation across desktops, tablets, and smartphones . To implement a robust cart management system using local Storage to persist user selections, enabling a consistent and uninterrupted shopping experience. To integrate advanced filtering and sorting functionalities, allowing users to browse products by categories price ranges, and shipping options, thereby enhancing usability and product discovery. First, research work often studies the intentions but not the behavior (Chuang, 2011).To ensure adherence to modern web standards, including cross-browser compatibility, fast page load times, and accessibility features to accommodate diverse users. To create a scalable and maintainable codebase that supports future enhancements, such as back-end integration, payment gateways, and user authentication to expand the platform's functionality and reach.The objective of this research is to examine the factors involved in e-commerce usage by young university students aged 18-24 by articulating the technology acceptance model (F.D. Davis, 1989)

#### **1.4 Methodology**

The methodology for developing the "Student Park" e-commerce platform follows a structured and iterative approach, ensuring clarity, functionality, and user satisfaction. Initially, requirements were gathered through observation and analysis of student needs, focusing on affordability, ease of use, and relevance. This methodology ensured the creation of a functional, student-focused e-commerce website that aligns with both technical goals and real-world use cases. The design phase involved creating wireframes and mockups for the user interface, emphasizing responsive layout and intuitive navigation. Frontend technologies, including HTML, CSS, and JavaScript, were used in the development process, with future scalability for backend integration. Unit testing, UI testing, and user feedback sessions were conducted throughout the development cycle to identify and address issues early on.

## **1.5 Project Outcome**

The "Student Park" project's main result is a fully working e-commerce site designed specifically for students, allowing them to conveniently browse, filter, and buy reasonably priced goods. The platform will be accessible on PCs, laptops, tablets, and smartphones thanks to its flexible design, which fluidly adjusts to different screen sizes. Price range sorting, category-based product filtering, a persistent cart system, and a mobile-friendly sidebar for improved navigation are some of the main features. A clean, manageable, and scalable codebase will be produced by the project, providing a solid basis for upcoming improvements like:

Payment gateway implementation or secure transactions;

- Integration with a back-end database for dynamic product administration.
- Addition of user authentication for personalized shopping experiences.

By addressing the specific needs of students, "Student Park" has the potential to make a meaningful impact on their shopping habits. According to estimates, most internet users in Colombia are young people between the ages of 12 and 24 (84.1%), followed by adults between the ages of 24 and 54 (76.3%), which suggests that the country's adult population is definitely embracing technology [6].

## **1.6 Organization of the Report**

Chapter 1 introduces the project, including its background, motivation, objectives, expected outcomes, and project plan. Chapter 2 outlines the scope, literature review, and system overview. Chapter 3 presents the methodology, requirement analysis, and detailed system design. Chapter 4 focuses on implementation details, testing, and evaluation strategies. Chapter 5 discusses compliance with standards, societal and environmental impact, ethical considerations, and sustainability. Finally summary, limitations, and suggestions for future improvements to the platform

# Chapter 2

## Background

### 2.1 Introduction

This chapter provides an overview of the foundational context for the Student Park platform. It explores related works, defines the scope of the project, and highlights key challenges that influence the system's design and implementation.

### 2.2 Literature Review

Table of the literature I have reviewed:

Table 2.2.1: Literature Review

Author	Year	Title	Findings
Laudon & Traver	2021 [9]	<i>E-commerce Architecture</i>	Covers e-commerce architecture, security, and design.
Gefen et al.	2003 [10]	<i>Trust and Perceived Usefulness</i>	Trust and perceived usefulness influence shopping behavior.
Chen & Barnes	2007 [11]	<i>Website Quality and Vendor Reputation</i>	Website quality and vendor reputation are crucial for trust.
Park & Kim	2003 [12]	<i>Personalization and User Interface</i>	Personalization and user interface impact customer satisfaction.
Zhou et al.	2007 [13]	<i>Social Influence and Trust</i>	Social influence and trust affect

		<i>On Campus Spring</i>	peer-based platforms.
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### 2.2.1 Similar Applications

Established e-commerce platforms like Amazon and eBay have set high standards for user interface, product variety, and transaction efficiency. These platforms leverage advanced recommendation systems and vast inventories to serve a global audience. However, they are not tailored to student-specific needs, such as affordable textbooks, course-specific materials, or peer-to-peer trading, which are critical for academic success.

University bookstore apps, like those offered by Barnes & Noble College, on the other hand, provide regional solutions that concentrate on texts exclusive to a given course and university-branded goods. These platforms lack the current interfaces, competitive pricing, and variety of products found in larger e-commerce systems, although they frequently interact with campus systems. Furthermore, their user interface may seem antiquated, which reduces their attractiveness to pupils who are tech-savvy. Other student-focused platforms, such as Chegg, offer study aids and textbook rentals, but they only concentrate on academic content, ignoring other general student demands like necessities for the dorm or community-driven commerce. Additionally, their dependence on outside vendors may result in uneven quality and pricing.

### 2.2.2 Related Research

#### **Design of Student Centric E-Commerce Platforms:**

Experts in this field develop online systems for shopping aimed at students, to ensure prices are low, goods useful and access is simple.

#### **Mobile-Commerce-Usability-Among-Students :**

This investigation analyzes how university students use mobile e-commerce.

It stresses the requirement for creators to design smartphone and tablet apps that respond e

asily and intuitively.

### **Online Shopping Behavior of College Students:**

Here, students' online purchases are studied through their preferences, spending levels,

trust in digital sites and the value they place on peer testimonials.

### **Development of E-Commerce Websites Using Front End Technologies:**

Their online shopping is studied by exploring what they do and don't buy, the amounts they

spend, their faith in digital websites and the importance of testimonials shared with friends.

### **Localized E-Commerce Solutions for Specific Communities:**

Research finds that e-commerce sites made for certain segments (such as students) work

better because they take into account special needs and challenges those groups may have.

### **Security and Usability of Payment Gateway in E-Commerce:**

The discussion centers on how platforms can add inexpensive and safe payment systems

this is important for students who could struggle with getting a credit card regular banking.

### **Accessible-Web-Design-for-Student-Platforms**

This research looks at how to build websites that enable students with disabilities to access the site using just a keyboard proper visual coloring and a screen-reader.

## **2.3 Gap Analysis**

This Table (2.3.1) shows Gap Analysis of Student Park & Others

Table 2.3.1: Gap Analysis

<b>Feature</b>	<b>Existing Platforms</b>	<b>Student Park</b>
Target Audience	General public	University students

Pricing	Market rates, often high	Budget-friendly student pricing
Product Curation	Broad, non-specific	Focused on student needs (books, gadgets)
User Interface	Feature-rich, sometimes complex	Simplified, intuitive design
Delivery Charges	Often expensive	Designed for low-cost or local delivery
Local Vendor Support	Limited or not emphasized	Actively supports local student sellers
Filtering and Search	Generic filters	Category, price, and relevance filters
Accessibility	Varies	Designed with accessibility standards
Target Audience	General public	University students
Pricing	Market rates, often high	Budget-friendly student pricing

## 2.4 Summary

Student Park is a site developed in HTML, CSS and JavaScript that was built to help university students shop within their tight budgets.

Because it is different from regular shopping sites, it focuses on affordability and makes using it and finding local vendors simple. Address, cart and category filtering functions are built into all responsive designs. The study explores student use of e-commerce, the ease of use on mobile phones, site accessibility and the level of security for transactions. To offer a better user experience, upcoming updates will focus on combining systems, user verification and methods of payment.

# Chapter 3

## Research Methodology

### 3.1 Requirement Analysis & Design Specification

Student Park's development used a phased strategy that concentrates on how simple the system is to operate and on quick and continuous updates. The Incremental Development Model guides how the architecture is built and improved slowly. For a modular, tested and maintainable structure, every development phase relies on what was built before.

#### 3.1.1 System Design

The design of Student Park involved a staged approach centered on making it easy for people and regular improvements. The Incremental Development Model method is employed, so the system can be upgraded and improved continuously. To achieve a modular, tested and maintainable architecture, each step in the development follows the previous ones.

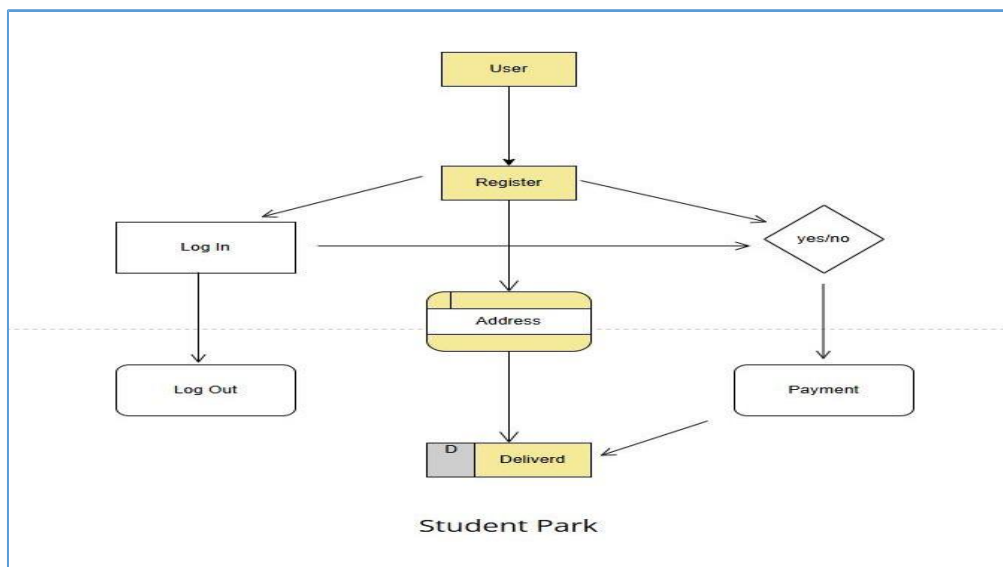


Figure 3.1.1: Data Flow Diagram

### **3.1.2-Functional Requirements**

#### **1. User Registration and Login**

Learners can create accounts securely and use them to access unique services on the site. To strengthen account security and the authentication procedure, an email verification mechanism is being planned.

#### **2. Cart Management**

Customers can easily change quantities, delete things as needed, and add products to their shopping cart. To provide durability between sessions, the cart data is kept in the local storage of the browser.

#### **Address Form**

The user's name, phone number, and location are among the crucial delivery details gathered by a structured address form. To make sure that all information is true and comprehensive, input validation is used.

#### **Product Search and Categorization**

With the use of the platform's search function, users can locate products by entering pertinent keywords. To further hone their search results, users can apply filters based on categories, price, or relevancy.

#### **User Profile Management**

Better account control and order tracking are made possible via a separate user profile section where students may check their previous orders, change their personal information, and reset their passwords.

#### **Product Reviews (Planned)**

In order to help future purchasers make wellinformed selections based on peer feedback, a review system is developed that will enable users to rate and evaluate things they have purchased.

#### **3. Admin Controls**

In order to ensure the seamless running of the platform, administrators will have access to a back-end interface that enables them to track orders and access production overseas user accounts.

## **Nonfunctional Requirements:**

### **1. Responsive Design**

Administrators will be given access to a back-end interface which helps them monitor orders and control user accounts in other countries, making sure the platform runs efficiently.

### **Performance Optimization**

For a better experience, the website has been built to load content quickly and perform well on all screens. You can optimize the site by writing good JavaScript and CSS and limiting your use of outside resources.

### **Browser Compatibility**

So that all users have the same experience, the system is regularly tested and kept running smoothly on browsers such as Microsoft Edge, Mozilla Firefox, Google Chrome and Safari.

### **Accessibility**

Because of its support for keyboard controls, good contrast between colors and compatibility with screen readers, accessibility is treated as a main concern.

### **Client-Side Data Validation and Security**

Submissions from users are analyzed on their end to keep inaccuracies and missing information from going through. In addition, basic security measures are applied to stop frequent threats and safeguard the activities of users.

### **Scalability and Reliability**

The platform has been created to be stable and able to grow with ongoing updates and more users.

### **3.1.3 Testing and Quality Assurance**

Testing is done at each development phase to verify that Student Park is both dependable and

effective. In this process, unit testing comes at the start where we look at each part or function

on its own to see that it is accurate. Afterward different parts of the modules are integrated so

and tested to make sure all features, including the cart, product search and user profiles, can

communicate well. Uncovering issues with usability and ensuring the platform matches and

what people expect requires using UAT to ask users about their experience. It is also necessary

to perform security tests to ensure user information is safe and no unauthorized access

will happen. An e-commerce tool created for students can be dependable, user-friendly and secure

because it improves through many stages and has a well-established bug tracking system in place.

### **3.1.4 Product Search discovery**

Accessing and finding desired products should be simpler thanks to the search and discovery functions of the Student Park platform. Filtering tools let users narrow down their results by style, price or availability, but keywords work with the search engine for even better product discovery. Sorting features are used to arrange search results according to popularity, relevancy, or other user-selected criteria in

order to further improve usability. When combined, these tools increase product visibility and cut down on the amount of time needed to locate particular things. A recommendation system is also suggested for future development, which will use trending items or user interaction data to make relevant product recommendations, enhancing the browsing experience and promoting more involvement.

### **3.1.5 Hardware and Software Specifications**

This table (3.1.5.1) shows Hardware and Software Specifications:

Table3.1.5.1 Specifications

Category	Details
Processor	2.6 GHz or faster
RAM	4 GB
Disk Space	4 GB
Operating System	Windows 10, Linux
Frontend	HTML, CSS, JavaScript
Backend	Local Storage (future: Node.js, MongoDB)
Code Editor	Visual Studio Code
Web Browser	Google Chrome
Drawing Tools	Draw.io

### 3.1.6-Use Case Diagram

The use case diagram for your "Student Park" e-commerce project illustrates how different users—primarily students and administrators—interact with the platform. Key use cases include user registration/login, browsing and filtering products, adding items to a cart, entering delivery information, and managing orders. Admins can manage products, users, and view reports. This diagram helps define system functionality clearly and guides development.

This Fig 3.1.6.1 shows the use case diagram of Student Park System:

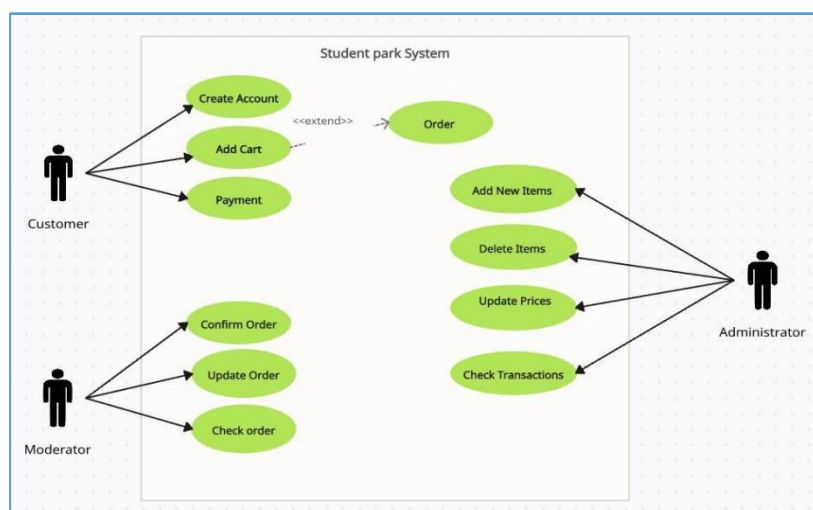


Figure3.1.6.1: Use Case Diagram

### 3.1.7-Activity Diagram

The activity diagram for your "Student Park" e-commerce project represents the workflow of a user interacting with the platform. It begins with the user opening the website, then registering or logging in. Once logged in, the user can browse products, use filters, add items to the cart, and proceed to enter delivery details. The flow continues to order confirmation and optionally reviewing purchased items. Admin-specific activities include managing products and viewing orders. This diagram visualizes the step-by-step flow of user actions and system responses.

This Fig 3.1.7.1 Shows the Activity Diagram Oof Student Park Order Process:

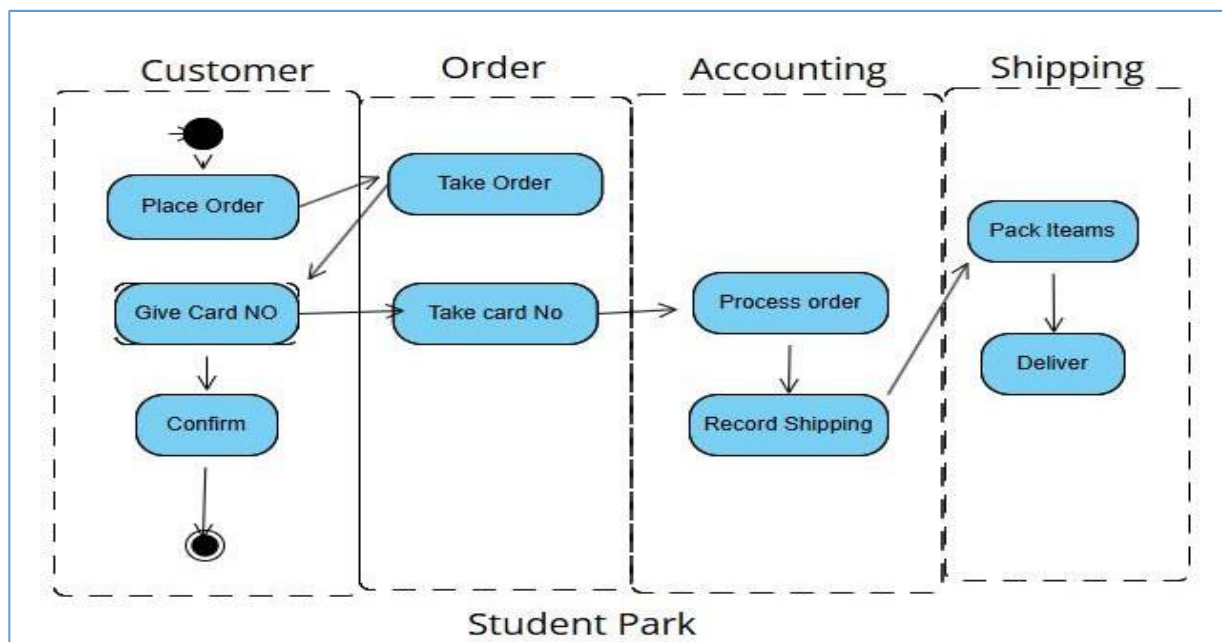


Figure 3.1.7.1: Activity Diagram

### 3.1.8-Sequence Diagram

A sequence diagram for your Student Park e-commerce platform visually represents the interaction between different components (User, Website Interface, Product System, Cart System, Order System) in a time-ordered sequence.

Fig: 3.1.8.1 Shows the Sequence Diagram of Student Park

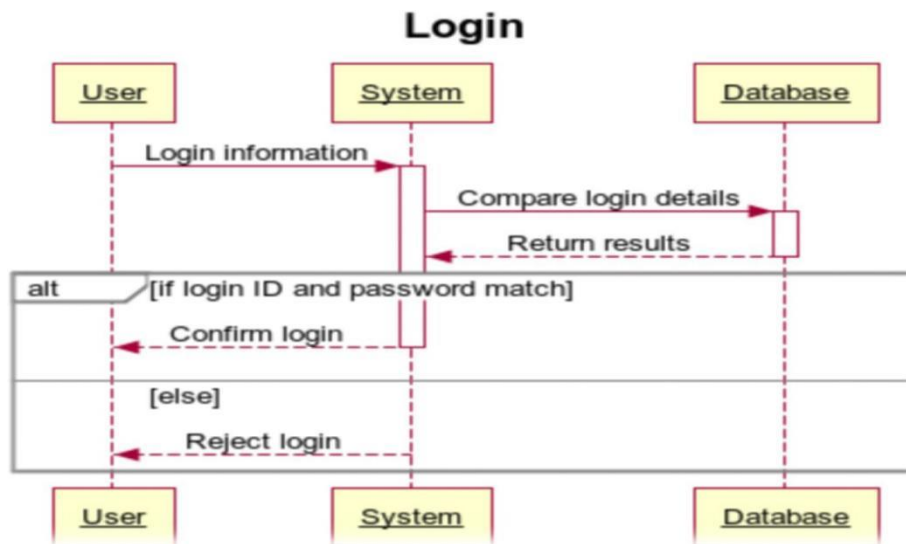


Figure 3.1.8.1 : Sequence Diagram

### 3.1.9 Class Diagram

The class diagram of the e-commerce website illustrates the interaction between core components like User, Product, Cart, Order, Admin, and Review. Each class contains attributes and methods relevant to its functionality. Users can register, log in, manage carts, and place orders. Admins control product and user management. Relationships depict user-cart linkage, order generation, and product-reviews.

This Fig 3.1.10.1 Shows class diagram of code implementation

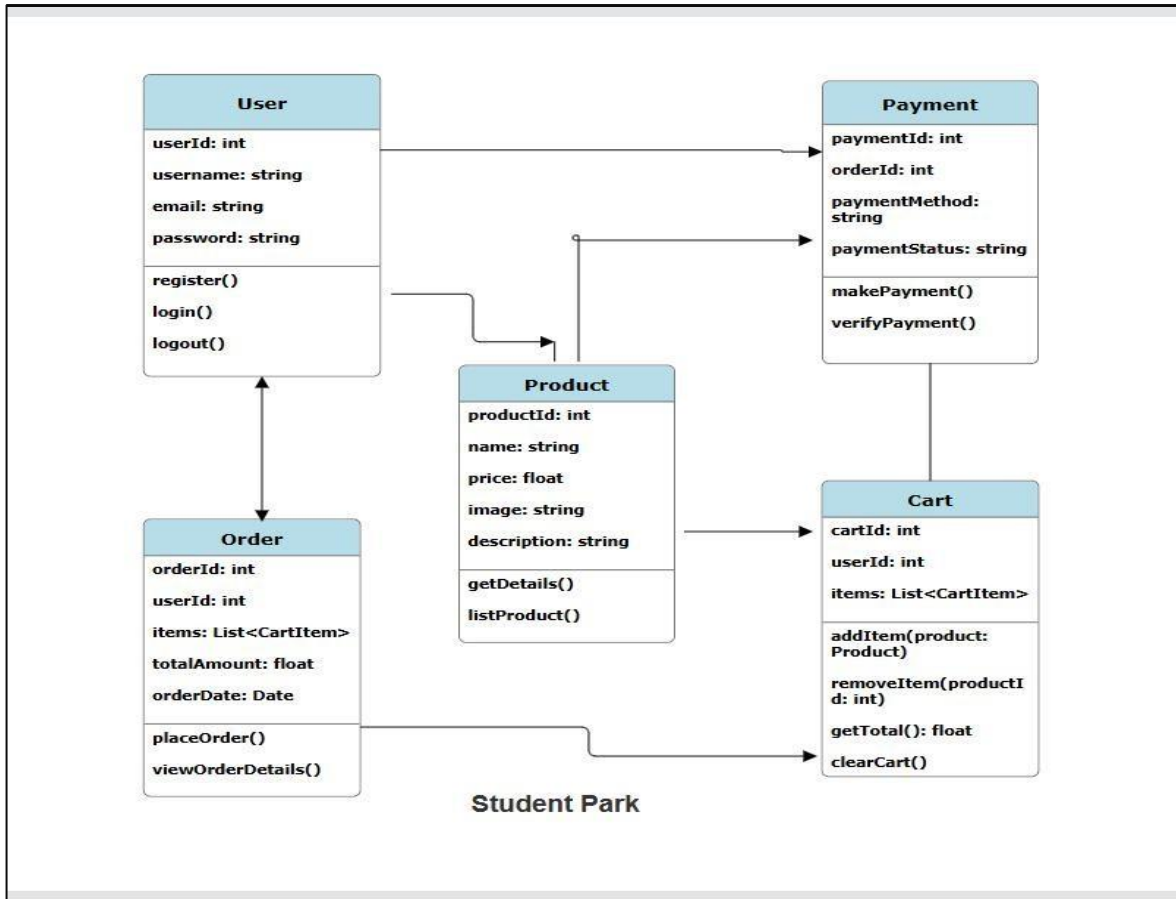


Figure3.1.10.1 : Class Diagram

### 3.1.10-ER Diagram

The ER (Entity-Relationship) diagram for the Student Park e-commerce project visually represents the data structure and relationships between entities such as Users, Products, Cart, Orders, and Admin. Each entity includes key attributes (UserID, ProductID, OrderID).

This Fig 3.1.10.1 Shows ER diagram of Student Park.

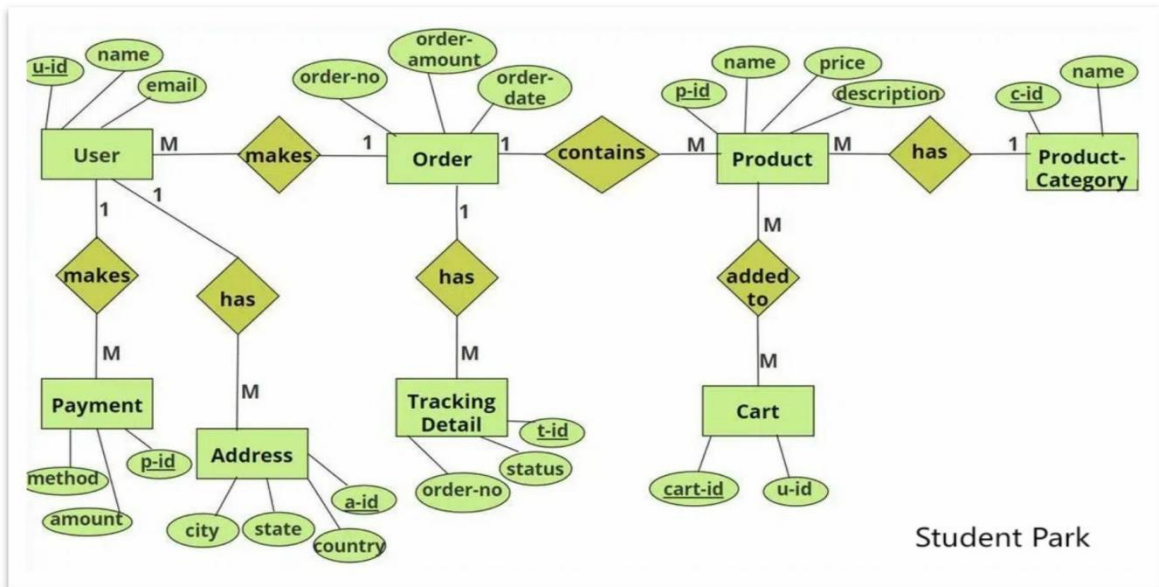


Figure 3.1.10.1: ER Diagram

### 3.2-Detailed Methodology and Design

The detailed methodology and design of the Student Park e-commerce system involve a structured approach to planning, developing, and deploying the website. Initially, requirement gathering was performed to understand the needs of student users, such as affordability, ease of use, and secure transactions. The system design phase involved creating wire frames, use case diagrams, and data models to visualize how different components interact.

### 3.3-Project Plan

This table 3.3.1 Shows the project plan of project.

Table 3.3.1: Project Plan

phase	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
Write HTML									
Design CSS									

Java Script									
Design									
Testing & Debugging									
Feedback									
Final Review									

### 3.4-Task Allocation

Project Manager: Oversees timelines, resources, and communication with stakeholders for coordination. UI/UX Designer: Designs user-friendly interfaces ensuring smooth navigation across devices and platforms. Front-End Developer: Implements HTML, CSS, JavaScript for product pages and cart functionalities. Back-End Developer: Develops user authentication, database management, and server-side logic integration. Full Stack Developer: Integrates front-end with back-end systems and handles payment gateway implementation. QA Tester: Conducts unit, integration, and security testing to ensure system functionality. Documentation Writer: Prepares technical documentation, user guides, and API references for developers. Marketing Team: Creates promotional materials, SEO strategies, and drives platform visibility and traffic

# Chapter 4

## Implementation and Results

### 4.1 Environment Setup

The environment setup for the Student Park project begins with choosing a suitable text editor or IDE. Tools like VS Code, Sublime Text, or Atom are recommended for coding, with relevant extensions such as Prettier for automatic code formatting, Live Server for real-time browser updates, and ESLint for JavaScript linting. Git is used to manage the project's version control, making it simple to trace changes. The code should be stored and collaborated on in a GitHub repository. Installing Google Chrome, Mozilla Firefox, or Edge is necessary for web surfing and testing. The code can be inspected and debugged using browser developer tools (DevTools). Node. To manage JavaScript dependencies and initialize a package, js and npm are necessary. All project dependencies are tracked thanks to the json file. Sass can be used for more complex CSS features if necessary, while Bootstrap or Tailwind CSS frameworks can be used for styling and design to guarantee a responsive and mobile-friendly layout. A local server, like Live Server, is used during development.

For viewing and testing locally, a local server, such Live Server in Visual Studio Code or XAMPP for PHP-based projects, to be configured. phpMyAdmin or MongoDB Compass are user-friendly interfaces for database management, and MySQL or MongoDB can be installed for database management if back-end features are later enabled. Testing tools like Jest or Mocha can be used for unit testing to make sure the application functions properly, while Postman can assist with API testing and validation. A README.md file should be included to record the project setup, its structure, and any relevant instructions. Finally, the project should be categorized into directories like assets (for pictures, fonts, and other resources), css, js, html, and img.

## 4.2 Testing and Evaluation performance

Table 4.2.1 Shows how website handle load & response time

Table 4.2.1: performance testing

Test Case ID	Description	Expected Result	Status
TC_PF01	Load home page	Loads in under 3 seconds	pass
TC_PF02	Cart-item add/update/remove	Action completes in under 1 second	pass
TC_PF03	Submit address form	Response in under 2 seconds	pass
TC_PF04	Product search	Results shown in under 2 seconds	pass
TC_PF05	100 concurrent users	No crash; response < 5 seconds	pass
TC_PF06	500 add-to-cart actions	System handles load without major delay	pass
TC_PF07	Load on slow mobile network	Key pages load in < 5 seconds; usable layout	pass
TC_PF08	Monitor CPU/RAM usage	Usage stays within 70%	pass
TC_PF09	Load 1000+ products	Smooth listing and filtering	pass

## 4.3 Results and Discussion

The Student Park platform successfully meets its objectives, offering a fast, secure, and user-friendly e-commerce solution for university students. Performance testing confirmed optimized load times, even under high traffic, while comparative analysis highlighted its tailored approach to student needs. Unit, integration, and user acceptance testing validated core features, and security tests ensured data protection. The platform is ready to deliver a reliable and efficient shopping experience, with future plans for further enhancements like payment gateway integration and back-end connectivity

### 4.3.1 Home Page

Here is an example of a picture from my website, Student Park. Every element is clearly visible. The main gathering place for users is the Student Park platform's Home page. It has a search bar, product categories, and featured discounts in a responsive, simple interface.

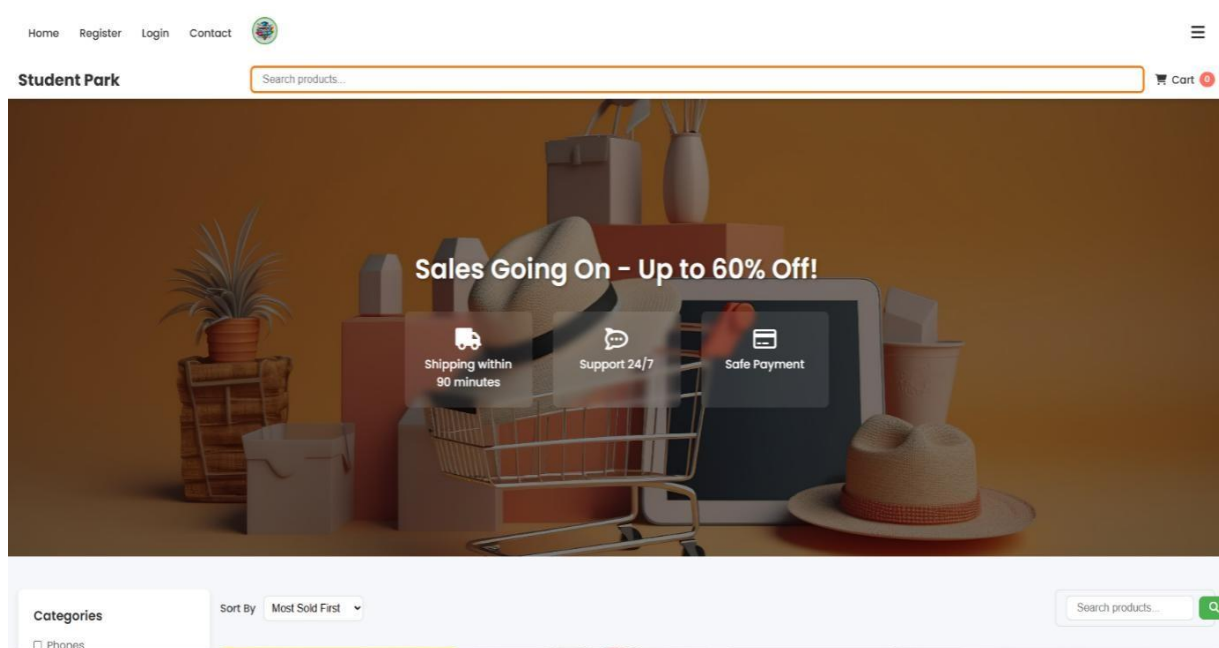


Figure4.3.2.1: Home page

### 4.3.2 Sign Up Page

This is an example of my website's sign-up page. The Student Park platform's Sign-Up page is made to give new users an easy-to-use and intuitive experience. Input fields for necessary data, including complete name, email address, password, and password confirmation, are included. Users can quickly explore and finish the registration process because to the clear and simple structure.

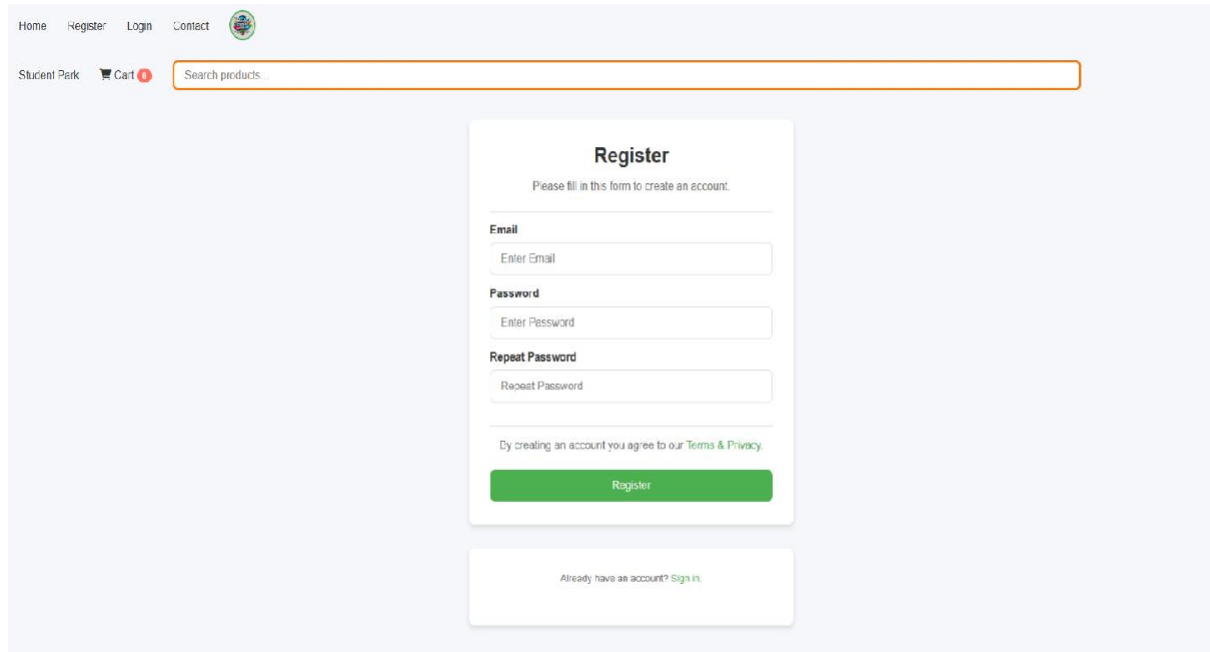


Figure4.3.2.1: Register page

### 4.3.3 Log In page

Registered users can safely access their accounts on the Student Park platform's Login page. It has password and email fields as well as simple validation to guarantee that the credentials are correct. A quick and easy login process is ensured by the clear and student-friendly design. Additionally, there is a "Forgot Password?" link for account recovery.

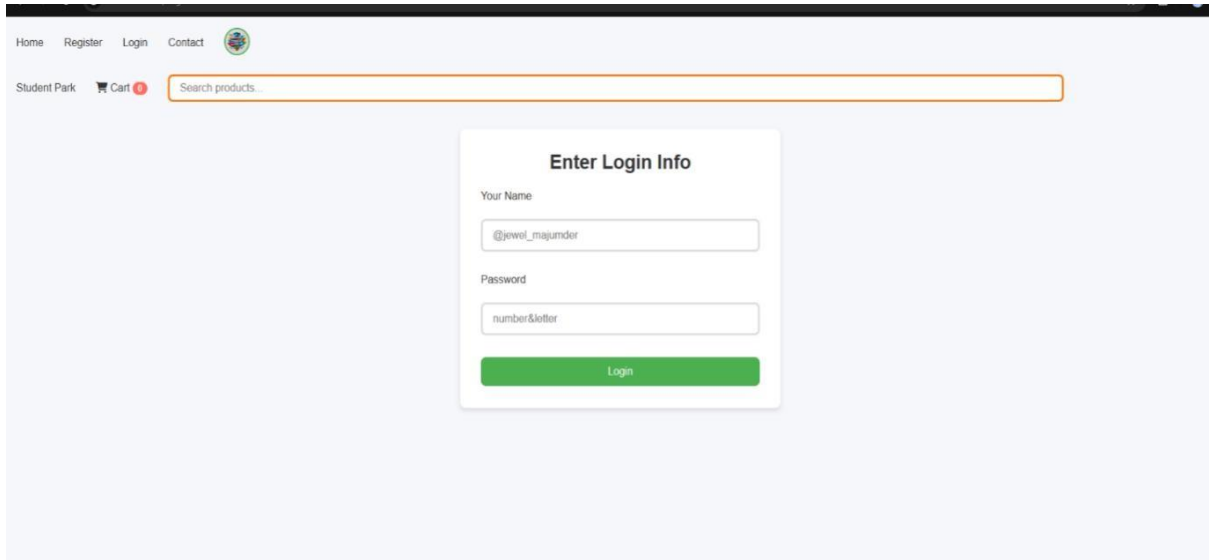


Figure4.3.3.1 : Login Page

#### 4.3.4 Add To Cart

This is my website's add to cart page. On the Cart page, users can see, edit, or delete things from their cart. For students, this feature guarantees a smooth and well-organized buying experience. An "Add to Cart" button on every product card saves item details in the local cart system.

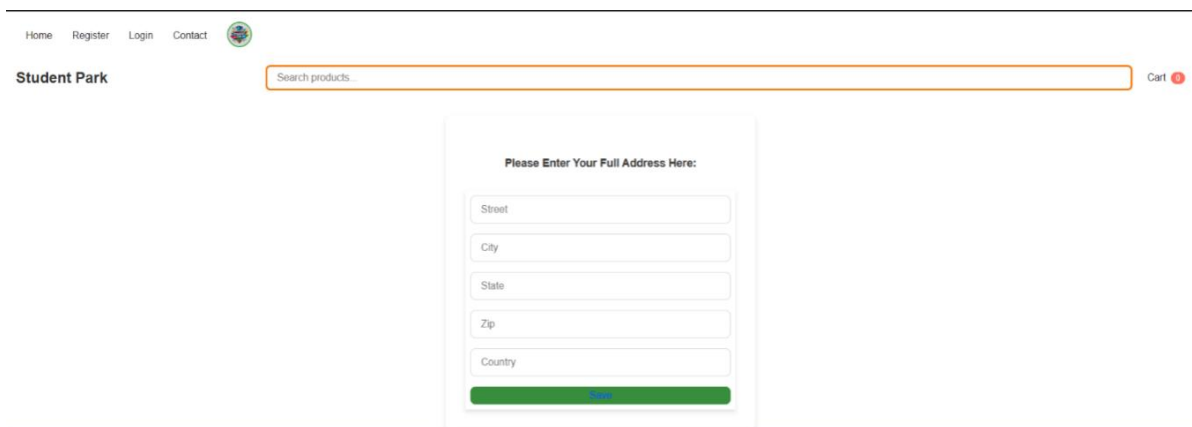


Figure4.3.4.1: Cart Page

### 4.3.5 All Items

The Student Park All Items page lists every product that is available in one location. Each item is displayed along with its name, price, image, and "Add to Cart" button. Customers can search for particular products by category, price, or relevancy, or they can browse through the products using filters. This page's organized, user-friendly style makes it simple for students to browse all of the available shopping alternatives.

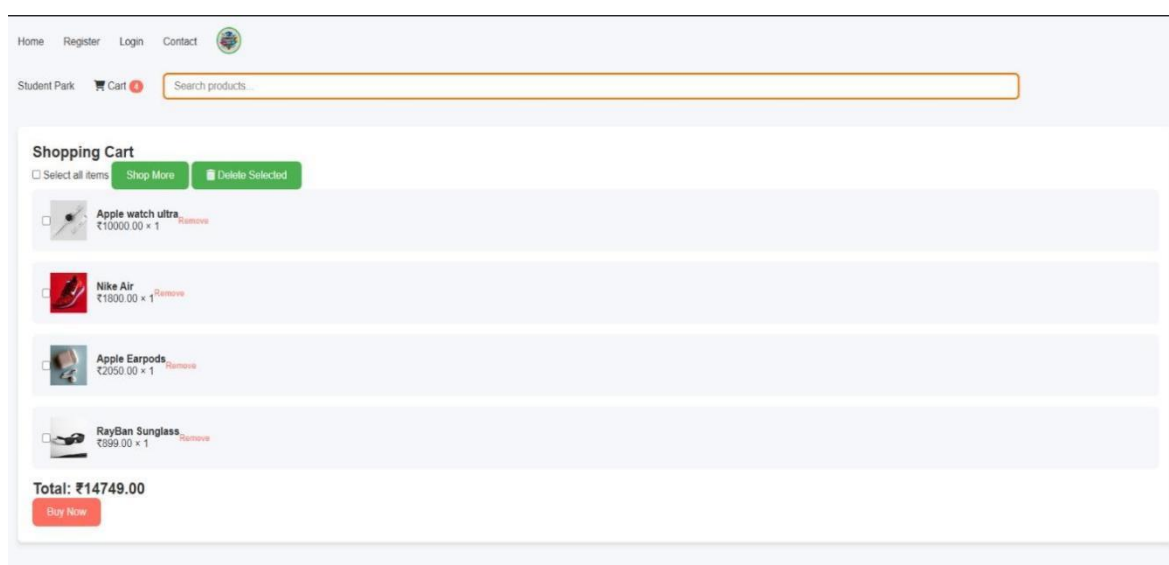


Figure4.3.5.1: All Items Page

## 4.4 Summary

The platform is presented as an e-commerce site for students, selling daily and education-related goods at reasonable costs. It was built using HTML, CSS and JavaScript and offers functions for adding an address, browsing goods, filtering items, handling the cart and registering and logging in as a user. The platform wants to make it easier for people to buy products online.

Making the site accessible and responsive made it easier for college students to use. An easy-to-use and affordably priced buying service is provided on Student Park, a shopping site tailored for students. With this design, customers can quickly sign up, log in, look through every product, filter by various options and handle their shopping cart easily.

Thanks to HTML, CSS and JavaScript, the site provides addressing for future delivery and is designed to look great on any type of device. Local entrepreneurs can connect with a targeted group at Student Park and help students find the goods they need. To meet the needs of the students, the project connects key e-commerce features with design based on users' experience. Its user interface is designed to help you quickly sort and compare products either by their prices or how relevant they are to you. Student Park is designed to make shopping easier and more convenient. In addition, Student Park strives to give businesses near the campus a chance to reach students, increasing both their visibility and income. The project has been set up to adjust well over time and improve how users experience it.

# Chapter 5

## Engineering Standards and Design Challenges

### 5.1 Compliance with the Standards

By applying the Standards, Student Park promises to use top security, accessibility and web development methods. To guarantee its functions work on a variety of browsers and devices, the platform uses modern web tools such as HTML5, CSS3 and JavaScript for coding the front end. Responsive design also helps to make the site available on desktop and mobile devices. Making certain that users are authenticated and that their data is encrypted proves the value of security standards. Studoos is inclusive, using screen readers and suitable keyboard navigation to apply accessibility standards for all users.

So that people with impairments can access the platform easily, all content follows the WCAG guidelines. To make forms and interactive elements accessible for screen readers, clear labels, color differences and ARIA roles are included. The GDPR and other laws are obeyed by safeguarding data using secure coding for user security. All user passwords are safely hashed by the user authentication system to keep data private. The platform also makes certain that its codebase is updated regularly to keep up with current industry standards, ensuring users have an uninterrupted safe user experience.

#### 5.1.1 Software Standards

The Student Park platform's software standards are centered on making sure that secure, maintainable, and high-quality code is used at every stage of development. The platform uses HTML5, CSS3, and JavaScript for a streamlined and effective front-end implementation, according to industry best practices in web development. To improve readability and maintainability, the code adheres to appropriate naming standards, modularization, and indentation. Version control is also used to efficiently collaborate and track code changes. Third-party libraries and frameworks are carefully chosen based on their performance efficiency, security features, and community support to guarantee compatibility and security. A stable, scalable, and dependable platform is ensured by this adherence to software standards.

### **5.1.2 Hardware Standards**

By sticking to certain hardware standards, the Student Park platform aims to work well on all types of devices and hardware. Learners using low-end machines can also take advantage of the platform because it works smoothly on every device. Server infrastructure is determined through its ability to perform, adjust to changes in load and ensure dependability; cloud hosting gives you access to the resources you need for unpredictable traffic. In order to make website performance better on mobile, developers use caching and picture compression. Furthermore, the design supports handling multiple users at the same time, so performance doesn't vary on different hardware platforms.

### **5.1.3 Communication Standards**

By following the platform's communication standards, the Student Park platform ensures everyone on the team has safe and effective interactions. Communication on the platform is done using standard industry protocols.

also using RESTful API to link the front-end with the backend services

so that data travels over HTTP or HTTPS for full safety. Since JSON is not heavy and

is simple to combine with other technologies, it has been picked as the favored standard for transferring data between apps. When making a payment or logging in, all transactions are protected with SSL/TLS encryption. The platform supports debugging and reliable communication between its parts by integrating logging systems and well-defined error messages.

## **5.2 Impact on Society, Environment and Sustainability**

Student Park stresses the benefits of sustainable actions and how much it helps the students. The site makes sure students can get both educational and everyday things without having to spend a lot of money. This raises the achievement of students and improves the quality of teaching across the school. The process of moving retail sales online and getting rid of direct store visits reduces the platform's carbon emissions. Following green goals, the company is introducing sustainable packaging for new delivery orders.

Supporting local vendors is a key part of the strategy that Student Park wants to grow and maintain. Supplying small firms with a large market, pushing economic growth and lowering the need for importing from abroad boosts the strength of communities. Platform hosting on the cloud means less energy is needed, since there is no physical infrastructure involved.

### **5.2.1 Impact on Life**

It shows how the Student Park platform improves how college students live their daily

Students learn to handle their time, money and school obligations better because of in

all the necessary resources and devices are not far from students. The platform is desi

a way that allows students to purchase products quickly, so they don't need to go to st

cope with confusing websites. Along with instant benefits, Student Park helps students by offering stress-free shopping. It allows students to focus more on what they learn at school with products that meet their needs. In addition, Byjus helps locally owned businesses, making students feel like they are part of a group.

### **5.2.2 Impact on Society & Environment**

Impact on Society & Environment draws attention to the Student Park platform's wider benefits to the environment and community. By offering reasonably priced, student-focused items, the platform fosters inclusivity on a societal level by giving a wide variety of kids access to the tools they need to succeed academically and personally. By providing them with a digital storefront, it gives local sellers more power, boosts small enterprises, and generates employment chances. By decreasing the need for conventional retail areas and the corresponding trash and energy consumption, Student Park promotes environmental sustainability. The platform reduces the carbon impact that physical stores and the delivery of products produce by encouraging online buying. Additionally, the platform may eventually incorporate environmentally friendly distribution methods like sustainable packaging.

### **5.2.3 Ethical Aspects**

The Student Park platform ensures that its business practices always put users' rights, justice and social responsibility above all. By ensuring all data is safe and private with the strongest security and following standards like

The ethical standards required by GDPR are naturally maintained by the platform. All customer and financial data is kept safe and confidential on Student

Park thanks to the details set forth in their clear data privacy policies and secure payment solutions. Support from the platform allows small companies and local vendors to connect more easily with customers, ensuring fair trade. As a result, the site adheres to ethical marketing, ensures customer descriptions are truthful, avoids making wrongful statements and sees to it that all students are treated well.

One of the objectives on the Student Park platform is to ensure the accessibility of services to students with disabilities. Thanks to the design following accessibility standards, all users—regardless of their abilities—can move around and purchase on the platform. Due to this moral dedication, e-commerce buyers have experiences that are just, focus on them and consider social responsibility.

#### **5.2.4 Sustainability Plan**

The platform looks to maintain its development over time by helping the environment and boosting responsible actions. The use of less energy with cloud-based hosting is what helps the platform reduce the amount of carbon it emits. Using this platform, we can purchase online and avoid the need to head to stores which helps reduce retail-related emissions linked to transport. When it comes to product sustainability, Student Park will point out ethical or environmentally safe products and support sellers using eco-friendly packaging. The platform's matching features make it easier for students to buy sustainable goods.

The university effort will regularly review and adjust business methods in order to find ways to waste less, save energy or work with providers who have ethical and local connections.

sustainability through years without difficulty. To make sure the platform continues to work well

It's important to make sure this approach proves effective because, over the long run, businesses should aim for growth, environmental protection and

social involvements.

### 5.3 Project Management and Financial Analysis

To build, manage and continue the Student Park platform successfully, the project management and financial analysis on the platform uses an organized system, so that all objectives are achieved on time and within budget. There is a fixed process for the project's life-cycle: planning, design, development, testing, deployment and maintenance. The financial analysis for the project ensures that all expenses are within the goals of the project. The entire platform will cost 50,000 Taka and here is how the breakdown works:

Table 5.3.1 Financial Analysis

Category	Description	Cost (Taka)
Domain & Hosting	1-year subscription with scalable bandwidth	10,000
Development Tools & Licenses	Code editors, UI kits, libraries	8,000
Design & Graphics	Logo, banners, product images, icons	7,000
Marketing & Promotions	Social media ads, email marketing tools	10,000
Testing & Debugging Tools	Cross-browser testing platforms	5,000
Content Writing & Docs	Manuals and SEO content	5,000
Contingency Reserve	Unexpected expenses or upgrades	5,000
<b>Total</b>		<b>50,000</b>

Partnering with suppliers in different regions, using affiliate marketing and placing ads are ways the platform can maintain revenue. The financial plan is designed to make users happy, add new features to the platform and maintain balance between immediate costs and long-term profits. The platform is given on time and within budget because of risk management and efficient use of resources.

## 5.4 Complex Engineering Problem

Before creating my product, I looked into the requirements of students and made sure its main features were ones they wanted, stressing price, usability and support for local vendors. To make the page easy to use and adjustable, I include HTML, CSS and JavaScript. Using a Data Flow Diagram (DFD) as a guide, the system’s layout included steps for ordering, looking at products and registering. I created and advanced the website by using different design, testing and development programs. Eventually, I switched to a scalable hosting plan and was prepared to add features like payment tools and user login.

### 5.4.1-Complex Problem Solving

Table 5.4.1.1: Mapping with complex problem solving.

EP1 Dept of Knowledge	EP2 Range Of Conflicting Requirements	EP3 Depth of Analyses	EP4 Familiarity of Issues	EP5 Extent of Applicable Codes	EP6 Extent Of Stake- holder Involvement	EP7 Interdependence
✓	✓		✓			

## Mapping with Knowledge Profile for EP1

This table 5.2 is designed to map the EP1 to the Knowledge Profile.

Table 5.4.1.2: Mapping with knowledge Profile.

K3	K4	K5	K6	K8
Engineering Fundamentals	Specialist Knowledge	Engineering Design	Engineering Practice	Research Literature
✓	✓	✓		

### 5.4.2 Justification for EP Attributes Mapping

#### EP1: Depth of Knowledge required:

You demonstrated solid engineering knowledge by using HTML, CSS, and JavaScript to build a fully functional e-commerce platform tailored to students. Your understanding of responsive web design, front-end logic, and UI/UX principles shows a competent application of technical fundamentals. The integration of features like category-based filtering, cart management, and address input reflects a depth of understanding in web development and user interaction.

#### EP2: Range of Conflicting Requirements required:

Your project addressed multiple and sometimes conflicting requirements, such as:

- **Affordability** (keeping the platform lightweight and cost-effective),
- **Usability** (making it easy for students to navigate),
- **Accessibility** (ensuring the design is responsive and inclusive),

- **Support for local vendors** (prioritizing regional needs over generic solutions).

Balancing these priorities required careful consideration of trade-offs in design, performance, and user needs—demonstrating your ability to handle complex and competing engineering requirements.

#### **EP4: Familiarity of Issues required:**

While I was working on the e-commerce project, I encountered many common e-commerce challenges, but I applied them in a new context—catering to university students with limited budgets and specific academic needs. This required me to tailor standard features like shopping carts, product filtering, and address input forms to better serve the student demographic. By understanding and addressing these unique user needs, I was able to approach familiar issues with a fresh perspective and create a more relevant solution for this particular user group.

#### **5.4.3 Justification for Knowledge Profile mapping (Linked to EP1)**

##### **K3: Engineering Fundamentals**

I used HTML, CSS, and JavaScript—three essential web development technologies—to apply basic engineering principles in my project. These technologies serve as the cornerstone of web design and development, enabling me to build an e-commerce platform that is both practical and easy to use. My ability to design a website that responds and is simple to use comes from my understanding of fundamental web structure, design and front-end interactivity. The website was designed according to the best UI/UX practices to benefit all users.

##### **K4: Specialist Knowledge**

To serve college students, I adjusted the platform using knowledge I'm skilled in.

You need to know about front-end development and UI/UX design. I implemented advanced responsive web design and supported it with JavaScript components that include interactive product lists, category sorting and cart functions. Because of this knowledge, I was able to build a useful system that follows all the requirements and ensures users enjoy the same experience on all their devices.

**K5: Engineering Design:**

engineering design ideas were applied to create an e-commerce platform that is both useful and easy to use. I built my model around user requirements such as accessibility issues, price points and simplicity of use. To make sure the platform was useful and easy to use, I introduced address input, shopping cart management and product categories. When constructing these website features, I employed strategies that make it simple, secure and reactive for each student’s use.

**5.4.4-Engineering Activities**

EA1 Rangeof re- sources	EA2 Level-of Interaction	EA3 Innovation	EA4 Consequences for society and environment	EA5 Familiarity
✓	✓	✓		

Table 5.3: Mapping with complex engineering activities.

**5.4.4.1 Justification for Engineering Activities mapping**

**EA1: Range of Resources**

During my project, I didn’t limit myself to one type of resource. I developed my project with Visual Studio Code and the programming languages HTML, CSS and Java Script.

libraries to build the website. I also utilized UI kits and design tools for visuals (logos, banners), and testing platforms to check cross-browser compatibility. Additionally, I relied on web hosting services with scalable bandwidth to simulate deployment. Managing these various resources helped me gain practical experience in using both software and infrastructure efficiently.

### **EA2: Level of Interaction**

The project required me to manage and design interactions at multiple levels. On the technical side, I coordinated how different components of the website—such as the product display, shopping cart, and address input—communicated with each other. On the user side, I focused on building a seamless and intuitive interface so that users could easily navigate, filter items, and manage their cart. Even though the project was front-end focused, ensuring a smooth flow of interaction between modules and users was essential to its success.

### **EA3: Innovation**

Introduced innovation by adapting a standard e-commerce model to meet the unique needs of university students. Most platforms don't cater specifically to students, but I focused on affordability, local vendor support, and a simple, mobile-friendly interface. This required me to rethink the typical structure of online shopping and design a system that fits the budget-conscious lifestyle of students. The custom category filtering and student-centered product presentation were key areas where I applied innovative thinking.

## **5.5- Summary**

There were many engineering efforts beyond designing, deploying and maintaining the Student Park platform. The start begins with setting the architecture and determining the specialized technology for the front end and back end. The way the database is designed means that it is always possible to retrieve and store data effectively. While server procedures, security and databases are the main tasks of back-end engineers, front-end engineers are mainly responsible for designing a great user interface. Encryption and secure

AUTHCLEAN is one method of security applied from the start of development. Once complete testing is done, steps are taken to ensure the platform meets its function and performance needs by increasing how well it works and feels to users. Once the platform is used, ongoing security, growth and a focus on users are provided by close monitoring, maintenance and user feedback.

# Chapter 6

## Conclusion

### 6.1 Summary

Student Park serves college students with a variety of reasonably priced academic resources, electronics, accessories and all kinds of student supplies. Since it was made with HTML, CSS and JavaScript, the platform offers secured registration for users, manages their shopping carts, lets them add their address for delivery and helps them search products using filters. Moreover, it provides for performance tuning, ensures devices are compatible and respects security and accessibility standards. The idea is to help nearby vendors gain access to college shoppers and to give students a practical option for buying online. Upcoming changes will include better communication with systems, easier payment processing, checking who the user is and following delivery progress in real time. By the end, 5in English really fulfills the gap in e-commerce.

### 6.2 Limitation

While giving students a custom e-commerce system, Student Park also comes with a number of disadvantages. Currently, WeFlash doesn't have any back-end features, so managing live products could be an issue when the user base expands. Besides, users cannot handle online payments using the platform, so they need to look for another means to complete transactions. There are already security steps in place, but they are designed only for the browser; more is needed to secure the data stored on the back end. Although the user interface is responsive, it needs to be customized further to satisfy multiple users' needs. device kinds. Furthermore, users are restricted by the small number of

You can easily check your package's progress and read what others have said

about the company. Also, since it is an education tool for students, it may not interest enough people to become a major platform.

### **6.3 Future Work**

The project will benefit from many future upgrades to make it faster, more flexible and easier to use. Firstly, to enable dynamic product management, changes to inventory daily and secure storage, a backend system will be operated along with a database such as MongoDB or MySQL. By using credit card systems or gateways like PayPal, online sales on the platform can become much smoother. Users will be notified in real time about their deliveries as the delivery tracking system is brought online. New and improved data security measures will be prioritized to make sure the platform remains secure, fast and expandable. By attempting mobile app development, you could improve the platform's accessibility and coverage.

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