FINAL YEAR PROJECT

BARTER BRAINS

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Bachelor of Science in INFORMATION TECHNOLOGY (2021-2025)
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DECLARATION

We declare that this software and report are completely our own work. Nothing has been copied from any sources. If any part s later found to be copied or taken from somewhere else, we accept full responsibility. This work has not been submitted for any other degree orcourse at any other institute.

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CERTIFICATE OF APPROVAL

It is to certify that the final year design project (FYDP) of BS (INFORMATION TECHNOLOGY) **"Barter Brains"**is developed by **TahreemAzeem [057722]** and **Eman Noor [057680]** under the supervision of **"MS SADAF SIKANDAR"** in my opinion; it is fully adequate in scope and quality for the degree of Bachelors of ScienceInInformation Technology

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Executive Summary

Barter Brains is a web-based platform created to make it easy for people to share and exchange skills. It helps individuals teach what they know and learn new things from others all free of cost. The goal is to build a supportive community where users can grow together by exchanging knowledge and talents. After successful skill-sharing, users are awarded a digital certificate**.**

Objectives:

- Offer their skills to teach others.
- Find and learn skills they are interested in.
- Connect with people for mutual skill exchange.
- Receive digital certificates after completing a skill exchange.

Methodology:

Barter Brains was developed using:

- **Frontend:** HTML, CSS (with Bootstrap), and JavaScript
- **Backend:** PHP (Laravel Framework)
- **Database:** MySQL

The platform follows the **MVC (Model-View-Controller)** architecture for clean, modular design and easy maintenance.

Conclusion:

Barter Brains is a functional, user-friendly platform that makes skill exchange easy and free. It creates a community where people can learn, teach, and grow together. With its clear design and automated certificate generation, the platform encourages active participation and promotes lifelong learning.

Keywords:

- Skill Exchange Platform
- Laravel Web Application
- Digital Certification
- Peer-to-Peer Teaching

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Table of Contents

1.INTRODUCTION **10**
1.1problem Statement **10**
1.2 Problem Solution **10**
1.3 Objectives Of The Purposed System **10**
1.4 Scope **11**
1.5 System Components **11**
1.5.1 Client Web Module 11
1.5.2 Admin Web Module 12
1.6 Related System Analysis **12**
1.7 Vision Statement **12**
1.7.1 Limitations 13
1.7.2 Constraints 13
1.8 Tools and Technologies **13**
1.9 Project deliverables **14**
1.10 Project planning **14**
1.11 Summary **15**
2.Requirement ANALYSIS **17**
2.1User Classes And Characteristics **17**
2.2 Requirements Identifying Techniques **17**
2.2.1 Use Case Diagram 18
2.3 Functional Requirements **18**
2.3.1Sign Up 19
2.3.2 profile Creation 19
2.3.3 sign in 19
2.3.4 Skill search 20
2.3.5 send friend request 20
2.3.6 Accept/reject request 20
2.3.7 Chat 21
2.3.8 E-certificate 21
2.3.9 Feedback/ Queries 21
2.3.10 Log Out 21
2.3.11 Admin Login 22
2.3.12 Manage Account 22
2.3.13 Monitor and Handle Report 22
2.3.14 Admin Dashboard Analysis 23
2.3.15 Notifications 23
2.4 Non-Functional Requirements **23**
2.4.1 Reliability 23
2.4.2 Usability 24
2.4.3 Performance 24
2.4.4 Security 24
2.5 External Interface Requirements **24**
2.5.1 User Interface Requirements 24
2.5.2 Software Interface 24
2.5.3hardware Interface 24
2.5.4 Communication Interface 25
2.6 Summary **25**

3. SYSTEM DESIGN **27**
3.1Design Models **27**
3.1.1 Class Diagram 27

3.1.2 State Diagram 29
3.2 Architecture Design 31
3.3 Data Design 31
3.3.1 Data Dictionary 32
3.4 User Interface Design 32
3.4.1 User Experience Overview 32

4. IMPLEMENTATION 39
4.1 Algorithm 40
4.2 Externals APIs 41
4.3 Code Repository 41
4.3.1Metrics Of The Git Repository 41
4.4 Summary 42

5. Introduction 44
5.1 Unit Testing 44
5.2 Functional Testing (FT) 46
5.3 Integration Testing (IT) 50
5.4 Summary 51

6. Introduction 53
6.1Conversion Method 53
6.2 Deployment Approach 53
6.2.1 Tools and Environment 53
6.2.2 Deployment steps 53
6.3 Testing After Deployment 53
6.4 Testing and Verification 54
6.5 Limitations of Local Deployment 54
6.6 Summary 54

7. Introduction 56
7.1Evaluation 56
7.2 Traceability Matrix 56
7.3 Conclusion 56
7.4 Future Work 57

Chapter 1

Introduction

1. Introduction

Barter Brains is a skill exchange platform where people swap skills, such as trading coding lessons for music classes. It allows for collaborative learning and helps users learn new skills without spending money. The platform includes skill categories, user profiles and exchange requests, promoting learning and development.

1.1 Problem Statement

In today's busy world, many people want to learn new skills but can't afford expensive classes. At the same time, people have valuable skills they could teach others. However, there is no common and trusted platform where people can connect and exchange skills without money.
So, there should be a platform where people can exchange their skills for free.

1.2 Problem Solution

Barter Brains is a web-based platform that being developed to solve this problem by providing a system where users can offer a skill they know and request a skill they want to learn. This system promotes learning through collaboration and builds a skill-sharing community. Barter Brains makes learning process a two-way street where everyone is both a teacher and a learner. Barter Brains allows users to create a profile, search for matching users, and send skill swap request.

Some main facilities of Barter Brains:

To create a user-friendly platform for skill swap

To provide learning without financial cost

To support personal growth and community development

To make the platform accessible on mobile and desktop

To notify users about skill swap request

To support multiple categories of skills like art, tech, music, cooking etc

1.3 Objectives of the Proposed System

Barter Brains system is to let people barter skills by being both learner and teachers. The system helps people teach a skill and learn another skill from someone else. To see if it works, the system will track how many skills barters happen, how happy users are based on reviews and feedback, and how quickly people are matched for skill barters.
The system should be easy for everyone to use. It is also useful today because people want to learn from each other and build communities without spending a lot of money. The system focuses on what the user wants and needs. It will have an easy-to-use design and will be improved as needed. This platform avoids unclear or confusing language. Everything will be explained in easy language so users can use it without difficulty.

1.4 Scope

Barter Brains is a website where people can barter skills. Users sign up and create a skill profile, look for new skills, and find other users who share interests. They can send and receive exchange requests,

swap skills, and leave reviews after each exchange. The site does not have online payments or video calls it has only chat system for communication between learner and trainer. The main groups involved are people who want to learn, people who offer skills, site administrators, and the developers who build the project. The goal is to be a free and easy-to-use place for sharing knowledge. Important features are signing up, searching for skills and matching with others, and chatting with trainers. Key milestones of Barter Brains include requirement gathering, UI/UX design, backend setup, feature development, testing.

1.5 System Components

The Barter Brains system consists of several modules and each module handles specific tasks that together support the complete skill exchange process.

1.5.1 Client Web Module

These modules are designed for users who access the system through a desktop, laptop and mobile browser.

Module 1:User Account Management

This module helps users create and manage their accounts on the platform.

Sign Up/Login: Users can create an account with their email or phone number and log in securely.

Profile Setup: Users can add their name, and a profile picture to personalize their account.

Set Password: Users can set their password to secure their accounts.

Logout Account: Users can also logout their accounts if needed.

Module 2: Skill Listing

This module helps users to post skills they want to barter.

Create listing: Users can select from a given lists of skills, the skill they're offering as well as looking

Module 3: Skill Discovery and Matching

Search Skill: user can Browse and search for skills.

View Searched Skills: user can view searched users based on skill match.

Module 4:Skill Exchange Requests

Send Request: user can send a request to connect for skill exchange.

Accept/Reject Request: user can accept or decline incoming requests.

Module 5: Chatting

Send/Receiving Messages: user can chat with another user after accepting skill exchange request.

Module 6: Feedback

Reviews: user can write reviews and reports.

1.5.2 Admin Web Modules

These modules are built for system administrators to monitor and manage the platform.

Module 1: User Management

Manage Users: Admincan viewor deactivate user accounts.

Monitor Reports: Admin can monitor user reports.

Module 2: Dashboard and Analytics

Analysis: Admin can navigate platform usability statistics.

Track Exchange Request: Admin can check metrics such as amount of skill exchanges or active users.

1.6 Related System Analysis/Literature Review

Several other existing platforms support skill learning or exchanges, but they either focus on paid services or have limited features.

Website name	Weakness	Proposed Project Solution
Skillshare	Requires users to pay for access to courses; no real-time person-to-person exchange.	Barter Brains offers free, mutual skill exchange between users without involving money.
Meetup	Not designed specifically for learning; focuses on group events and has limited skill matching.	Barter Brains focuses on one-on-one skill exchange with intelligent skill matching features
Tandem	Limited to language exchange only; does not support other skills like art	Barter Brains supports a wide variety of skills, not limited to language learning.

1.7 Vision Statement

Barter Brain is a website that helps people barter skills for free. You can learn from others and teach what you know without paying money. This site wants to create a culture of sharing, teamwork, and growing together. It is different from paid learning apps or messy social media groups because it is free organized and safe. Plus it focuses on what user need and mutual advantage.

1.7.1 Limitations

Third-party Tool Usage: Barter Brains does not include built-in video calling, users must rely on external tools (like Zoom or Google Meet) for live sessions.

Users Skill verification: The system depends on user honesty and peer feedbacks, as it cannot independently verify the actual skill levels of users.

User Adoption: People may be hesitant to trust a new bartering platform, especially for sharing skills or services, due to privacy or safety concerns.

1.7.2 Constraints

Project Scope: The platform will focus only on skill bartering (e.g. teaching a programming language for graphic designing) and will not include physical goods or monetary transactions in it.

Feature Set: To lunch quickly, the platform will include basic features like user profile, chatting and reviews, but advanced features like audio/videos calls will come later.

1.8 Tool and Technologies

Tools & Technologies	Version	Rationale
Visual Studio Code	1.103.2	Lightweight and efficient code editor for writing code.
Html	5	Basic structure of web-pages.
Bootstrap	5	For creating responsive and mobile-friendly UI designs quickly.
Javascript	ES6+	Adds interactivity and dynamic behavior to web pages.
PHP	8.2.12	Server-side scripting language for handling backend logic.
Laravel	12.25.0	A modern PHP framework that support MVC architecture, making backend development more organized and efficient.
MySQL	5.2.1	Relational database system to store user and skill-related data.
XAMPP	8.2.12-0	Provides an easy-to-use Apache server environment for PHP and MySQL during local development.
CSS	3	Styling system used to define the visual presentation of user and skill- related data on web interfaces.
Github	3.5.2	Used to manage our project's codebase, track changes, and collaborate as a team during development.

1.9 Project Deliverables

Planning Document: This is a clear plan that shows Barter Brains goals, a timeline, and the resources we need. It helps keep the team on track.

SRS (software Requirement Specification): This document explains what the Barter Brains platform should do. It includes user features (for example, creating a user profile and searching for skills) and technical needs (for example, security and speed).

Design: This includes sketches and layouts of how the Barter Brains website will look. It shows screens for user profiles, a list of skills, and how users will search for skills.

Prototypes:A basic working model of Barter Brains. It shows how users interact with the platform, such as signing up or asking for a barter.

Project: The final Barter Brains platform, fully built and ready to use. Users can barter skills without money.

Project Report:A summary of the whole project.It explains what we did, the challenges we faced, how the platform works, and the results and lessons learned.

1.10 Project Planning: To finish the Barter Brains website, we make a clear plan. A Gantt chart shows the main phases, key milestones, and how long each activity will take.

Gantt chart:

Sr#	Task Name	Duation	Starting	Finish	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug
	Barter Brains	280	21-11-24	27-08-25										
1	Planning	28 days	21-11-24	18-12-24										
2	Req. Gathering	39 days	19-12-24	26-01-25										
3	Desining process	39 days	27-01-25	06-03-25										
4	Frontend	63 days	07-03-25	08-05-25										
5	Backend	68 days	09-05-25	15-07-25										
6	Testing	33 days	16-07-25	17-08-25										
7	Project Closure	10 days	18-08-25	27-08-25										

Milestone	Duration	Milestone Description	Required Resources
Planning	28 days	Defines the Barter Brains scope and objectives.	Project manager, team lead, MS word/Excel
Requirement Gathering	39 days	Collect functional and non-functional requirements.	Analysts, Stakeholder interviews
Designing Process	39 days	Design UI/UX.	UI/UX designers, client feedback
Frontend Development	63 days	Build web & mobile frontends.	Frontend developers, HTML, CSS, Bootstrap 5, JS, VS Code
Backend Development	68 days	Develop backend logic and database handling.	Backend developers, PHP, laravel, MySQL, XAMPP
Testing	33 days	Perform functional and integration testing.	Tester, Developer
Project Closure	10 days	documentation & handover the project	Supervisor

1.11 Summary

Barter Brains, a skill exchange platform for the exchange of knowledge without using money, was thus introduced in this chapter. The concern raised was that the world has become increasingly expensive in terms of learning resources, while Barter Brains offers a solution through the promotion of free, peer-to-peer skill sharing. The chapter clearly explained the goals, scope and limits of the platform, along with the main parts for users and administrators. We also looked at the tools and technologies used, and shared the project timeline using a Gantt chart. Overall, this chapter serves to clarify how the Barter Brains system will function, the merits of the Barter Brains strategy, and its applied methods for successful implementation.

Chapter 2

Requirements Analysis

2. Requirement Analysis

This chapter explains how the requirements of Barter Brains platform were studied and identified. It breaks down what the system needs to do (functional requirements), how well it should do those things (non-functional requirements), and how should connect with users and other systems (interface requirements).

2.1 User Classes and Characteristics

User classes of the Barter Brains website refer to the different subsets of people who are likely to use the site, with every group having a particular requirement or other characteristics that will drive how the platform should work for them.

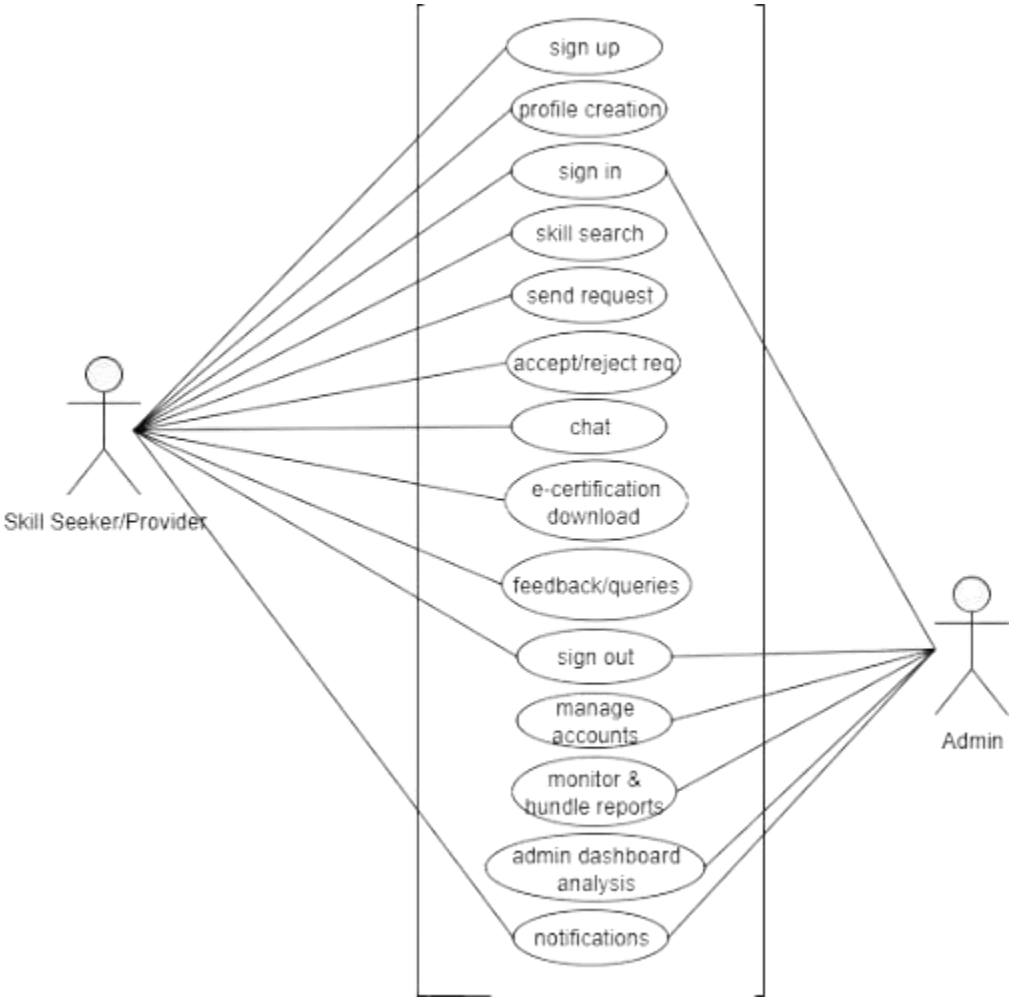
Table 2-1-1

User classes	Users Characteristics
Skill Seekers	People need help with something, like learning to code or graphic design. They are curious, want to learn, and want an easy way to find someone who can help.
Skill Providers	These users have skills they can share, like graphic design. They are confident in their abilities, enjoy helping others, and want to barter their skills for something they need. They need a simple way to show what they can do and connect with others.
Administrators	They're manages the platform, approve user profile, monitor exchanges, handle the complaints and ensures a safe & fair environment.

2.2Requirement Identifying Technique

This section explains the methods used to gather and define the functional requirements of a barter brains. For example, use cases (which include use case diagrams and detailed descriptions) are very useful for applications that involve user interaction. Each use case helps identify related requirements clearly.

2.2.1 Use case Diagram



2.3Functional Requirements

The functional requirement explains what the system is supposed to do. The main features and functions of the website are known as the functional requirements of the system or a website. All of the features and functions must be according to the needs of the users. The **Barter Brains** provides the different functional requirements to help users teach and learn skills by connecting them with others.

2.3.1 Sign-up

Field	Detail
Identifier	Fr-1
Title	Sign-up
Requirement	**User Perspective:** A new user can create an account by entering their name, email, and password, then clicking “Sign Up(Join Us)” **System Perspective:** The system checks if the email is unique, create the account, an. If the email is already in use, it displays, “the Email has been already taken try another.”
Source	Project team, users
Purpose	It keeps the site secure and personalizes the barter experience.
Business Rule	Passwords must be at least 8 characters; emails must be valid formats.
Dependencies	None, this is a starting point for other features.

2.3.2 Profile Creation

Field	Detail
Identifier	Fr-2
Title	Profile creation
Requirement	**User Perspective**: After signing up, the user can complete their profile by uploading an image, achievements, skill listings,and portfolio etc. **System Perspective**: The system validate and securely store the profile data
Source	users
Purpose	Enables personalization
Business Rule	Users achievements must be PDF/Doc
Dependencies	(Fr-1).

2.3.3 Sign-in (login)

Field	Detail
Identifier	Fr-3
Title	Sign-in (login)
Requirement	**User Perspective**: sign-up users can log in using email and password. **System Perspective**: the system authenticates credentials and grants/denies access by to access the whole website
Source	System/business rules(security requirements)
Purpose	Restricts access to Signed-up users only.
Business Rule	Password must match stored in hash
Dependencies	Sign-up (Fr-1).

2.3.4 Skill search

Field	Detail
Identifier	Fr-4
Title	Skill search
Requirement	**User Perspective**: logged-in users can search skills and view full matching user profiles.on the other hand logged-out(casual) users can also search for specific skills but cannot send request or access full profile until they logged in **System Perspective**: retrieves and displays results from database
Source	Users
Purpose	To let visitor explore available skill, encouraging them to sign-up/login for full access and for loged in user to have fll access.
Business Rule	Casual users: only basic preview visible/ logged in users: full profile access and ability to interact
Dependencies	(Fr-2).

2.3.5 Send friend Request

Field	Detail
Identifier	Fr-5
Title	Send friend request
Requirement	**User Perspective**: users can send requests through search skills or by browsing through other signed in users list **System Perspective**: stores the request with “Pending” status and notifies the receiver.
Source	Project team
Purpose	Networking between users.
Business Rule	Must be logged in.
Dependencies	(Fr-3, Fr-4).

2.3.6 Accept/ reject request

Field	Detail
Identifier	Fr-6
Title	Accept/ reject request
Requirement	**User Perspective**: receiver can accept or reject a pending request. **System Perspective**: updates request status; if accepts then become friends and if rejected then notifies sender.
Source	Project team(for sending notifications), users
Purpose	Enables user to connect with other and builds mutual agreements
Business Rule	Only pending requests can be acted upon
Dependencies	(Fr-5).

2.3.7 Chat

Field	Detail
Identifier	Fr-7
Title	Chat
Requirement	**User Perspective**: friends can chat to discuss skills and scheduling. **System Perspective**: enable real-time messaging and store history.
Source	Project team, users
Purpose	Controls skill-sharing agreement.
Business Rule	Only friends can chat.
Dependencies	(Fr-6).

2.3.8 E-Certificate Download

Field	Detail
Identifier	Fr-8
Title	e-Certificate download
Requirement	**User Perspective**: after completing skill learning, user downloads an e-certificate. **System Perspective**: generate and provides downloadable PDF with completion detail.
Source	Project team
Purpose	Motivates and reward users.
Business Rule	One certificate per completed skill.
Dependencies	(Fr-7).

2.3.9 Feedback/Queries

Field	Detail
Identifier	Fr-9
Title	Feedback/Queries
Requirement	**User Perspective**: logged in users can submit feedback/messages to admin. **System Perspective**: saves message in DB and notifies admin
Source	Project team, help improve the platform.
Purpose	Project support in improving
Business Rule	Login required
Dependencies	(Fr-3).

2.3.10 Logout (user/admin)

Field	Detail
Identifier	Fr-10
Title	Logout
Requirement	**User Perspective**: user can logout at anytime **System Perspective**: redirect to homepage/ login

Source	Project team.
Purpose	Security
Business Rule	User must be active
Dependencies	(Fr-3).

2.3.11 Admin login

Field	Detail
Identifier	Fr-11
Title	Admin login
Requirement	**Admin Perspective**: Admin logged in with special credentials. **System Perspective**: validates admin role before granting access.
Source	Project team, moderation
Purpose	Allow system management
Business Rule	Only admin role is authorized.
Dependencies	None

2.3.12 Manage Accounts

Field	Detail
Identifier	Fr-13
Title	Manage accounts
Requirement	**Admin Perspective**: Admin can delete or dismissuser accounts.
Source	Project team, moderation.
Purpose	Maintain platform integrity.
Business Rule	Only admins can access.
Dependencies	Sign in(Fr-2).Admin role.

2.3.13 Monitor and Handle Reports

Field	Detail
Identifier	Fr-14
Title	Monitor and Handle Reports/feedback
Requirement	**Admin Perspective**: Admin can view , approve or dismiss feedback. **System Perspective**: update status and sends notification to user.
Source	Project team, to handle issues.
Purpose	Improve platform and users trust.
Business Rule	Only admin can approve
Dependencies	(Fr-9, Fr-11)

2.3.14Admin Dashboardand Analysis

Field	Detail
Identifier	Fr-15
Title	Admin dashboard and analysis
Requirement	**Admin Perspective**: Admin views statistics like active users, feedbacks, certificates etc. **System Perspective**: Displays data in dashboard format.
Source	Project team
Purpose	Track platform performance.
Business Rule	Admin only
Dependencies	(Fr-11).

2.3.15 Notification (admin/ users)

Field	Detail
Identifier	Fr-16
Title	Notifications
Requirement	**User/Admin Perspective**: user; request updates, acceptance/rejection etc. on the other had admin; new user sig-up, friend requests, queries etc **System Perspective**: pusher real-time role-base notifications
Source	Project team, announcements or help.
Purpose	Keep admin/users informed.
Business Rule	Must be real time
Dependencies	(Fr-5 to Fr-13)

2.4Non-Functional Requirements

The Non-Functional requirements focus on the quality of the website, focusing on how reliable, easy to use, fast, and secure it should be, rather than specific features.The **Barter Brains** provides the different non-functional requirements

2.4.1 Reliability

The reliability website is dependable. It should not crack often, and when it does, it should be fix quickly. This is important because if the site is down, users can not search for or offer skills, which stop the whole bartering process.

Consequences of Failure: If the site happens to go down, then the users cannot search for any skills which stops barters from happening.

Error Reporting: This crash and bug will be logged by the system and notified to the supportteam immediately.

2.4.2 Usability

The site should be easy to learn, use, and recover from mistakes, so users feel comfortable trading skills. It is about making website user-friendly, even for the beginners.

Ease of Use: Buttons like “Search” or “Contacts us” will be big, clear, and in the same place on every page.
Error Avoidance: If a user forgets to fill in a field (like a password), the site should highlight it.

2.4.3 Performance

The systems should be quick. When users search for a skill, they should see the result within few seconds even if 10 or 100 people are using the same site at the same time.

2.4.4 Security

The website must keep user’s information (like emails, passwords) safe. It means protecting site from and its users from harm. This build trust and users are relaxed while using it that their information is saved.

2.5External Interface Requirements

This section explains how the Barter Brains platform interacts with users, software, hardware, and communication systems. These interfaces ensure that the platform functions smoothly across different environment.

2.5.1 User Interface Requirements

The design of Barter Brains will focus on making things simple, clear, and consistent for users. Fonts are clean and readable, and all pages use a similar layout so user don’t get lost.
Every screen will include helpful icons, buttons, and a top menu for navigation. The website will be fully responsive, meaning it’ll work well on desktops, tablets and smartphones.

2.5.2 Software Interface

Barter Brains is built using modern technologies:

- The frontend is built using HTML, Bootstrap 5 and JS.
- The backend is built using PHP laravel.
- All data, such as user profiles and skill exchange, will be stored in MySQL database.

It’s designed to work with all modern web browsers like Google Chrome, Mozilla Firefox and Microsoft Edge.

2.5.3 Hardware Interfaces

Since Barter Brains is a website, it doesn’t need any special hardware to work. Users will interact with Barter Brains using regular devices such as desktop, laptop, smartphones and tablets etc.

2.5.4 Communication Interfaces

To keep users informed and connected, the platform will support:

- **On-site notifications** for things like skill exchange requests, updates, or alerts.
- **On-site messaging** so users can safely communicate within the platform.

All data exchanged between users and the server will be secured using **HTTPS**. It’s designed to work well over normal internet connections, whether it's Wi-Fi or mobile data.

2.6Summary

Barter Brains is a smooth, safe, easy-to-use platform for people who want to exchange skills in their community. It includes important features like creating profiles, searching for skills, and handling exchange requests. To plan how users will interact, we used use-case modeling and considered qualities like usability, performance, reliability, and security to improve the platform. We also described the interface so Barter Brains works consistently with different tools, devices, and communication systems.

Chapter 3

Design and Architecture

3. System Design

Barter Brains is a platform where people can barterskills with one another, like bartering their guitar lessons for cooking tips. It is a web-based platform that can be accessed on a mobile, tablet, or computer without needing anything to be installed.

Assumptions and Dependencies

Barter Brains has some basic ideas it relies on. First, users should have a steady Internet connection and use a desktop computer with a modern browser like Chrome, Firefox, or Edge. Second, users are expected to know how to use the site online: create accounts, send skill exchange requests, and browse profiles.

Risks

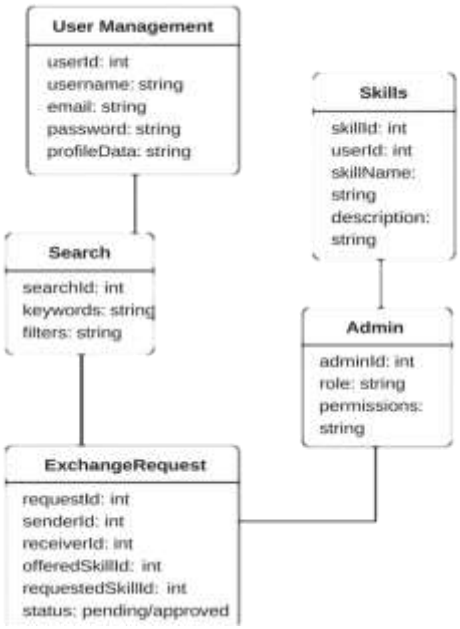
Several potential risks were considered during the design of Barter Brains. The first is that of data privacy since users are now feeding in personal information, the system is designed to be securely authenticated and to store such data encrypted. The second is that of overload of the system, particularly if a large number of users join at the same time. For this aspect, the overall building of the platform comprises the idea that such a platform will grow without speed decay.

3.1 Design Models

To better understand how Barter Brains is structured and functions, we've used several object-oriented models. These help visualize the different parts of the system, how they interact, and how they behave over time. Below are the descriptions of the models used:

3.1.1 Class Diagram

The class diagram shows the building blocks of Barter Brains in the term of objects, their attributes, and how they relate to each other.



Explanation of Class Diagram

This diagram shows different parts (called classes) of a system, likely for a trading or bartering platform, and how they connect. Here's a simple explanation:

Class User Management: This part handles all user information in the system. A user can add skills, send/receive exchanges requests and interact with search.

Class Skills: This store the skills a user offer for exchange. It is connected to user management and linked to Exchangerequest where skills are exchanged.

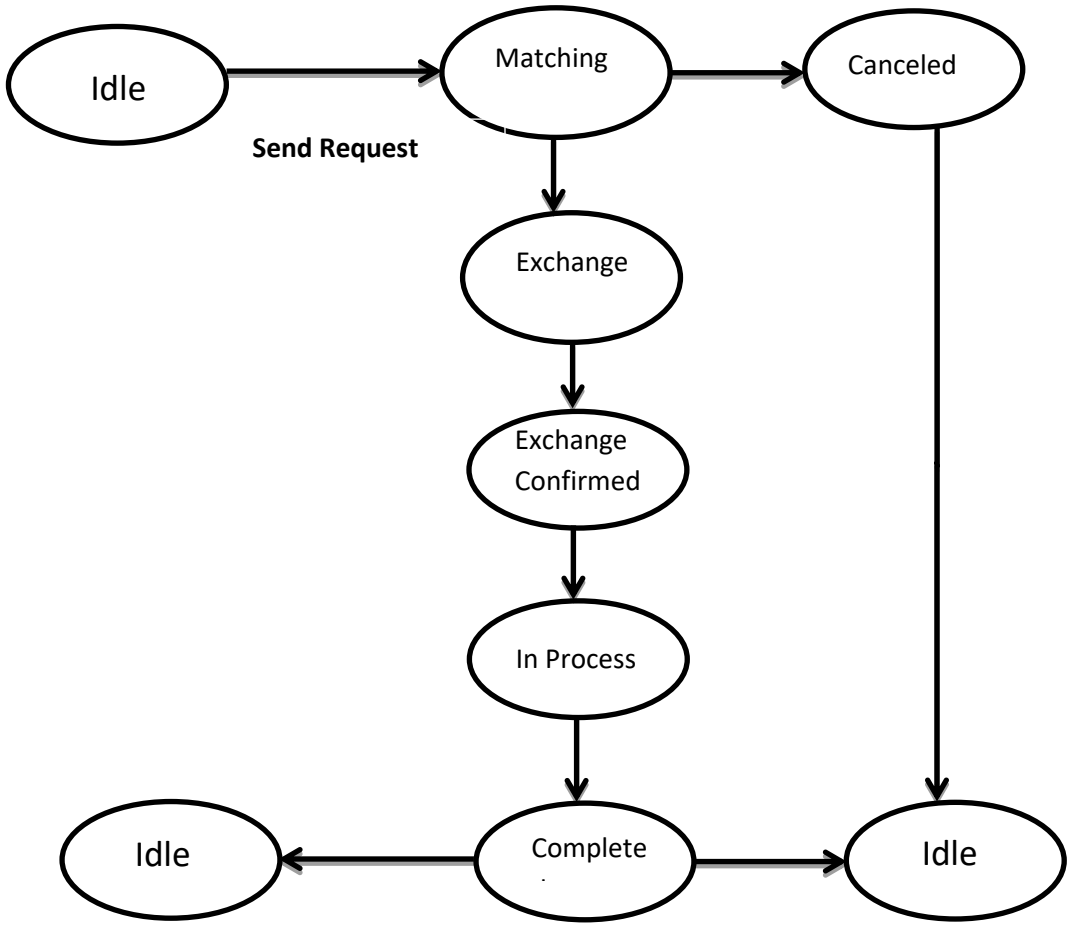
Class Search: This helps users find other skills. Connected to user management and skills for searching relevant data.

Class Admin: This manages administrative activities and has power over users.

Class ExchangeRequest: This represents a request between two user to exchange skills

3.1.2 State Diagram

We also created a state transition diagram for the **ExchangeRequest** object. This diagram helps track how the system reacts to different events and ensures that the exchange flow is managed properly in the backend.



Explanation of the State Diagram:

Idle: The user is not engaged in any exchange yet.

Send Request (Matching): The user browse skills or search and clicks “send Request” button for a desired skill.

Matching: The system waits for the receiver to respond to the request.

Canceled: If the receiver rejects the request the request is canceled.

Exchange: when the receiver accepts the request the exchange process in initiated.

Exchange Confirmed: Both users agree to do the skill exchange.

In Process: The actual skill exchange (teaching, tutoring, etc.) is happening.

Completed: The barter is finished successfully.

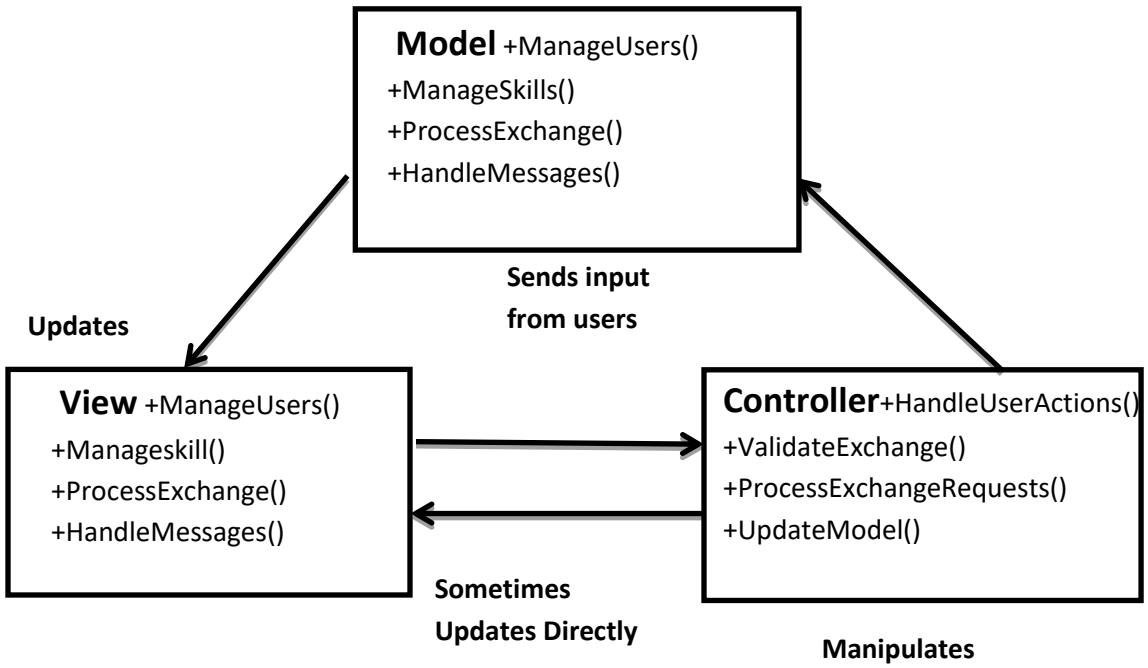
Back to Idle: The user can now start a new barter if they want.

3.2Architecture Design

Barter Brain uses a multi-layer design called MVC (model view controller). This means it keeps three parts separate: the user interface, the data and the logic.

Components:

1. **Model:** represents the data and business logic of a application.
2. **View:** Represents the user interface and displays the data provided by the model.
3. **Controller:** Receives inputs and acts as bridge between model and view.



Join Us Flow in Barter Brains

ViewUser opens "join_us.blade.php" page (form with Name, Email, Password, Skills, etc.) and click on "apply" button.

Controllervalidates the user.

Model (JoinWeb.php) saves user's data in "join_webs" table.

Updated data is sent back to **View** to show the profile of user.

3.3 Data Design

Barter Brains' data design specify how all essential information storage, organization, and processing of users, skills, messages, and exchange requests happens. All data is hosted on a well-defined database management system (like MySQL), and the system follows an object-oriented design where everything revolves around classes (objects) with related data (attributes) and behavior (methods).

Clear objects have been defined for users, skills, exchanges, and communication. Each of these has specific attributes describing it (for instance, a user's name or a skill's category), and contains methods for it to perform certain actions (sending or accepting request capabilities).

3.3.1 Data Dictionary

This dictionary catalogs the core entities and data elements of the barter brains system to keep focused clarification to developers and supervisors.

Terminology	Data Type & Description
ExchangeRequest	Object: Represents a request to exchange skills between two users.
ExchangeRequest.requestID	Integer: Unique identifier for the request.
ExchangeRequest.senderID	Integer: ID of the user who initiates the request.
ExchangeRequest.receiverID	Integer:ID of the user receiving the request.
ExchangeRequest.skillOffered	Skill: The skill the sender is offering.
ExchangeRequest.skillRequested	Skill: The skill the sender wants in return.
ExchangeRequest.status	String: Tracks request status (e.g., "Pending", "Accepted", etc.).
Skill	Object: Represents a skill a user can offer or request.
Skill.skillID	Integer: Unique identifier for each skill.
Skill.title	String: Name of the skill (e.g., "Guitar").
Skill.category	String: Skill type (e.g., Art, Language).
Skill.description	Text: Brief details about the skill.
Skill.ownerID	Integer: ID of the user who owns this skill.
User	Object: Represents a platform user.
User.userID	Integer: Unique identifier for each user.
User.name	String: Full name of the user.
User.email	String: Email address used for login and contact.
User.password	String: Encrypted password.

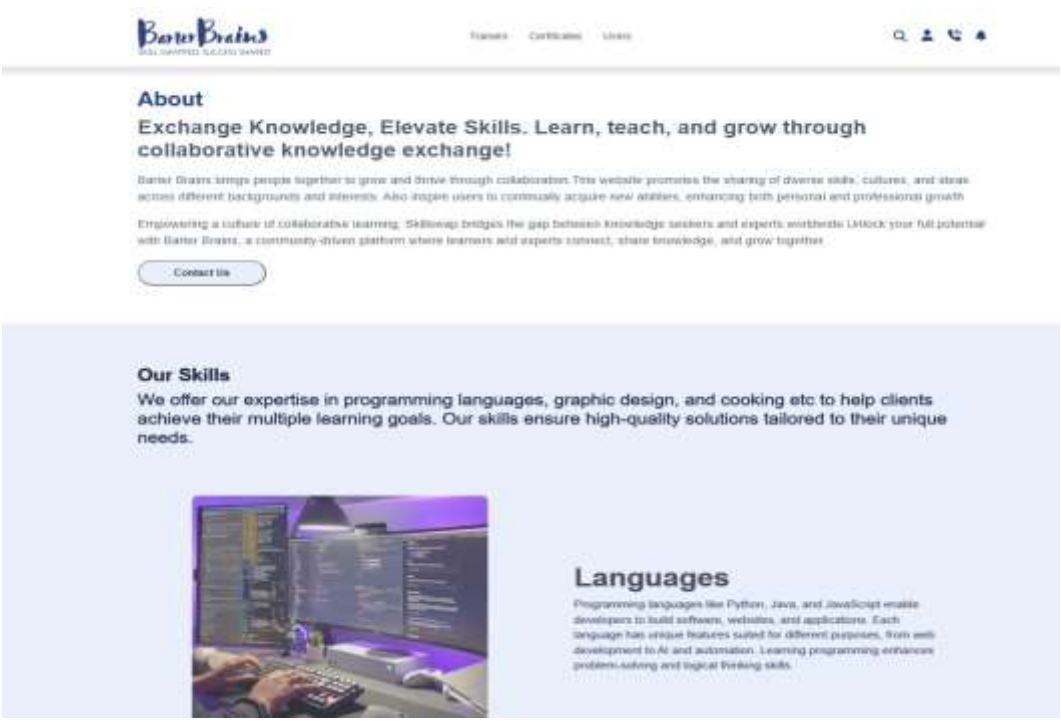
3.4 User Interface Design

The Barter Brain is user-friendly system, which make it possible for everyone to interact with this system easily.The complete number of web pages are designed and styled using HTML, CSS and Java Script, which are also liked up with each other. The whole interface is responsive according to multiple screen sizes.

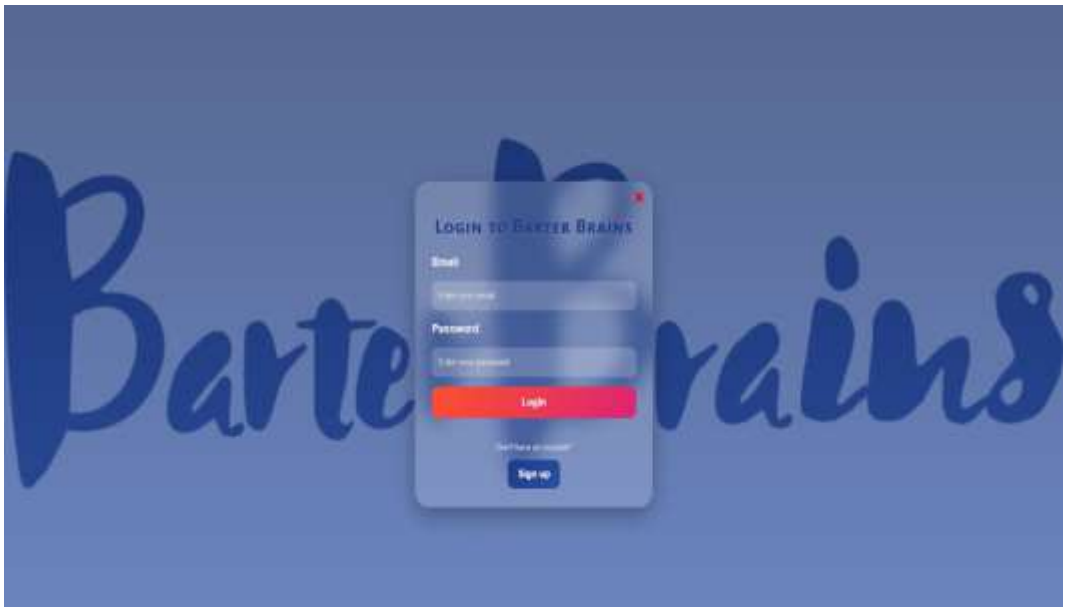
3.4.1 User Experience Overview:

Following are the web pages of Barter Brains:

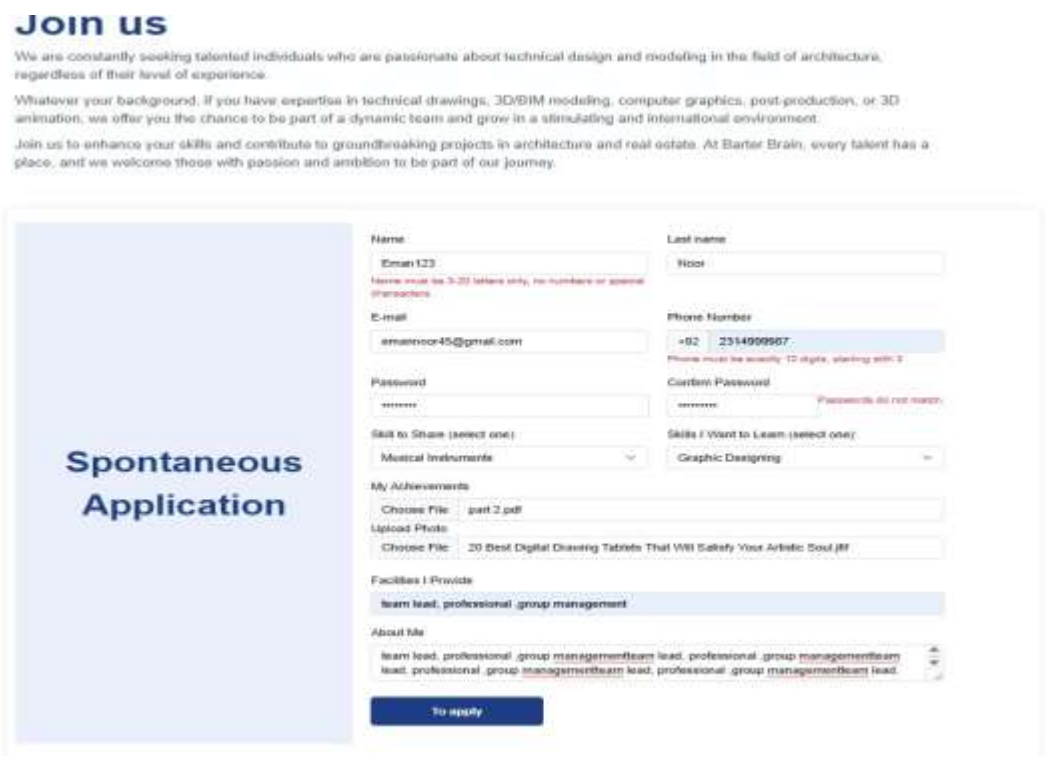
- **Welcome Page:**



- **Login Form:**

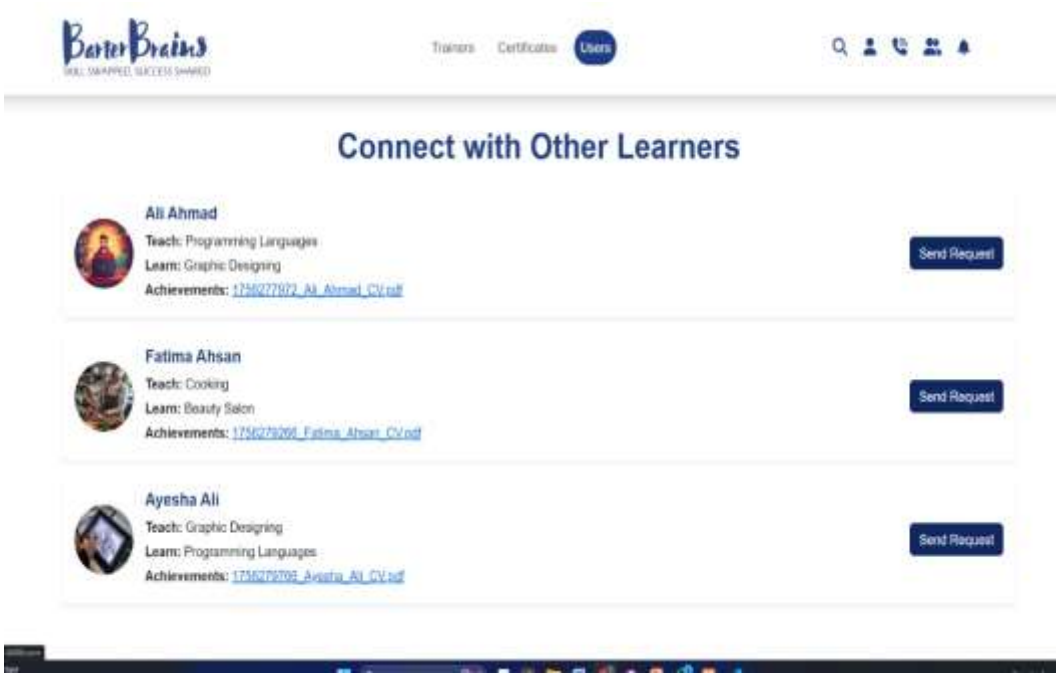


- **Join Us Page (Sign-up):**

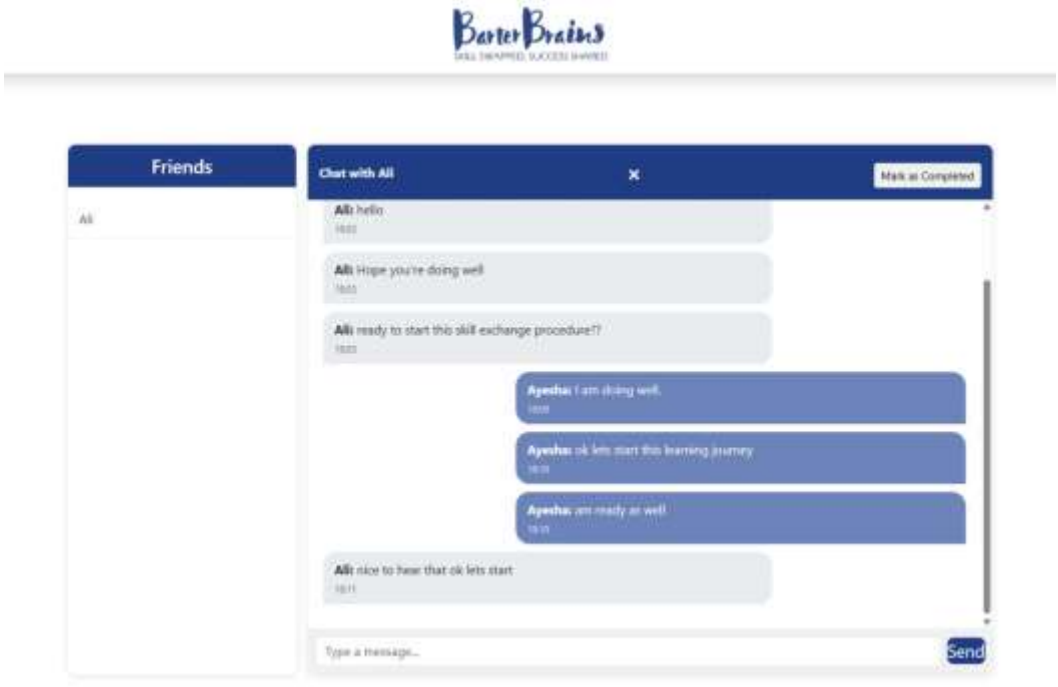


- **User Profile**

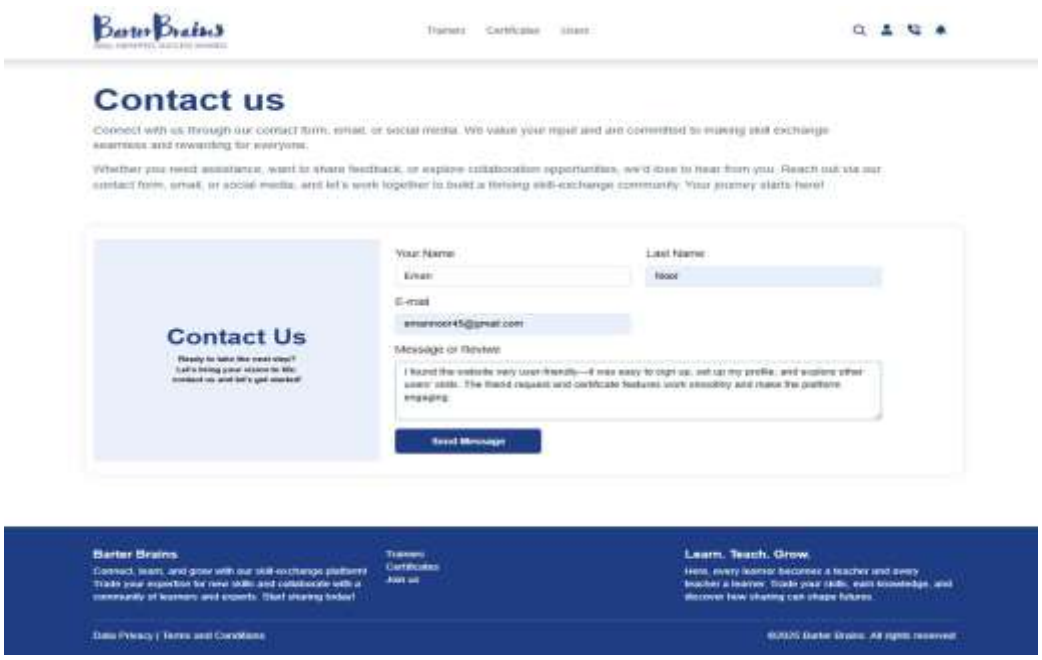
- **Users:**



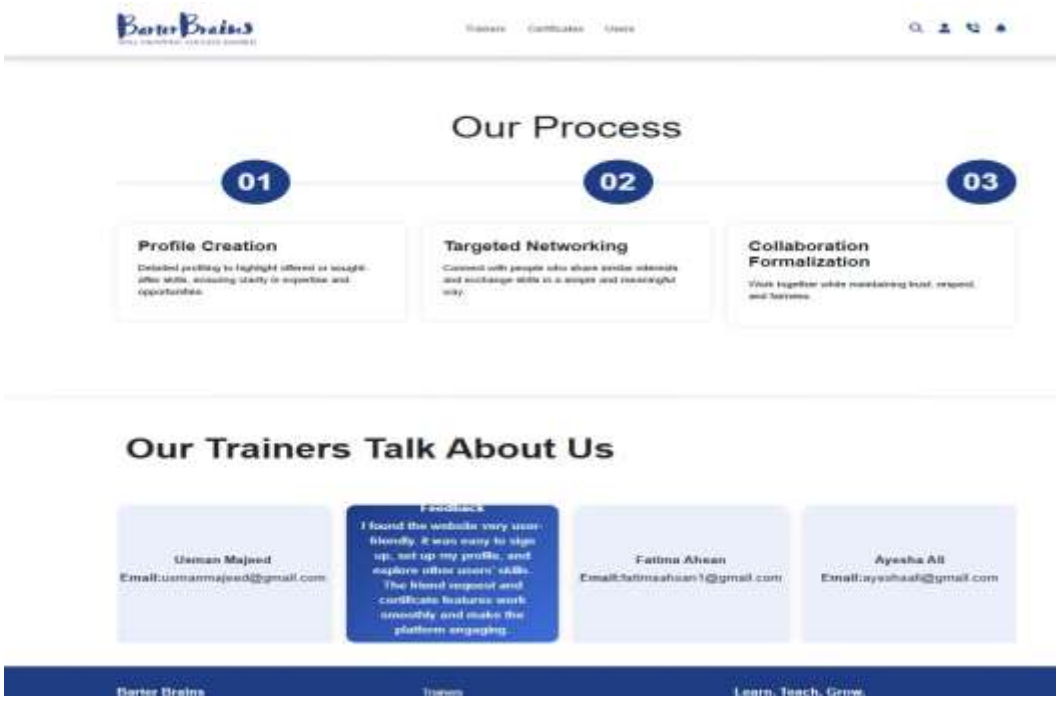
- **Chat box:**



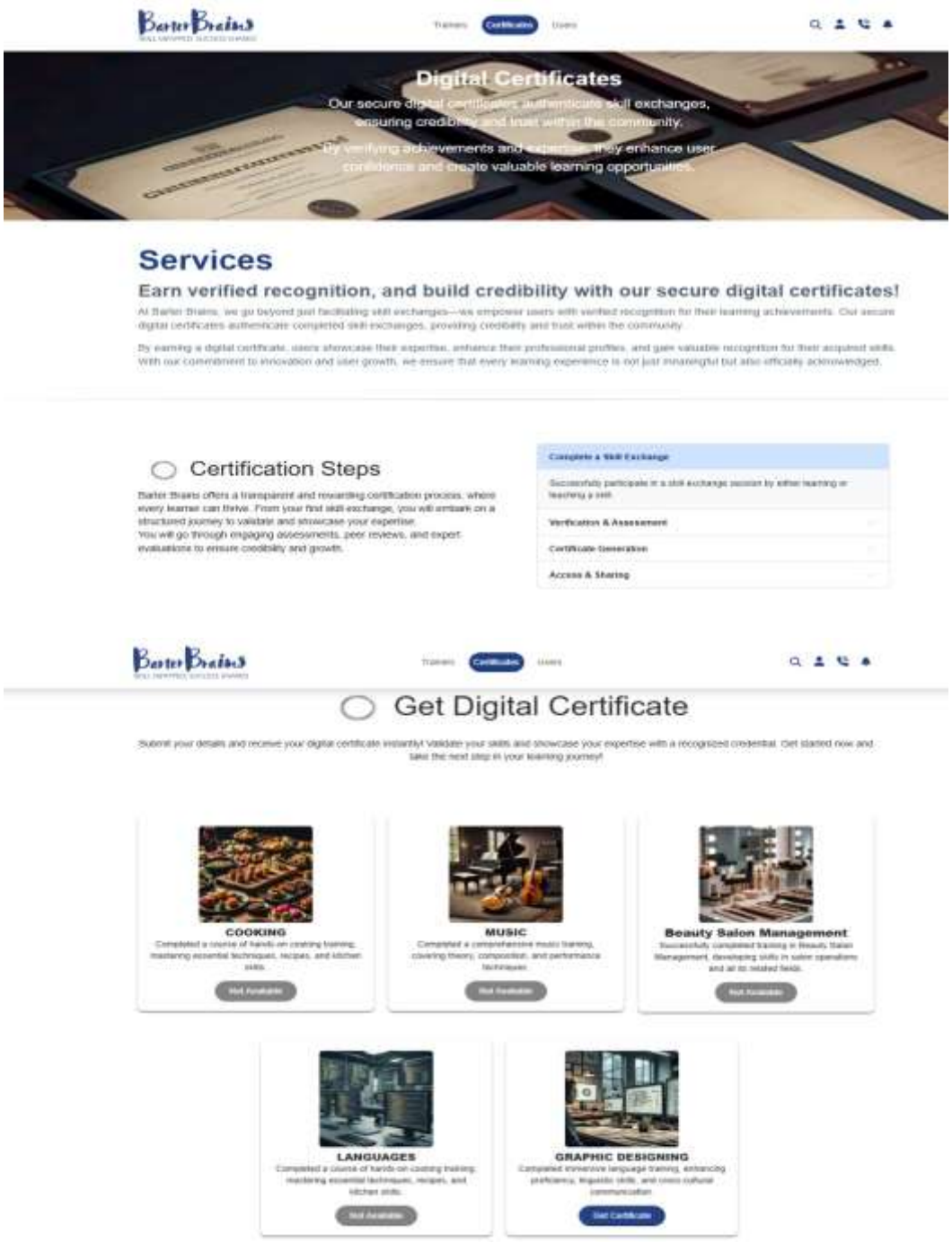
- **Contact Us Page:**



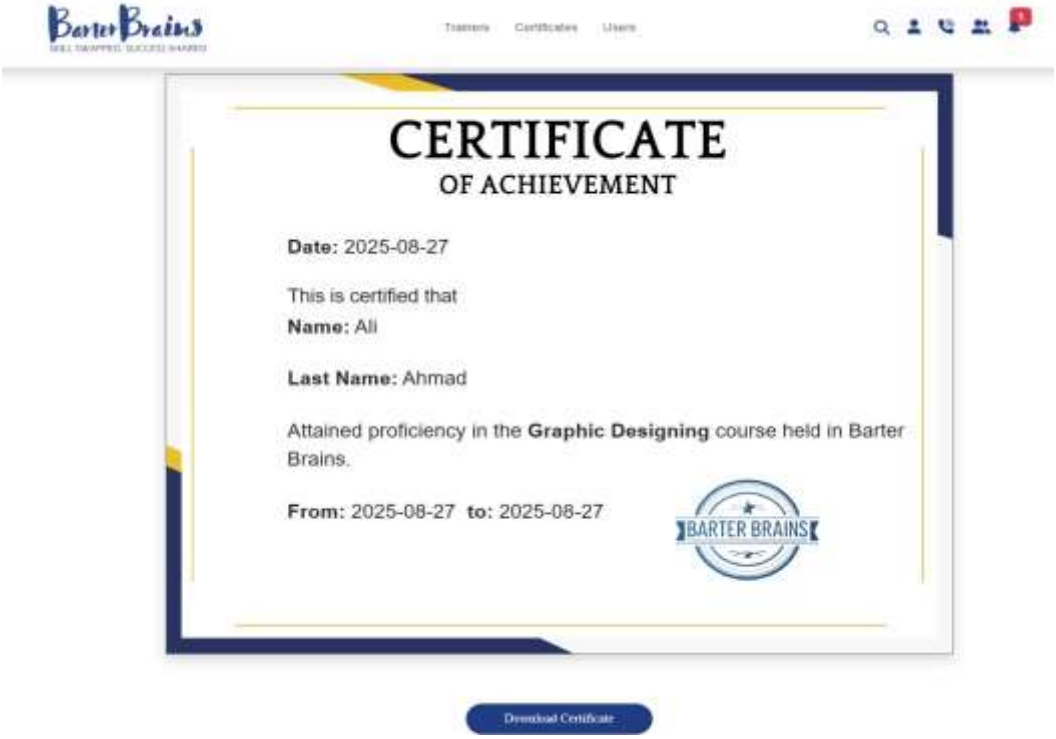
- **Trainers**



- **Certificate Page:**



- **E- Certificate**



- **Admin Dashboard:**

Chapter 4

Implementation

4.1 Algorithms

Barter Brains come with a host of smart features like skill searching, exchange requests. Some examples below indicate pseudocode for the barter brains website, which help users to find the best possible skill exchange partner based on offering and requiring skills.

Table 4- 1 Skill Matching Algorithm

Input: A list of users with the skills they offer and the skills they need
Output: List of best possible matching users

1: Start with an empty list called searchResults
2: User enters the search skill (skillToFind)
3:Go through each user in the database
4:If a user offersskillToFind and add this user to searchResults
5:After checking all users, sortsearchResults by match score (best match on top)
6:Return the final searchResults list

Explanation:

- **Steps 2–3:** Go through all users and check their offered skills.
- **Step 4:** Select only those who offer the searched skill.
- **Step 5:** Sort results so that the most relevant matches appear on top.
- **Step 6:** Return the final list of matched users.

Table 4- 2 Skill ExchangeAlgorithm

Input: Skill Exchange requests sent by one user t another.
Output: A list showing whether their request is approved/ rejeted or pending

1: Start with an empty list called skillExchanges
2: for each new request sent by user
3:check if user B has responded
4:if user B accepts the request then:
   a. Create an exchange working
   b. Add notification accepted.

Else if user B rejects the request:
a. Add notification rejected

5:else no response yet.
6: return list of all requested user.

Explanation:

- **Steps 2–3:** loop through each request and check the receiver's response.
- **Step 4:** if accepted enabled the chat and mark it successful.

- **Step 5:** if rejected cancel.
- **Step 6:** if no reply mark as pending
- **Steps 7:** return the final status of all requests.

4.2 External APIs

APIs (Application Programming Interfaces) are tools that enable communication between different software systems. In Barter Brains, APIs are the ones that connect customized features such as user login, notifications, and image upload without having to build these from scratch and thereby make the application smarter and more efficient.

Name of API: Pusher

Description of API: A hosted service that adds real-time bi-directional communication between servers and clients. It allows broadcasting events and receiving them instantly without refreshing.

Purpose: To implement real-time chat and live notifications in the Barter Brains platform.

API functions list:

- Pusher\Pusher (PHP SDK)
- broadcastOn() (Laravel event class)
- Echo.channel()
- Echo.private()
- Echo.listen() (JavaScript client)

4.3 Code Repository

To manage versioning and facilitate collaboration among the Barter Brains team, GitHub was used as the primary code repository. All relevant project files such as source code were put into that repository. Tracking changes, organizing tasks, and keeping the project current was made easier by using GitHub.

Git Repository Link:

https://github.com/EmanMalik47/FYP-project

4.3.1 Metrics of the Git Repository

Commits:A total of **130 commits** were made during the project. This tracked every update in the codebase, showing the consistency and frequency of development work.
Branches: The project was maintained entirely on a single branch (main). No separate feature or bugfix branches were created due to the project's small scale and direct collaboration approach.
Pull Requests: No pull requests were created. All updates were directly committed and pushed to the main branch instead of using a formal PR workflow.

Contributors:2 contributors actively participated in the project, contributing commits, file uploads, and documentation updates.
Code Reviews: Formal GitHub code reviews were not conducted since pull requests were not created.

Summary

Barter Brains works smartly because it uses clear and effective rules, strong third-party APIs, and good teamwork through GitHub. These parts are the core of the platform, helping people barter skills faster, more securely, and more easily. This setup makes Barter Brains run smoothly and supports its main goal: portable skill exchange between people.

Chapter 5

Testing and Evaluation

5. Introduction

We perform software testing operations at Barter Brains to ensure the correct operation of the Barter Brains platform. By using this software testing, we are able to check if everything performs as expected and meets the requirements. There are still cases for manual testing, so all tests should filfil with these major principles:

Independent Tests: Each test can run on its own without relying on others.

Clear Assertions: Tests check that the actual results match the expected ones.

Repeatable Tests: Tests can be run multiple times without issues.

5.1 Unit Testing

Barter Brains uses unit testing to test individuals units or components like functions or methods etc. we used it to ensure that each small piece of Barter Brains work correctly on its own.

Table 5-1-1

Testcase ID	**UT1**
Requirement ID	REQ-LOGIN
Title	Validate login logic
Description	Test login function in isolation
Objective	Ensure correct handling of credentials
Driver/Precondition	Database mock, test client
Test Steps	1. Call login() with valid credenials 2. Observe return value
Input	Email: learner@gmail.com Pass: 123456
Expected Results	Login success token is returned
Actual Result	As expected
Test Status	Pass

Table 5-1-2

Testcase ID	**UT2**
Requirement ID	REQ-SIGNUP
Title	Validate signup
Description	Test signup logic
Objective	Ensure new user is created with valid details
Driver/Precondition	Database mock, test client
Test Steps	1. Call signup() with valid email 2. Observe DB entry
Input	Email: learner@test.com Pass: abcd1234
Expected Results	User record save with hash password
Actual Result	As expected
Test Status	Pass

Table 5-1-3

Testcase ID	**UT3**
Requirement ID	REQ-Friend
Title	Validate send friend request logic
Description	Test sendRequest() function
Objective	Ensure request data is saved properly
Driver/Precondition	Two valid users accounts exits
Test Steps	Call sendRequest(sender, receiver)
Input	Sender 1, receiver 2
Expected Results	New friend request row created with status "pending"
Actual Result	As expected
Test Status	Pass

Table 5-1-4

Testcase ID	**UT3**
Requirement ID	REQ-Notify
Title	Validate notification creation logic
Description	Test notify() function
Objective	Ensure notifications stored for receiver
Driver/Precondition	Friend request action occurss
Test Steps	Call notify(user, message) Observe DB
Input	Sender 1, receiver 2
Expected Results	Notification row created with unread status
Actual Result	As expected
Test Status	Pass

Table 5-1-5

Testcase ID	**UT3**
Requirement ID	REQ-CERTIFICATE
Title	Validate certificate generation logic
Description	Test generateCertificate() function
Objective	Ensure certificate is created for correct user and skill
Driver/Precondition	User and skill exits
Test Steps	Call generateCertificate(user, skill)
Input	User Name: Learner Skill: Graphic designing
Expected Results	Certificate file created
Actual Result	As expected
Test Status	Pass

5.2 Functional Testing (FT)

Functional testing is the process that tells what the system barter brain does, not how it does it. It confirms the platform works correctly from the perspective of end users. These features include sign up, login skill exchange etc.

Table 5-2-1

Testcase ID	**FT1**
Requirement ID	REQ-SIGUP+ Profile creation
Title	User SIGNUP Functionality
Description	User signup new account.
Objective	Ensure new user account is created
Driver/Precondition	Website deployed
Test Steps	1. Go to signup page 2. Enter credentials (name password, achievements , select skills etc) 3. Click sign up
Input	Email/password valid
Expected Results	User Signup
Actual Result	As expected
Test Status	Pass

Table 5-2-2

Testcase ID	**FT2**
Requirement ID	REQ-LOGIN
Title	login Functionality
Description	Flow of login screen
Objective	Ensure login screen after logging in redirect to profile
Driver/Precondition	User exits in DB
Test Steps	1. Go to login page 2. Enter credentials (email, password) 3. Click login
Input	Email/password valid
Expected Results	User loged in
Actual Result	As expected
Test Status	Pass

Table 5-2-3

Testcase ID	**FT3**
Requirement ID	REQ-Skill-search
Title	Skill search
Description	Search Skill by using keyword
Objective	Ensure skill search works both logged-in and guest,

	but request option restricted
Driver/Precondition	User may or may not logged in
Test Steps	1. Enter “graphic designing” in search
Input	Target skill: “graphic designing”
Expected Results	List of users with “graphic designing”shown (request option only after login)
Actual Result	As expected
Test Status	Pass

Table 5-2-4

Testcase ID	**FT3**
Requirement ID	REQ-SKILLREQ
Title	Send Skill Request
Description	Send Skill Request
Objective	Ensure request is submitted & notification sent
Driver/Precondition	Users must be registered
Test Steps	1. Open another user profile 2. Click “Request Skill”
Input	Target skill: Guitar
Expected Results	Success message: "Request sent successfully"
Actual Result	As expected

Table 5-2-5

Testcase ID	**FT5**
Requirement ID	REQ-SKILL-ACCEPT/REJECT
Title	Accept/Reject Request
Description	User accepts/rejects skill request
Objective	Ensure request status updates correctly
Driver/Precondition	Pending request exists
Test Steps	1. Go to notifications 2. Accept o reject requests
Input	Accept request for Cooking
Expected Results	Request status updated + sender notified
Actual Result	As expected
Test Status	Pass

Table 5-2-6

Testcase ID	**FT5**
Requirement ID	REQ-CHAT
Title	Chat Messaging
Description	User exchange messages
Objective	Ensure real time chat
Driver/Precondition	Bot users connected
Test Steps	1. open chat

	2. Send messages
Input	Message “HI”
Expected Results	Message delivered and shown
Actual Result	As expected
Test Status	Pass

Table 5-2-7

Testcase ID	**FT5**
Requirement ID	REQ-CHAT
Title	Chat Messaging
Description	User exchange messages
Objective	Ensure real time chat
Driver/Precondition	Bot users connected
Test Steps	1. open chat 2. Send messages
Input	Message “HI”
Expected Results	Message delivered and shown
Actual Result	As expected
Test Status	Pass

Table 5-2-8

Testcase ID	**FT6**
Requirement ID	REQ-CERTIFICATE
Title	e-certificate download
Description	User download certificate
Objective	Real-time certificate download
Driver/Precondition	Motivate and appreciate the user give reward
Test Steps	1. Open chat 2. Click download certificate
Expected Results	Certificated downloaded
Actual Result	As expected
Test Status	Pass

Table 5-2-9

Testcase ID	**FT7**
Requirement ID	REQ-FEEDBACK
Title	Feedback/query submission
Description	User send query
Objective	Ensure query saved and admin notified.
Driver/Precondition	User logged in
Test Steps	1.Go to contact us 2.write your feedback/ query 3.enter submit.
Input	Feedback “easy to use platform to work on”
Expected Results	Query stored and admin notifies
Actual Result	As expected
Test Status	Pass

Table 5-2-10

Testcase ID	**FT7**
Requirement ID	REQ-SIGNOUT
Title	User sign out
Description	User logs out
Objective	Ensure secure logout
Driver/Precondition	User logged in
Test Steps	1.click on logout
Input	N?A
Expected Results	Redirect to login page
Actual Result	As expected
Test Status	Pass

Table 5-2-11

Testcase ID	**FT8**
Requirement ID	REQ-ADMIN-Manage user
Title	Manage User accounts
Description	Admin manages accounts
Objective	Ensure admin can delete/dismiss a user
Driver/Precondition	Admin logged in.
Test Steps	1.go to Admin manage users 2. deletes user
Input	Email: learner@test.com
Expected Results	User status: deleted
Actual Result	As expected
Test Status	Pass

Table 5-2-12

Testcase ID	**FT9**
Requirement ID	REQ-ADMIN-REPORTS
Title	View Reports/Feedback
Description	Admin views platform usage reports
Objective	Ensure query/feedback is visit
Driver/Precondition	Admin logged in
Test Steps	1. Go to reports
Input	N/A
Expected Results	User recrive notification from admin
Actual Result	As expected
Test Status	Pass

Table 5-2-13

Testcase ID	**FT10**
Requirement ID	EQW-ADMIN-Dashboard
Title	Admin dashboard analysis
Description	Dashboard analysis
Objective	Ensure updated dashboard visible
Driver/Precondition	Admin logged in

Test Steps	1.open dashboard
Input	N/A
Expected Results	Analysis of dashboard
Actual Result	As expected
Test Status	Pass

Table 5-2-14

Testcase ID	**FT10**
Requirement ID	REQ-NOTIFICATIONS
Title	notifications
Description	Notifies user and admin
Objective	Ensure notifications update
Driver/Precondition	Even gve further option like ‘accept, approve” etc
Test Steps	1.platform Action
Input	N/A
Expected Results	Notifications visible on bell.
Actual Result	As expected
Test Status	Pass

5.3 Integration Testing (IT)

Integration testing verifies how the components of Barter Brains interact with one another. For example, does user login work well with skill requests?

Table 5-3-1

Testcase ID	**IT1**
Requirement ID	REQ-SIGNUP/LOGIN
Title	Sign up + Login
Description	Full flow from sign-up to login
Objective	Validate that new users can immediately login
Driver/Precondition	No user exists with email
Test Steps	1. Register new user 2. Log in using same credentials
Input	Email: test@bb.com Pass: qwerty123
Expected Results	Successful login redirect to dashboard
Actual Result	As expected
Test Status	Pass

Table 5-3-2

Testcase ID	**IT2**
Requirement ID	REQ-LOGIN/SEARCH
Title	Public Search + restricted request
Description	Test that skills can be searched without login, but sending a request require login.
Objective	Ensure that search is public but user interactions are restricted to logged-in users
Driver/Precondition	User not logged in or in guest mode.
Test Steps	1.Login/ or without Login

	2.Go to search 3.Search skill
Input	Skill: Cooking
Expected Results	Skill results shown
Actual Result	As expected
Test Status	Pass

Table 5-3-3

Testcase ID	**IT3**
Requirement ID	REQ-SKILLREQ/NOTIFY
Title	Skill request + Notification
Description	Verify request notification
Objective	Ensure skill request notifies receiver properly
Driver/Precondition	Two users created
Test Steps	1. User A sends skill request to User B 2. User B checks notifications
Input	User A to User B, Skill: Graphic designing
Expected Results	Notification: "New request from User A"
Actual Result	As expected
Test Status	Pass

Table 5-3-4

Testcase ID	**IT4**
Requirement ID	REQ-Chat/FEEDBACK
Title	Chat + Feedback Flow
Description	Chat ends then if user wants then submitBarter feedbacks
Objective	Give feedback/review of the bartering system that help others to check websites reviews
Driver/Precondition	User (trainer)
Test Steps	Submit feedback
Input	Feedback message
Expected Results	feedback stored, shown on users/trainers feedback
Actual Result	As expected
Test Status	Pass

5.4 Summary

Different kinds of software testing were carried out to ensure Barter Brains platform functioning and its adherence to requirements. Unit testing was performed to check the functions of the individual components such as login and registration in order to catch any bugs as early as possible. Functional testing validated features such as user login and skill search and the sending of skill requests completely. Integration testing guaranteed that the different aspects of the system, in particular login and skill requests, integrate well. Performance testing was carried out using JMeter to determine the concurrent user handling capacity of the system with particular emphasis on login and search activities. All tests were developed following best practices such as being independent, using correct test data, steering clear of hardcoded values, and ensuring repeatability.

Chapter 6

System Conversion

6. Introduction

The transition of the system is a journey from an old system to a new, fully developed 'Barter Brains' platform. It involves the transfer of essential data, the setup of all features, and the seamless functionality of a live system. However, the transition is smooth with minimal disruption to the users' lives.

6.1 Conversion Method

For Barter Brains platform, we have adopted Pilot Conversion method.

Pilot Conversion

The platform was first launched for a small group of users, maybe testers, friends, or selected volunteers, so that we can get live feedback, do observing how the system performs, correct issues, and make small improvements before fully opening it to everyone. This method helped minimize risk and surely made the experience better once the platform was fully opened.

6.2 Deployment Approach

Our website Barter Brain was deployed and tested in local environment instead of using containerization like Docker. It allow us to easily configure, run and test the system.

6.2.1 Tools and Environment:

Operating System: Windows 10
Local Server: XAMPP (Apache + MySQL + phpMyAdmin)
Framework: Laravel (PHP-based framework)
Web Server Execution: php artisan serve command
Database Management: phpMyAdmin (for creating and managing tables)

6.2.2 Deployment steps include:

- Install XAMPP
- Framework : laravel.
- We server execution: “php artisan serve”

6.3 Testing After Deployment

1. Installed **XAMPP** to configure Apache and MySQL services.
2. Created a new **MySQL database** for the project using phpMyAdmin.
3. Updated Laravel project .env file with database credentials.
4. Ran migrations (php artisan migrate) to create required tables.
5. Started local server using: php artisan serve
6. Accessed the application at http://127.0.0.1:8000.
7. Performed test cases such as login, signup, profile creation, and admin panel functions.

6.4 Testing and Verification

- Verified database connectivity (user registration, login sessions, and admin approvals stored in DB).
- Validated core features like **skill search, friend requests, feedback, and notifications** in the local environment.
- Conducted **functional testing** with sample users created in phpMyAdmin.

6.5 Limitations of Local Deployment

- Application accessible only on the local machine (not publicly available).
- No use of scalable environments (like Docker, or cloud).

6.6 Summary

The deployment of the Barter Brains platform was completed in a **local environment** using XAMPP, Laravel's built-in server, and phpMyAdmin. The process included configuring the .env file, setting up the MySQL database, running migrations, and starting the Laravel server with the php artisan serve command. We then tested all the core functionalities such as registration, login, skill exchange, notifications, and feedback submission to verify that the system worked as expected.During the process, we faced some challenges such as **database connection errors**, minor **route misconfigurations**, and a few **UI-level bugs**. These issues were resolved by carefully updating the environment configuration, checking migrations, and debugging Laravel controllers and views. Overall, the deployment was successful and allowed us to validate that the system fulfills its intended requirements in a student-level setup.

Chapter 7

Conclusion

7 Introduction

The chapter wraps up the project. It looks back at the objectives and goals set at the beginning and checks how well they have been realized. It also put cot through some recommendations for future improvement.

7.6 Evaluation

Below is the list of key objectives of Barter Brains. This table describes whether a certain objective was met with the final developed version of the website Barter Brains.

Table 7-1

Objectives	**Status**
Allow users to be able to sign-up and create a profile.	Completed
Enable users to search for skills offered by others	Completed
Let users send and receive skill exchange requests	Completed
User can accept and reject the request	Completed
User can chat with other users	Completed
Add a review feature generally	Completed
User-friendly platform with a clean UI	Completed
Secure Entry and Basic User Authentication	Completed
Display a dashboard to manage users and responses	Completed

7.7 Traceability Matrix

This section shows which part of the Barter Brains system connects to each original requirement from the Software Requirements Specification (SRS). It makes sure nothing was missed and that every requirement was actually implemented and tested.

Requirement ID: A unique ID for each requirement.
Requirement Description: The explanation as to what the requirement is about.
Design Specification: The part/component of the system in which the requirement was handled.
Code: The specific file/module in which the functionality has been coded.
Test ID: The ID of the test case verifying that requirement.

7.8 Conclusion

The Barter Brains project was developed to provide a platform for the exchange of skills instead of money. Making skills inter-exchangeable encourages individual community interaction, learning, and collective growth whereby users teach what they know and learn what they require. Throughout this project, we were true to the goals and objectives set out at the beginning. Every single feature, from user registration to skill matching and dashboard management, was implemented as planned.

Below is a table showing the mapping of each initial objective to the actual functionality provided in the final system:

Table 7-2

Objective Defined	Functionality Provided
Users can sign up and build a skill profile	Registration form
Users can search for other users by skills	Skill search
Users can send and accept skill exchange requests	Request handling system
Users can review each other after skill exchange	Feedback module
Secure login and authentication	Login/signup with password protection and validation

7.9 Future Work

As the functionality of the core system is complete, the following are potential areas for improvement and new ideas for enhancing Barter Brains in the future:

Location-based matching would enable users to find skill partners in proximity.

A mobile-app version would facilitate easy access and convenience.

There should be audio or video calling system for easy communication between users.

Recommendations based on machine learning so that user matching can be done more precisely.

To enable users who do not speak English to utilize the platform.