



FINAL YEAR PROJECT

LEARN CODE PRO



**GOVT. RABIA BASRI GRADUATE COLLEGE FOR WOMEN,
WALTON ROAD, LAHORE**

SUPERVISOR

Dr. Erum Mehmood

SUBMITTED BY:

Sidra Yasmeen

2020-RBL-232 | 053680

Sadia Anjum

2020-RBL-213 | 053654

**SESSION: 2020-2024
PROJECT ID: 20-RBL-BSCS09**



Bachelor of Science in Computer Science FINAL YEAR PROJECT REPORT

“LEARN CODE PRO”

**A project presented to
Punjab University, College of
Information & Technology, Lahore**

In partial fulfillment of the requirement for the degree of

**Bachelor of Science in Computer
Science Session (2020-2024)**

By:

Sidra Yasmeen

2020-RBL-232 | 053680

Sadia Anjum

2020-RBL-213 | 053654



DECLARATION

The work reported in this project is completed by **Sadia Anjum (Roll No. 053654)** and **Sidra Yasmeen (Roll No. 053680)**, under the supervision of **Dr. Erum Mehmood**, Lecturer in Computer Science, GOVT. RABIA BASRI GRADUATE COLLEGE FOR WOMEN, WALTON ROAD, LAHORE. We hereby declare that we want to make it clear that we didn't copy any part of this software from anywhere else. We created this software and the report entirely on our own. If it's found that any part of this project is copied from somewhere else, we'll take responsibility for it. We haven't used any of this work in any other degree application at any university or institute.

Student Name	Registration No	Roll no	Signature
Sidra Yasmeen	2020-RBL-232	053680	_____
Sadia Anjum	2020-RBL-213	053654	_____



STATEMENT OF SUBMISSION

This is to certify that following students have successfully completed the final project named as:

Learn Code Pro at GOVT. RABIA BASRI GRADUATE COLLEGE FOR WOMEN, WALTON ROAD, LAHORE to fulfill the partial requirement of the degree of Bachelor of Computer Science.

Serial no	Registration No	Roll No.	Student Name
1	2020-RBL-232	053680	Sidra Yasmeen
2	2020-RBL-213	053654	Sadia Anjum

Head of Department

Mrs. Kiran Shehla
Associate Professor of
Computer Science
GOVT. RABIA BASRI
GRADUATE
COLLEGE FOR WOMEN
WALTON ROAD,
LAHORE

Supervisor

Dr. Erum Mehmood
Lecturer in
Computer Science
GOVT. RABIA BASRI
GRADUATE
COLLEGE FOR WOMEN
WALTON ROAD,
LAHORE

Project Coordinator

Dr. Erum Mehmood
Lecturer in Computer Science
GOVT. RABIA BASRI GRADUATE COLLEGE FOR WOMAN, WALTON RAOD
LAHORE



PROOFREADING CERTIFICATE

It is certified that this document does not contain any spelling, punctuation, or grammatical mistakes. This document is well organized, and this document meets the defined objectives.

Student Name	Registration No	Roll no	Signature
Sidra Yasmeen	2020-RBL-232	053680	_____
Sadia Anjum	2020-RBL-213	053654	_____



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All praise is to Almighty Allah who bestowed upon us a minute portion of His boundless knowledge by which we were able to accomplish this challenging task. We are greatly indebted to our project supervisor “Dr. Erum Mehmood” Without his supervision, advice and valuable guidance, completion of this project would have been doubtful. We are deeply indebted to him for their encouragement and continual help during this work.

Moreover, we are also thankful to our parents and family who have been a constant source of encouragement for us and brought us the values of honesty & hard work.

Serial No	Registration No	Roll No.	Student Name
1	2020-RBL-232	053680	Sidra Yasmeen
2	2020-RBL-213	053654	Sadia Anjum



CERTIFICATE OF APPROVAL

It is to certify that the final year project of BS (CS) “**Learn Code Pro**” was developed under the Supervision of “**Dr. Erum Mehmood**” by:

Student Name	Registration No	Roll no
Sidra Yasmeen	2020-RBL-232	053680
Sadia Anjum	2020-RBL-213	053654

It is fully adequate, in scope and quality for the degree of Bachelor of Science in Computer Science.

Supervisor

Dr. Erum Mehmood
Lecturer in Computer Science
GOVT. RABIA BASRI GRADUATE
COLLEGE FOR WOMEN,
WALTON ROAD, LAHORE

DATED: _____

Head of Department

Mrs. Kiran Shehla
Associate professor of Computer Science
GOVT. RABIA BASRI GRADUATE
COLLEGE FOR WOMEN,
WALTON ROAD, LAHORE

DATED: _____



ABSTRACT

Learn Code Pro is a comprehensive online platform offering a wide range of programming courses from basic to advanced levels. It provides learners with industry-competitive materials, including programming challenges, exercises, quizzes and integrated compiler. The platform supports self-paced learning, allowing students to progress at their own speed ,validating their newly acquired skills. Learn Code Pro aims to empower beginners, intermediate, and advanced learners with flexible, high-quality education tailored to meet the dynamic demands of the tech industry.



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1. INTRODUCTION

1.1 Brief Intro

Learn Code Pro is a cutting-edge educational platform designed to transform the learning experience for programming experts. By offering a wide range of programming language courses, this platform caters to learners of all levels, from novice coders to experienced developers. Learn Code Pro provides industry-competitive learning materials, including programming challenges, exercises, quizzes, and an integrated compiler, ensuring a comprehensive and engaging educational journey.

Upon registering, learners can select from an extensive catalog of programming languages, such as Python, JavaScript, Java, C++, and many more. The platform's primary goal is to empower individuals by providing a flexible, high-quality programming education that meets industry standards, helping them advance in their tech careers.

1.1.1 Objectives

- Democratize access to programming education for all skill levels.
- Provide interactive learning materials including exercises, and quizzes.
- Ensure relevance through real-world projects and practical exercises.
- Empower individuals to succeed in the tech industry with confidence.

1.2 Project Background

Learn Code Pro was conceived to address the growing demand for accessible, high-quality programming education in the rapidly evolving tech industry. Traditional learning methods often fail to keep pace with industry needs, leaving a gap in practical, up-to-date skill acquisition. Learn Code Pro aims to bridge this gap by offering a comprehensive online platform that provides flexible, self-paced courses on a wide range of programming languages. By integrating industry-competitive learning materials, such as programming challenges, exercises, and quizzes, and integrated compiler Learn Code Pro ensures learners can acquire the necessary skills to thrive in their careers. The platform's goal is to democratize programming education, making it accessible to learners of all levels, from beginners to advanced developers.

1.2.1 Level of Access:

Our system has three levels of access:

1. Admin
2. Student
3. Visitor



1.3 Literature Review

The development of Learn Code Pro is grounded in the growing body of research that underscores the importance of accessible and flexible learning in the digital age. Studies have shown that traditional classroom settings often fail to keep up with the fast-paced changes in technology and industry demands. Online learning platforms have emerged as effective alternatives, offering flexibility and a wide range of resources.

Research indicates that self-paced learning helps students understand and retain information better because they can learn at their own speed. Additionally, incorporating various types of learning material such as interactive challenges, and quizzes enhances engagement and comprehension.

Previous platforms have shown success in using these methods, but many lack comprehensive, industry-relevant content. Learn Code Pro aims to fill this gap by providing high-quality, up-to-date programming courses that meet professional standards. By offering a diverse selection of programming languages Learn Code Pro seeks to empower learners and equip them with practical skills that are directly applicable in the tech industry.

1.4 Analysis of Literature Review

The analysis we concluded from the above-mentioned literature review is as:

- Multimedia Learning Materials
- Industry Relevance
- Educational Gaps Addressed

1.5 Risk List

- Time constraint
- Unavailability of resources
- Lack of expertise
- Risk due to complexity of the project
- Too much Traffic on the website can affect the working
- There may be technological compatibility issues



1.6 Methodology and Software life Cycle of the project

Agile software methodology is a set of repetitive and incremental process models. It is most flexible and easily maneuverable for skittish requirement specifications environments. Unlike other process models where high formality is required and the specifications are expected to be known and verified before the commencement of design, agile models allow the use of increments or possible prototypes that can evolve into more suited and validated requirements and eventually software application. Pressman t (2004) defines it as a development pattern that encourages customer satisfaction and early incremental delivery of operational software; small, highly motivated project teams; informal methods; minimal software engineering work products; and overall development simplicity.

1.6.1 SCRUM Process Model

There are several evolving agile process models for different design scenarios, which are considered flexible, incremental, and repetitive in approach. For this project, we would be using SCRUM Agile process model because it supports object-oriented software design.

An Agile process model follows these activities:

- Requirements
- Analysis
- Design
- Evolution
- Delivery

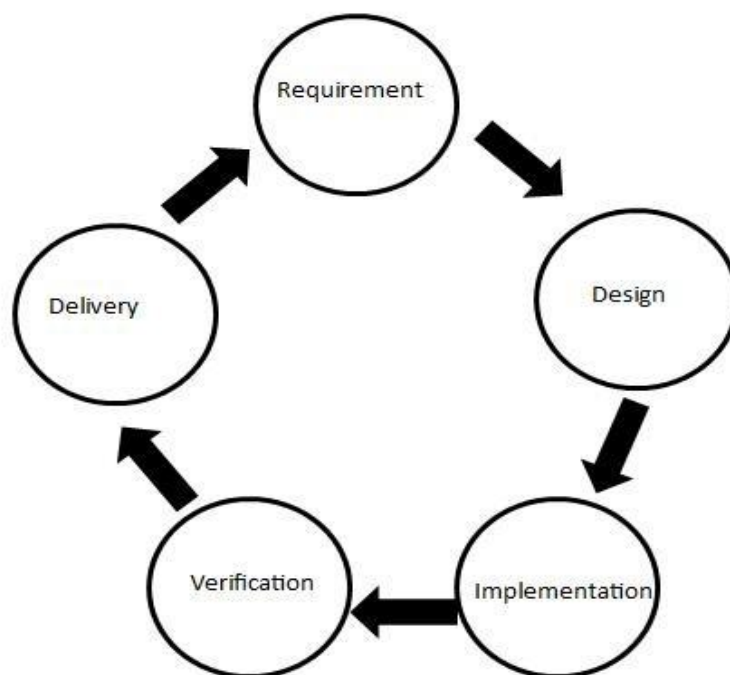
Pressman (2004) noted that Agile process models are not completely independent of the traditional process models; in fact, most Agile models are flexible derivations or variations of the traditional approach.

1.7 Rationale Behind Selected Methodology

In this section, we use the life cycle model employed broadly at Microsoft. This model is a combination of iterative and waterfall life cycle models. In this model, there are five phases whose boundaries define a sequential set of milestones for the project. The phases, in order of execution, are as follows:

- **Requirements:** To make a user-friendly website that can provide authentic information about all mobile phones to consumers. Customers can buy mobile phones online and can make online transactions.
- **Design:** Based on the functional requirements, physical design specifications are created, and prototyping is conducted to verify design ideas and investigate the capabilities.
- **Implementation:** Using the design and functional specifications, the coding is done.

- **Verification:** This is the process of testing the product to verify that it is performed according to the specifications.
- **Deliver:** After the product has been fully verified, it is packed and prepared for delivery to Customers





2.PROBLEM DEFINATION

2.1 Problem Statement

In today's fast-changing world of technology and education, there's a big gap between traditional learning methods and the need for accessible, high-quality programming education. Many schools and online platforms struggle to keep up with the latest advancements, resulting in outdated content that doesn't prepare learners well for real-world programming in languages like Python, C#, and JavaScript etc. Existing platforms often lack courses that are practical and relevant to industry needs, and they don't offer personalized learning experiences that cater to different learning styles around the world.

Traditional classrooms also have trouble accommodating flexible schedules and self-paced learning, which are crucial for learners at all levels, from beginners to experienced developers who want to deepen their skills. Learn Code Pro aims to solve these problems by offering a strong online learning platform that's easy to access and aligns closely with industry needs. We provide a variety of courses, interactive materials, personalized learning paths, and integrated compiler to help learners worldwide gain practical programming skills. Through innovation, partnerships, and a commitment to quality, Learn Code Pro aims to bridge the gap between theory and real-world application, empowering a global community of skilled tech professionals who can lead innovation and drive digital transformation.

2.2 Deliverable and Development Requirements

Below we mention some of the major hardware/software tools and technologies which will be used in the implementation of the project.

2.2.1 Development Required Tools

a) Design Tool(s):

- MS Word
- draw.io



b) Development Tools:

- Visual Code Studio

2.2.2 Languages & Frameworks

- HTML
- CSS
- JavaScript
- MySQL
- Node .JS

2.3 Current System

The current system of programming education includes both traditional institutions and online platforms. Traditional education relies on fixed courses delivered in classrooms, focusing heavily on theoretical concepts with limited flexibility for self-paced learning or real-world application of programming skills. In contrast, online platforms offer a broader range of programming courses accessible globally, with features like self-paced learning and interactive tools such as videos and coding challenges. However, online platforms vary in quality and may struggle with issues like technical disruptions and inconsistent credentialing. Overall, traditional education provides structured learning but may lag in adapting to rapid technological changes, while online platforms offer flexibility but face challenges in ensuring consistent quality and personalized learning experiences. Both systems aim to prepare learners for programming careers, but there is a recognized need for improvements in relevance, practical application, and scalability to meet the diverse needs of modern learners effectively.

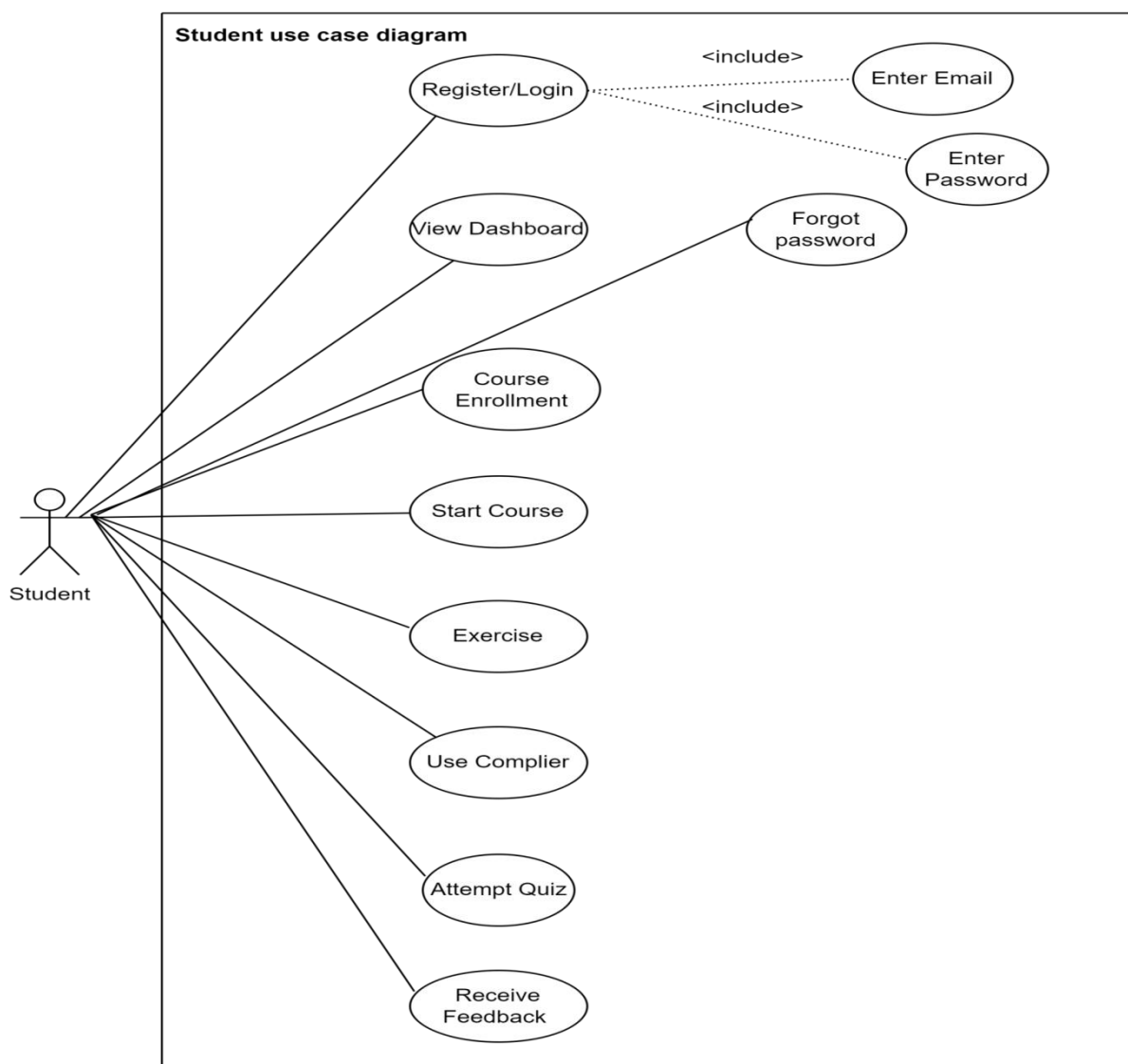
3. REQUIREMENT ANALYSIS

Requirement analysis involves defining, analyzing, validating, and aligning stakeholders' expectations for new projects while considering all possible conflicts.

STUDENT USE-CASE DESCRIPTION

A student use-case diagram illustrates the interactions between students and a system, highlighting key activities such as enrolling in courses, accessing learning materials, and submitting assignments. It visually represents how students engage with various features, ensuring their educational needs are met efficiently.

3.1 Student Use Case Diagram





3.1.1 REGISTER/LOGIN

Use case No:	UC-1
Use case Name:	Register /Login
Description:	Student creates an account or login to access the Learn Code Pro platform.
Priority:	High
Actor:	student
Precondition:	The student accesses the Learn Code Pro platform.
Postcondition:	The student is authenticated and logged into the system.
Basic flow:	<ul style="list-style-type: none"> ● The student navigates to the register or login page. ● The student enters their email or password. ● The student clicks the "Login" or "Register" button. ● The system verifies the credentials (for login) or creates a new account for registration.
Exceptional flow:	<p>If the student enters incorrect credentials:</p> <ul style="list-style-type: none"> ● The system displays an error message. ● The student is prompted to re-enter their credentials.
Post condition:	The dashboard page will appear.
Business rule:	Students must provide a valid email address.



3.1.2 VIEW DASHBOARD

Use case No:	UC-2
Use case Name:	View Dashboard
Description:	The student to view an overview and detail of all courses.
Priority:	High
Actor:	Student
Precondition:	The student logged into the system.
Post condition:	The student sees the details of courses.
Basic flow:	<ul style="list-style-type: none"> ● The student logs into the system. ● The student navigates to the dashboard. ● The system displays details of courses.
Exceptional flow:	<p>If there is a system error retrieving the dashboard data:</p> <ul style="list-style-type: none"> ● The system displays an error message. ● The student can retry.
Business rule:	None



3.1.3 COURSES ENROLLMENT

Use case No:	UC-3
Use case Name:	Courses Enrollment
Description:	Students enroll in one or more courses and get course content.
Priority:	High
Actor:	Student
Precondition:	The student must be registered onto the website.
Post condition:	The student is successfully enrolled in the selected courses.
Basic flow:	<ul style="list-style-type: none"> • The student logs into website • The student navigates to the course enrollment section. • The student selects the courses they wish to enroll in. • The system registers the student in the selected courses • The system notifies the student of successful enrollment.
Exceptional flow:	If there is a system error during enrollment, the system displays an error message and advises the student to try again later or contact support
Business rule:	Students can enroll in courses only during the designated enrollment periods



3.1.4 START COURSE

Use case No:	UC-4
Use case Name:	Start Course
Description:	The student starts a course and views the modules included in the course along with the detailed content.
Priority:	High
Actor:	Student
Precondition:	Student log into the system and has access to the dashboard.
Post condition:	Students access the course content.
Basic flow:	<ul style="list-style-type: none"> ● The student navigates to the course section from the dashboard. ● The student selects a course to start. ● The system displays the module content ● The student interacts with the course materials (reading text, Solving exercises). ● Student attempts quiz of each module and see the result.
Exceptional flow:	<p>If the course content fails to load:</p> <ul style="list-style-type: none"> ● The system displays an error message. ● The student can retry loading the course content or select a different module.
Business rule:	Course content should be structured in a way that facilitates incremental learning, building on previously acquired knowledge.



3.1.5 EXERCISES

Use case No:	UC-5
Use case Name:	Exercises
Description:	Students interact with and complete interactive coding exercises provided in their courses.
Priority:	Medium
Actor:	Student
Precondition:	<ul style="list-style-type: none"> • The student is logged into the system. • The student has enrolled in a course and navigated to the interactive exercise section.
Post condition:	<ul style="list-style-type: none"> • The student has completed the interactive exercises and challenges. • The student receives feedback on their performance in the exercises.
Basic flow:	<ul style="list-style-type: none"> • The student logs into the system and navigates to the interactive exercises section of their course. • The student selects an exercise or challenge to work on. • The student interacts with the exercise, following instructions and solving problems. • The students submit their solutions. • The system evaluates the solutions and provides immediate feedback.
Exceptional flow:	If the exercise submission fails, the system provides an error message and prompts the student to retry.
Business rule:	Exercises must be designed to assess various programming skills and provide accurate feedback



3.1.6 USE COMPILER

Use case No:	UC-6
Use case Name:	Use Compiler
Description:	Students use the integrated compiler to write, run, and test code snippets within the course.
Priority:	Medium
Actor:	Student
Precondition:	<ul style="list-style-type: none"> • The student is logged into the system. • The student has enrolled in a course that includes compiler access.
Post condition:	The student has successfully compiled and tested code snippets.
Basic flow:	<ul style="list-style-type: none"> • The student logs into the system and navigates to the course section that includes compiler use. • The student accesses the compiler interface. • The student writes the code snippet in the provided editor. • The student submits the code for execution. • The compiler processes the code and returns the output or error messages. • The student reviews the output or errors and makes necessary corrections.
Exceptional flow:	<ul style="list-style-type: none"> • If the code has syntax errors, the compiler displays error messages and prompts the student to correct them. • If the compiler encounters an internal error, the system notifies the student and may offer to retry.
Business rule:	The compiler must support the languages and syntax specified in the course requirements.



3.1.7 ATTEMPT QUIZ

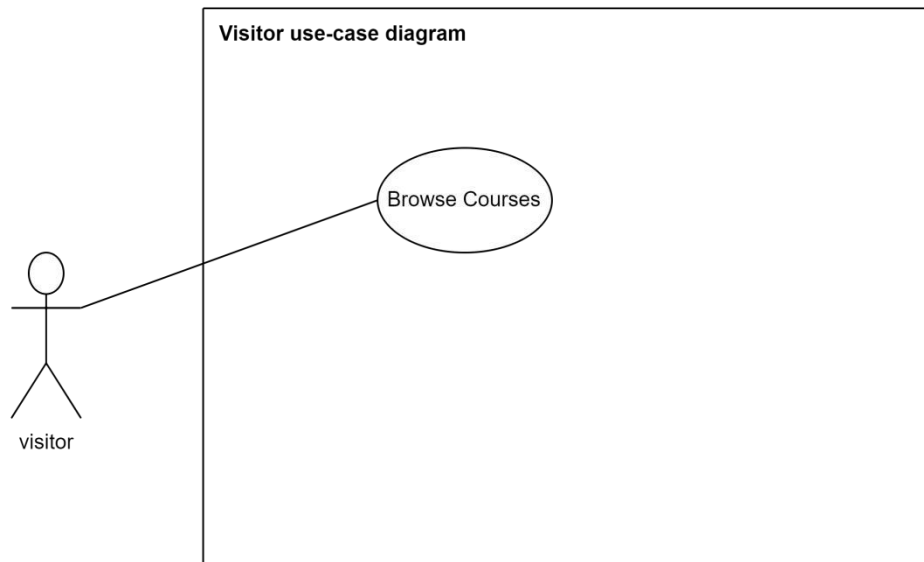
Use case No:	UC-7
Use case Name:	Attempt quiz
Description:	Students try to attempt the MCQs type quiz of each module of the selected course and submit their answer.
Priority:	High
Actor:	Student
Precondition:	The student engages in the quiz.
Post condition:	The student submits his solution for evaluation.
Basic flow:	<ul style="list-style-type: none"> ● The student reaches a quiz within a module. ● The student reads the quiz instructions. ● The student selects the correct option out of four given options and goes to the next quiz question. ● After submitting the result, students will be shown the quiz score.
Exceptional flow:	If the submission process fails (network error): <ul style="list-style-type: none"> ● The student retries to submission process. ● The student's work is saved locally to prevent data loss.
Business rule:	The quiz should be designed to test understanding of the module material.



3.1.8 RECIEVE FEEDBACK

Use case No:	UC-8
Use case Name:	Receive Feedback
Description:	The student receives feedback and sees his progress.
Priority:	Medium
Actor:	Student
Precondition:	<ul style="list-style-type: none"> • The student must be logged. • The student has completed or submitted a quiz.
Postcondition:	The student receives feedback based on their performance in the quiz.
Basic flow:	<ul style="list-style-type: none"> • The student navigates to the quiz section. • The student selects and completes the quiz. • After completing the quiz, the student submits their answers. • The system evaluates the student's responses. • The system displays feedback to the student.
Exceptional flow:	If there is a system error during feedback generation or display, the system notifies the student and advises them to try again later or contact support.
Business rule:	Feedback should be provided in a timely manner to facilitate learning and improvement

3.2 VISITOR USE-CASE DAIGRAM



VISITOR USE-CASE DESCRIPTION

A visitor use-case diagram outlines the interactions between a visitor and a system, focusing on key activities such as browsing content. etc.



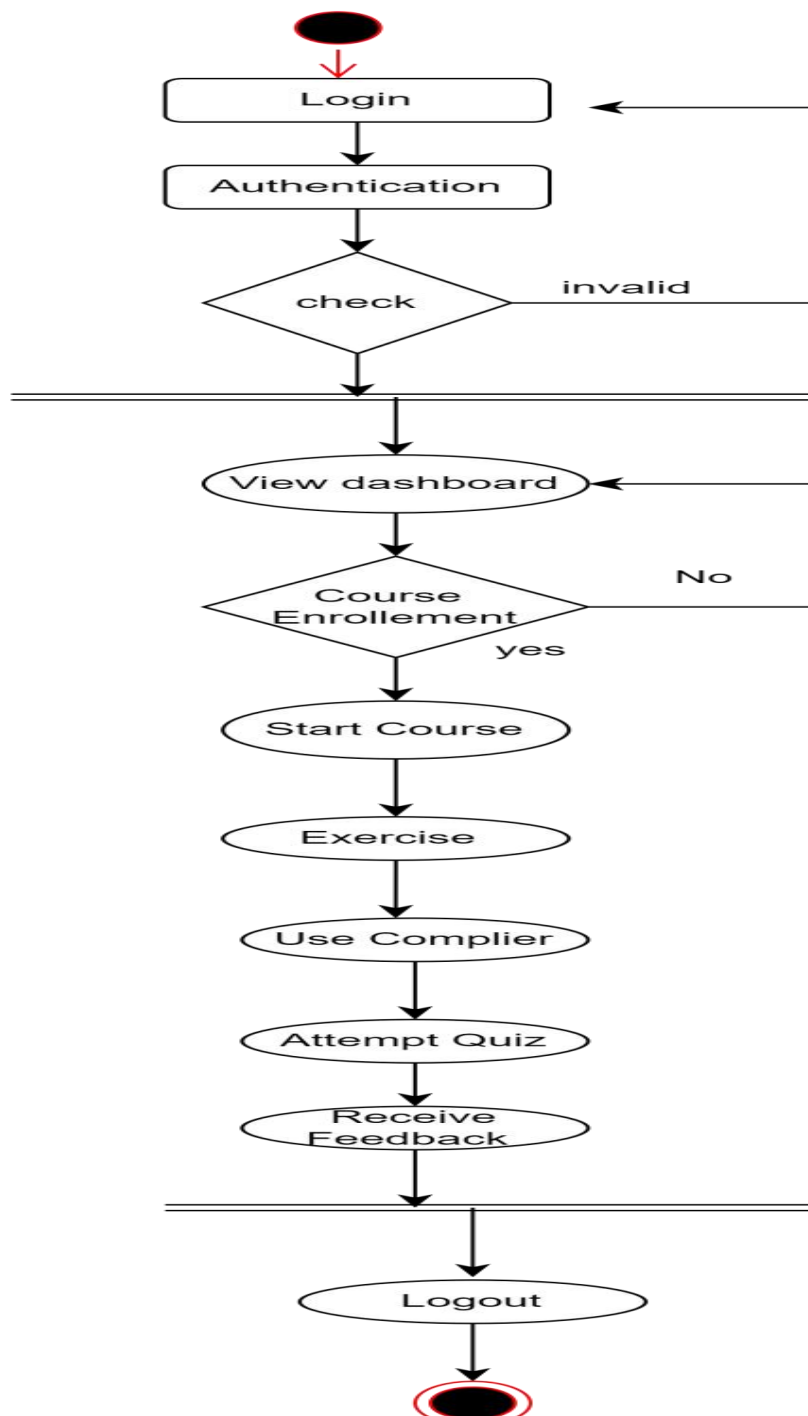
3.2.1 BROWSE COURSES

Use case No:	UC-9
Use case Name:	Browse Courses
Description:	The visitor browses the available courses on the website
Priority:	Medium
Actor:	Visitor
Precondition:	The visitor will be on the website's homepage or course catalog page.
Postcondition:	The visitor sees the available programming courses.
Basic flow:	<ul style="list-style-type: none"> • The visitor navigates to the course catalog or course listing page. • The visitor can filter the courses by category, difficulty level, start date, etc. • The visitor selects a course to view more details. • The visitor reviews the course description, syllabus, and any other relevant details. • The visitor may add the course to their cart or Wish list for later reference. • The visitor can continue browsing other courses or proceed to the enrollment process.
Exceptional flow:	If there are no courses available, the system notifies the user and provides alternative suggestions
Business rule:	The course details page must provide comprehensive information to help the visitor make an informed decision.

3.4 Activity Diagram

An activity diagram visually represents the flow of activities and decisions in a process, showing how actions are interconnected and the sequence in which they occur. It helps in understanding the overall workflow and identifying potential bottlenecks or improvements.

3.4.1 Student Activity





3.5 Functional Requirements

Functional requirements include the services that the proposed system must provide to the entire system users. The system will perform the following functionally.

Student Registration and Authentication

Students must be able to register, log in, and log out

Learning Activities

Student can attempt quizzes, exercise and receive feedback.

Dashboard and Progress Tracking

Student have access to a dashboard to view their courses and track pr

Support and Feedback

Students can receive feedback on quizzes and course performance.

3.6 Non-Functional Requirements

Performance

- The system should handle multiple concurrent users efficiently.
- Response times should be mini

Scalability

- The platform should be scalable to handle growing numbers of users and courses.

Security

- User data must be securely stored and encrypted.
- Secure authentication and authorization mechanisms must be implemented.

Usability

- The user interface should be intuitive and user-friendly.
- Accessibility standards should be met.

Reliability

- The platform should have high availability with minimal downtime.
- Backup and recovery mechanisms should be in plac



Compatibility

- The platform should be compatible with various browsers and devices.

Maintainability

- The system should be designed for easy maintenance and updates.
- Clear documentation should be provided



4. FEASIBILITY REPORT

4.1 Project Feasibility Report

The proposed project aims to enhance the coding experience by improving the programming language through various means such as language features, tooling, and developer experience. This application is a complete solution for all the problems that developers can face. This application uses the latest technologies like CSS, JS, and Node .JSP etc. Due to these technologies, this application is very fast and responsive and gives good user experience. This application provides students with a platform where they can learn programming languages with courses.

- Market Analysis
- Technical Feasibility
- Educational Content
- Operational Feasibility
- Economic Feasibility
- Organizational Feasibility

Market Analysis

- Identification of the target audience (e.g. students, professionals, educators).
- Analysis of the demand for programming education and online learning platforms.
- Competitive landscape and differentiation strategies.

Technical Feasibility

Current Language Analysis

- Evaluate the existing programming language for areas of improvement and enhancement.
- Identify technical challenges and limitations associated with the current language.

Proposed Enhancements

- Research and development of new language features to improve code readability, performance, and maintainability.
- Compatibility with existing codebases and libraries.



- Testing and validation of proposed enhancements.

Educational Content

- Examination of the availability and quality of educational resources and datasets.
- Feasibility of creating and curating diverse programming courses and learning materials.
- Integration of interactive coding challenges and projects.

Operational Feasibility

Developer Adoption

- Evaluation of the operational processes required to deliver courses and manage user interactions.
- Assessment of student support, course enrollment, content updates, and platform scalability.
- Identification of potential operational challenges and risk mitigation strategies.

Tooling and Integration

- Compatibility with existing development tools, IDEs, and libraries.
- Integration with version control systems, building pipelines, and deployment processes.

Economic Feasibility

Cost-Benefit Analysis

- Cost estimation for website development, hosting, maintenance, and content creation.
- Revenue projections and business model analysis (e.g., subscription-based, freemium, ad-supported).
- Identification of potential funding sources and investment requirements.

Return on Investment (ROI)

- Calculation of the expected ROI based on increased developer efficiency, reduced debugging time, and improved code maintainability.
- Long-term cost savings and competitive advantage through enhanced language capabilities.



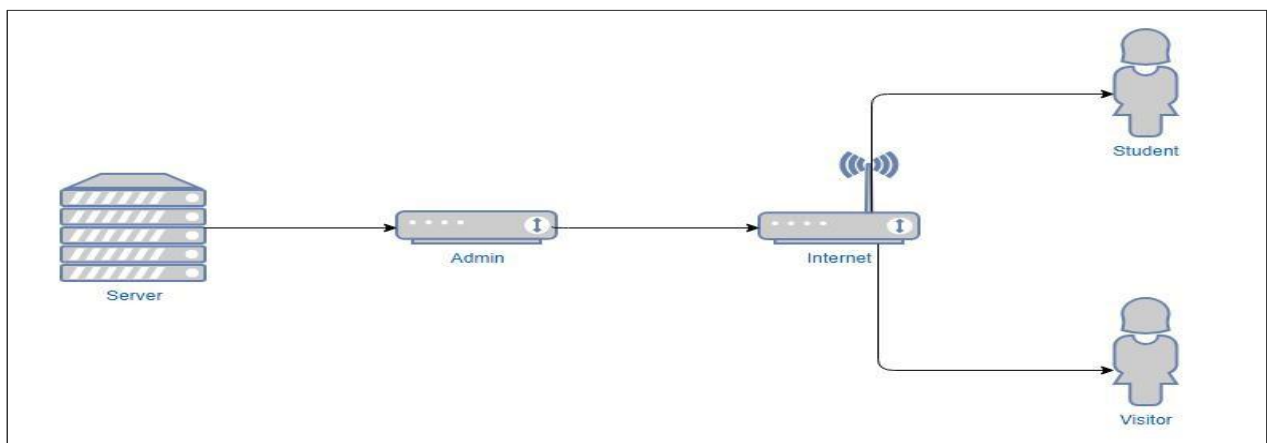
Organizational Feasibility

- Assessment of the organizational structure and human resource requirements.
- Identification of key personnel, roles, and responsibilities.
- Evaluation of the capacity to manage technical, educational, and administrative aspects of the platform.

5. DESIGN AND ARCHITECTURE

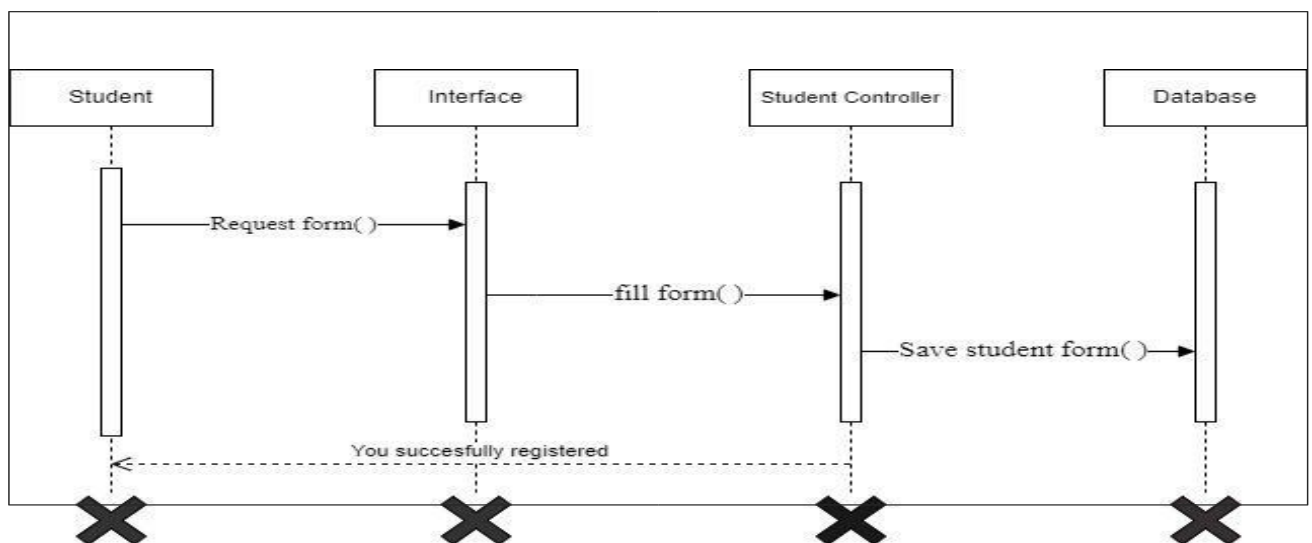
Design and architecture refer to the high-level structure of a software system, defining its components, their interactions, and the principles guiding its development. This ensures scalability, maintainability, and alignment with user and business requirements.

5.1 Network Diagram

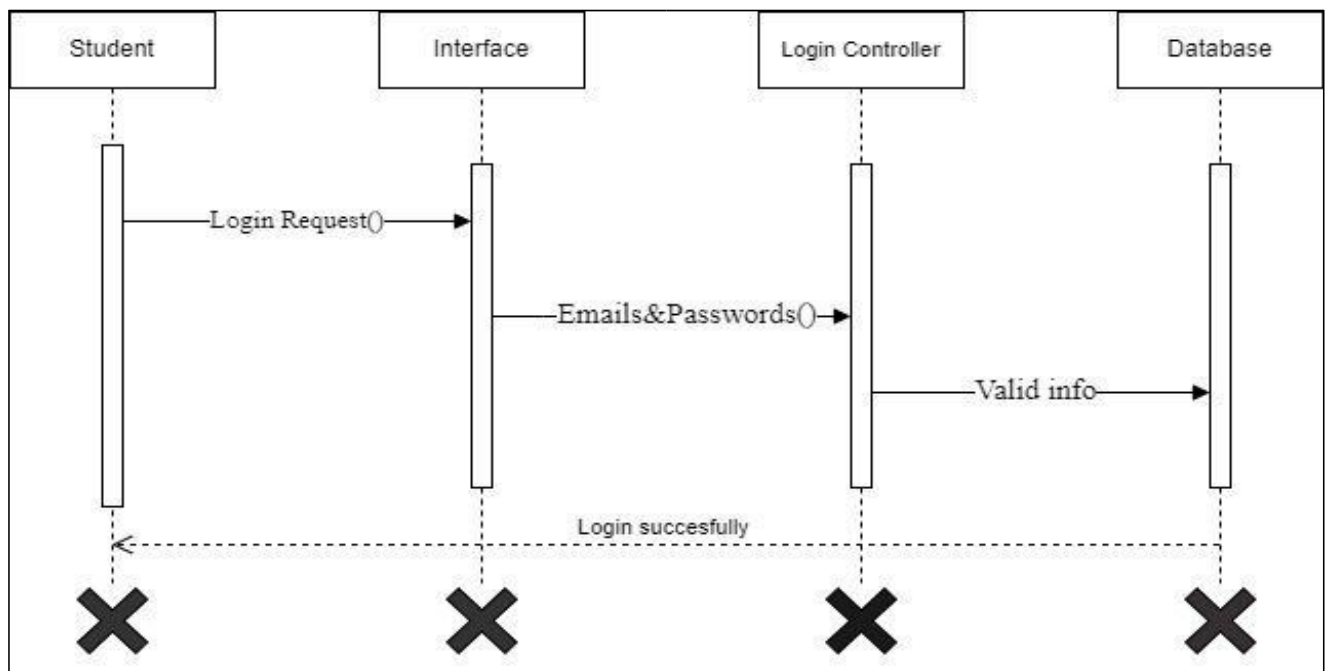


5.2 Sequence Diagram

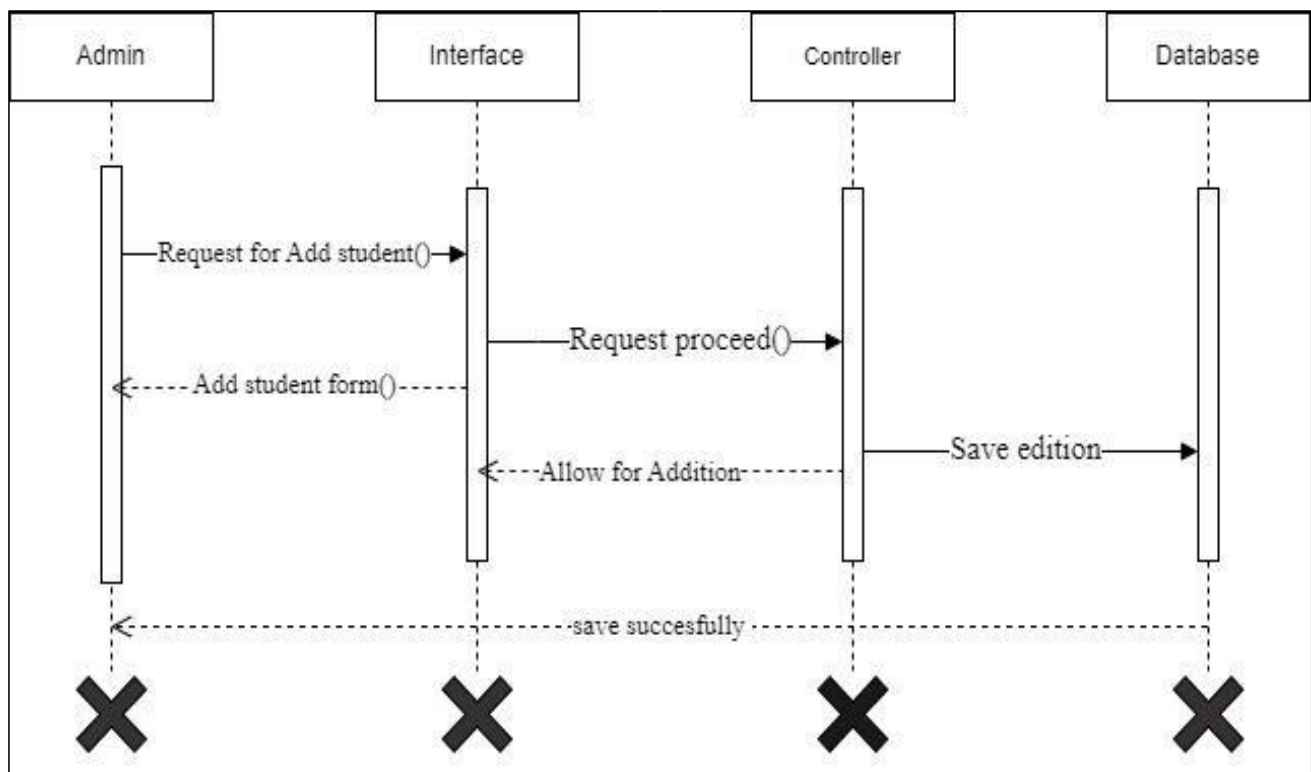
5.2.1 Sequence Diagram Create Account



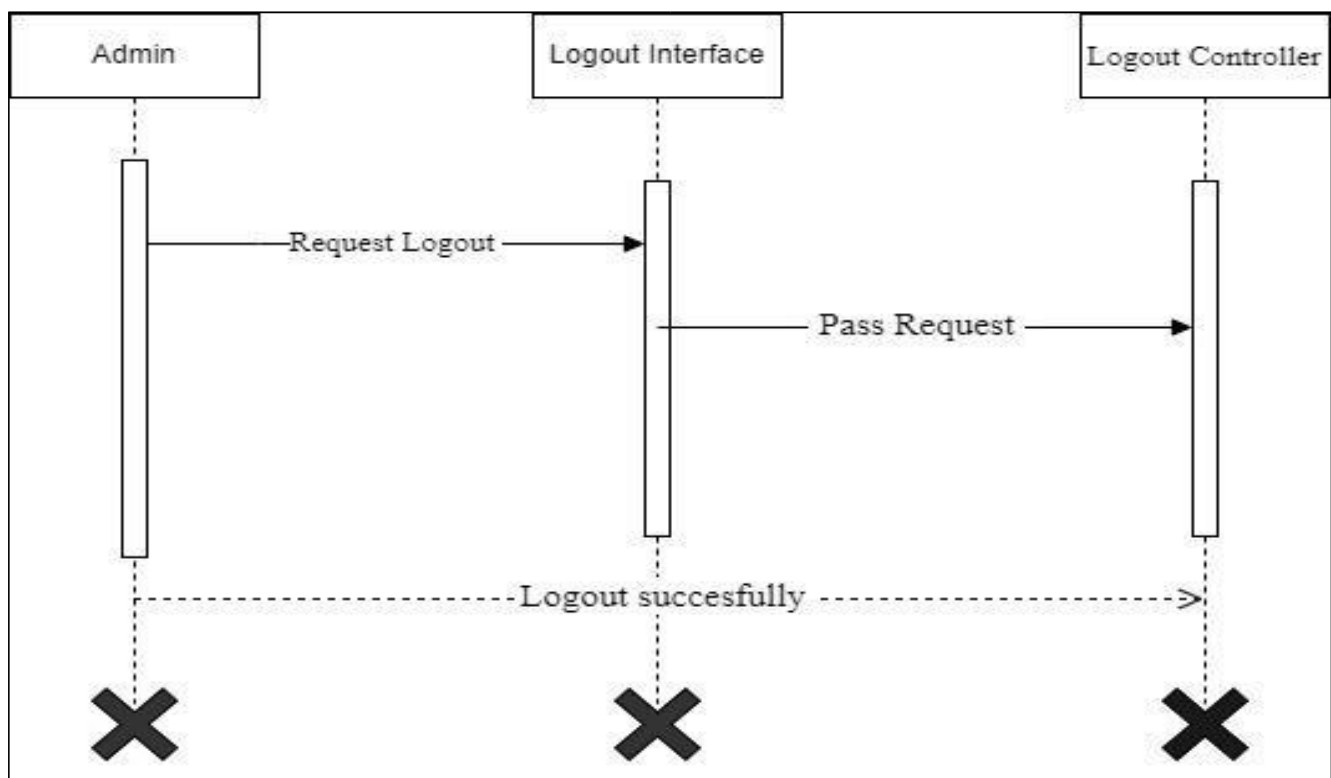
5.2.2 Sequence Diagram Login



5.2.3 Sequence Diagram Add Student



5.2.4 Sequence Diagram Logout



5.3 E-R Diagram

This is an Entity-Relationship Diagram (ERD) for the "Learn Code Pro" website that involves identifying the key entities and their relationships to design a clear and comprehensive database structure. Below is a simplified ERD that represents the main entities and relationships for the website.





6 PROJECT COSTING

6.1 Project Cost Estimation by Function Point Analysis

Computing Function Points:

Type of Components	Complexity of Components			FP Count Total
	Low	Average	High	
External Inputs	5x3	2x5	0x7	25
External Outputs	5x2	3x5	0x7	25
External Inquiries (EQ)	3x3	1x4	1x6	19
Internal Logical Files (ILFs)	7x4	2x5	0x10	38
External Interface Files (EIFs)	2x5	1x7	0x10	17
Count Total:	Total Number of Unadjusted Function Points			124

Calculation of $\sum (Fi)$:

Value Adjustment Factor: The value adjustment factor (VAF) is based on 14 general system characteristics (GSCs) that rate the general functionality of the application being counted. These fourteen factors and their values according to the project are calculated here. These values will be further used in the calculation of the function point of the project to estimate its cost. Degrees of influence of 14 general system characteristics (GSCs).

0	Not present, or no influence
1	Incidental influence
2	Moderate influence
3	Average influence
4	Significant influence
5	Strong influence throughout



Sr.#	Questions	Scale
1	Reliable backup and recovery required	4
2	Is data communication required?	4
3	Are there distributed processing functions?	3
4	Is performance critical?	2
5	Will the system run in an existing, heavily utilized operational Environment?	3
6	Does the system require online data entry?	5
7	Does online data entry require the input transaction to be built over multiple screens or operations?	3
8	Are the master files updated online?	4
9	Are the inputs, output, files, or inquiries complex?	1
10	Is the internal processing complex?	2
11	Is the code designed to be reusable?	4
12	Are conversion/installation included in the design?	2
13	Is the system designed for multiple installations in different organizations?	0
14	Is the application designed to facilitate change and ease of use by the user?	2
	<input type="checkbox"/> (Fi)	39



6.1.1 Calculation of Function Point (FP)

To compute function points (FP), the following relationship is used:

$$\text{FP est.} = \text{Count Total} * [0.65 + 0.01 * (F_i)]$$

$$\begin{aligned} \text{FP est.} &= \text{Count Total} * [0.65 + 0.01 * (\sum F_i)] \\ &= 124 * [0.65 + 0.01 * (39)] \\ &= 124 * [0.65 + 0.39] \\ &= 124 * [1.04] \\ &= \mathbf{129 \text{ FP}} \end{aligned}$$

6.1.2 Total Duration of the Project

$$\text{Average Productivity} = 15 \text{ FP}$$

$$\begin{aligned} \text{Total Estimated Effort} &= \text{FP est.} / \text{productivity parameter} \\ &= 129 / 15 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{Duration of the Project} &= \text{Effort month} / \text{No. of persons} \\ &= 9 / 2 \\ &= \mathbf{4.5 \text{ months}} \end{aligned}$$

6.1.3 Total Cost of the Project

$$\begin{aligned} \text{Labor Rate} &= \text{Rs.}9,000 \\ \text{Cost per FP} &= \text{Labor Rate} / \text{productivity parameter} \\ &= 9,000 / 15 \\ &= \text{Rs.}600 \end{aligned}$$

$$\begin{aligned} \text{Total Project Cost} &= \text{FP est.} * (\text{cost} / \text{FP}) \\ &= 129 * 600 \\ &= \text{Rs.}77400/- \end{aligned}$$



6.2 CPM - Critical Path Method

Following are the individual activities involved in the project.

- Planning
- Requirement Gathering
- Analysis
- Design
- Construction/Coding
- Testing/Debugging
- Deployment

6.2.1 Determine the Sequence of the Activities

There are many activities that are dependent on the completion of some other activities. The dependencies of activities upon each other are as under.

➤ Planning	None
➤ Requirement Gathering	Planning
➤ Analysis	Planning, Requirement Gathering
➤ Design	Analysis
➤ Coding	Design
➤ Testing	Design, Coding
➤ Deployment	Testing

6.3 Task Dependency Table

Task	Task Description	Duration (Weeks)	Dependencies
A	Planning	2 weeks	None
B	Requirement Gathering	2 weeks	A
C	Analysis	3 weeks	A, B
D	Design	4 weeks	C
E	Construction/Coding	6 weeks	D
F	Testing / Debugging	2 weeks	E
G	Deployment	1 week	F

6.4 Network Diagram

The network diagram of the activities is as under:

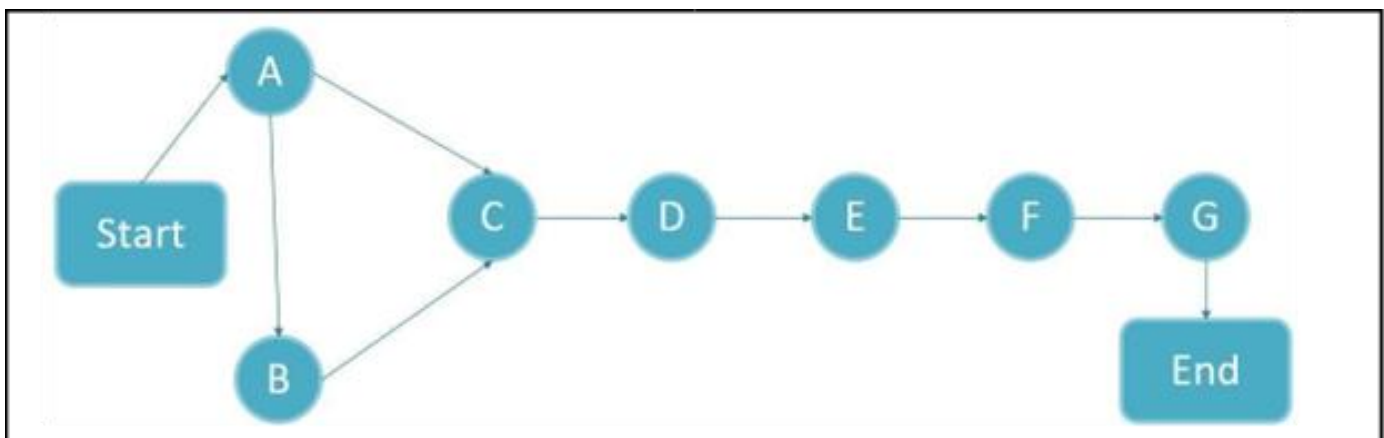


Figure 2: Network Diagram

6.5 Estimate Activity Completion Time

Task ID	Predecessors	Duration(weeks)
A	-	2 weeks
B	A	2 weeks
C	A, B	3 weeks
D	C	4 weeks
E	D	6 weeks
F	E	2 weeks
G	F	1 week







The time required to complete each activity can be estimated using experience or by the estimated knowledge of a person.

6.6 Identify the Critical Path

The critical path is the longest path through the network. The critical path for the above network diagram is:

$$A B C D E F G H = 2+2+3+4+6+2+1 = 20$$

6.7 Gantt Chart

Task Description	Start Date	End Date	Duration (weeks)	Gantt Bar
Planning	2024-03-01	2024-03-14	2	
Requirement Gathering	2024-03-15	2024-04-04	3	
Analysis	2024-04-05	2024-04-25	3	
Design	2024-04-26	2024-05-23	4	
Coding	2024-05-24	2024-07-18	8	
Testing	2024-07-19	2024-08-01	2	



7 Testing

7.1 Introduction to Test Case

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and coding. A strategy for software testing integrates software test case design methods into a well-planned series of steps that result in the successful construction of software.

7.1.1 Testing Objectives

- To find errors in the developed application
- To check that the working of the software function is according to the specifications.
- Their behavior and performance requirements are fulfilled.
- To check the reliability and quality of the software.

7.2 Student Test Case Description

A student test case description outlines the specific conditions and inputs under which a student's interaction with a system is evaluated. It details expected outcomes to verify the system's functionality and ensure it meets educational requirements.



Student Signup

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_1	The signup page is accessible	Navigate to the signup page. Enter a valid student name. Enter a valid email address. Enter a valid password. Confirm the password. Click the "Signup" button.	The student is successfully registered. The student is redirected to the sign in page.	Students were successfully registered, redirected to the sign in page.	pass

Student Sign in

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC-2	The student has an active account, and the sign in page is accessible.	Navigate to the sign in page. Enter a valid student name or email. Enter the correct password. Click the "Sign in" button.	The student successfully signed in. The student is redirected to the dashboard, displaying the list of enrolled courses and relevant information.	Students successfully signed in and were redirected to the dashboard, with all enrolled courses displayed.	pass



Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_3	The student has an account, and the sign in page is accessible.	Navigate to the sign in page. Enter a valid student name or email. Enter the correct password. Click the "Sign in" button.	The student is not signed in. An error message is displayed, indicating that student name or password. Please try again.	Error message displayed: 'Invalid student name or password. Please try again.'	Pass

Access Dashboard

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_4	The student successfully signed in.	Sign in with valid credentials. Navigate to the dashboard page.	The dashboard page is displayed, showing a list of the available courses.	The dashboard displayed successfully with all expected information.	Pass



Course Enrollment Process

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_5	The student signed in. The course catalog is accessible.	Navigate to the course catalog. Select a course to enroll in. Click the "Enroll" button. Confirm enrollment.	The student is successfully enrolled in the selected course. The student views the module of the selected course.	Students were successfully enrolled, and the course appeared in the 'course module section'.	Pass

Start Course

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_6	The student is signed in. The student is enrolled in the course.	The student navigates to the course section. The student selects a course to start. The system displays the module content.	The course content is accessible. The student can begin the course from the first lesson	Course content was successfully accessed and started from the first lesson.	pass



Complete Exercise

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_7	The student signed into the system. The student has enrolled in a course and navigated Interactive exercises.	Navigate to the course dashboard. Select the enrolled course. Navigate to the interactive exercise section. Select an exercise to complete. Read the exercise instructions and enter the required input or code. Submit the completed exercise.	The student successfully completes and submits the exercise. The system records the completion status and provides feedback .	The exercise is completed successfully, and the student receives feedback .	pass



Use Compiler

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_8	The student signed into the system. The student has enrolled in a course and navigated to code compilation.	Navigate to the course dashboard. Select the enrolled course. Enter the provided or custom code into the compiler. Click the "Run" button. Review the output generated by the compiler.	The code is compiled successfully without errors. The correct output or relevant error messages are displayed.	The code is compiled successfully, and the correct output is displayed	pass

Quiz Attempt in a Course

Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_9	The student signed in. The student is actively taking a course that includes quizzes.	Navigate to the course's quiz section. Start the quiz. Answer the questions. Submit the quiz.	The quiz is submitted successfully. The user receives immediate feedback on the quiz results. The score is recorded in the user's progress	Quiz submitted successfully, feedback provided, and score recorded	pass

Receive Feedback



Test Case ID	Precondition	Step to be Executed	Expected Result	Actual Result	Pass or Fail
TC_10	The student has submitted a quiz	Review the feedback provided after the quiz submission. Check the correct and incorrect answers	The student sees the feedback, which includes the total score they could have achieved and the score they gained	Feedback displayed: 'You scored 8 out of 10,' showing the student's gained score and the total possible score	pass

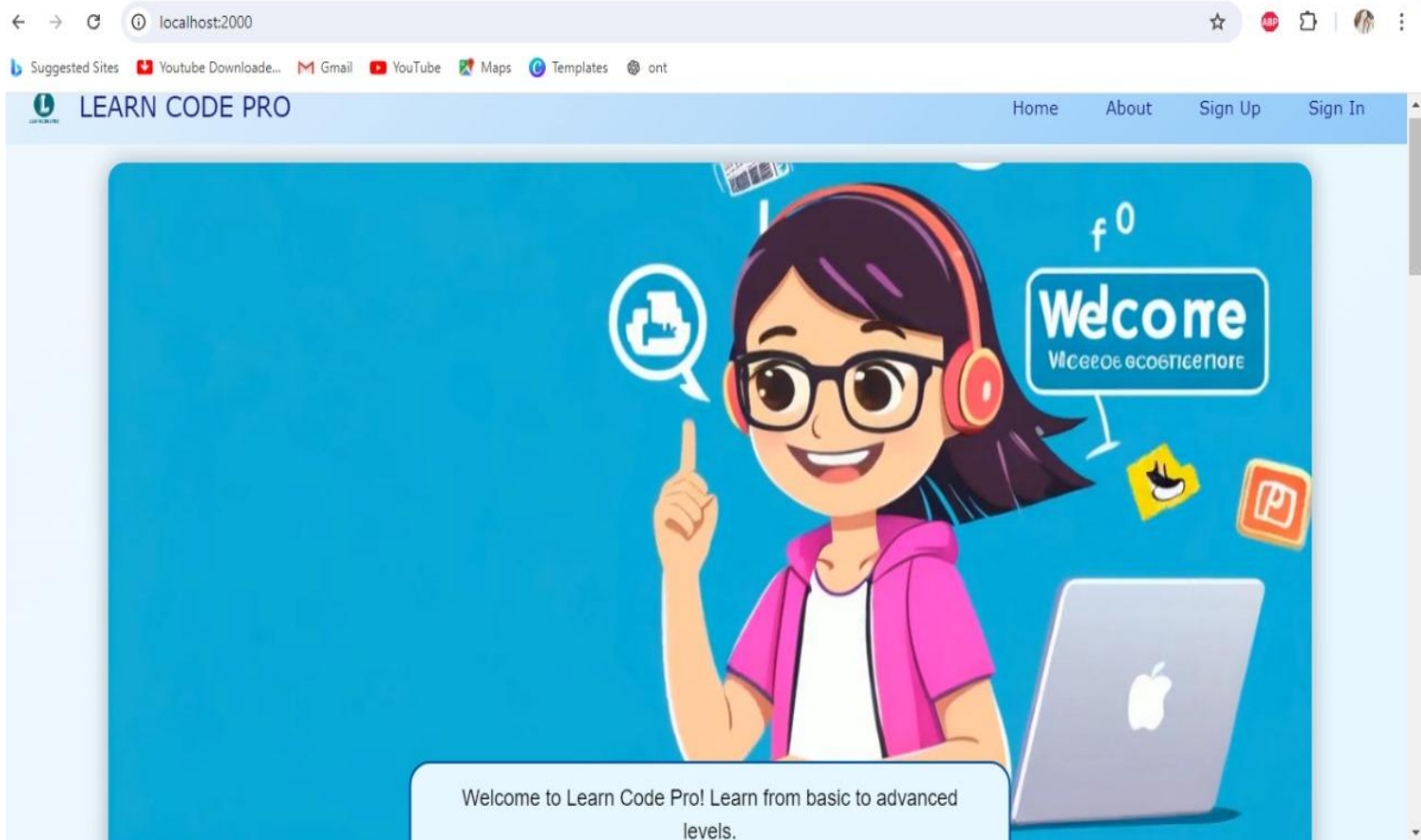


7.2 Requirement Traceability Matrix

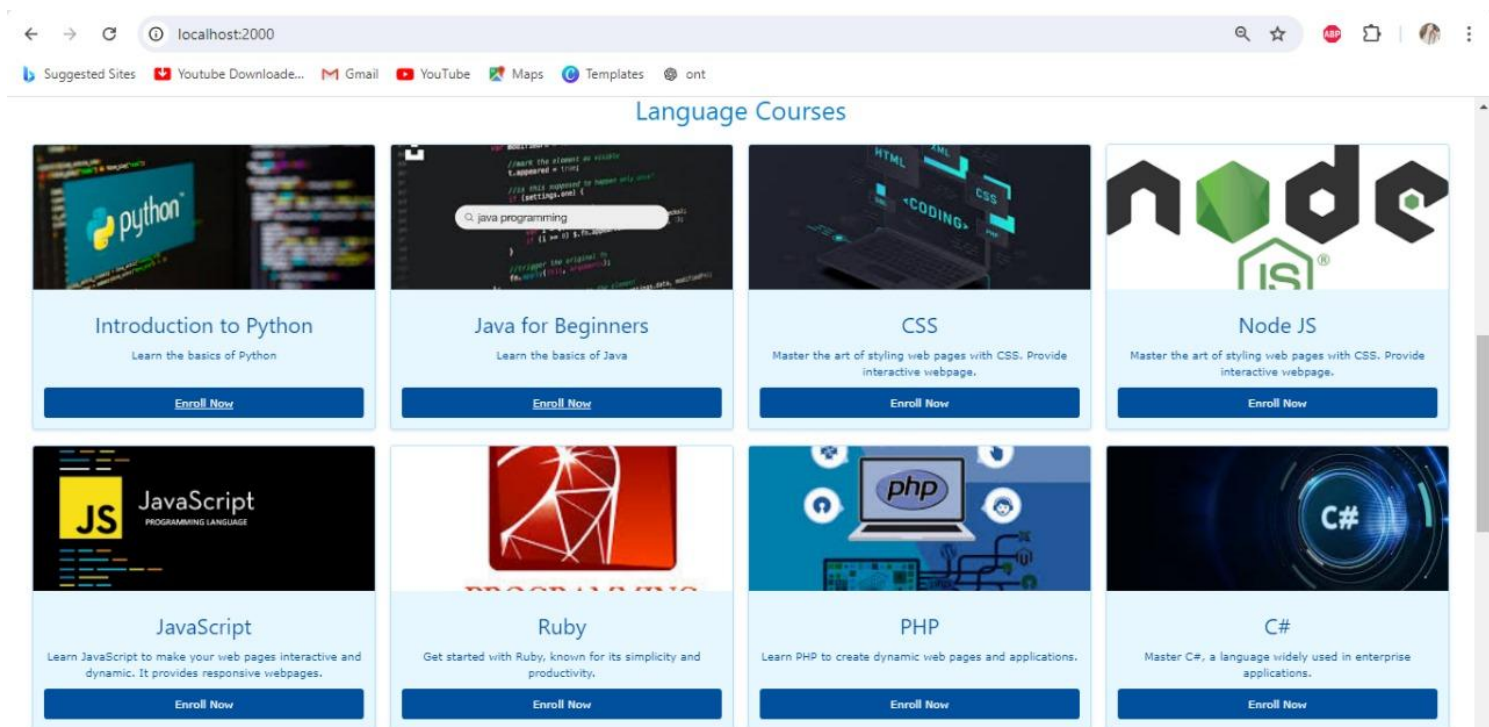
Sr.#	Rank	System Specification Text	Build	Use Case Name	Category
1	High	System "shall" allow students to register, update, and delete their accounts.	B1	Registration	Online
2	High	System "shall" allow students to login and access their dashboard.	B1	Login	Online
3	High	Students "shall" enroll in the courses.	B1	Course Enrollment	Online
4	High	Students "shall" start the enrolled course and access its materials.	B1	Start Course	Online
5	High	Students "shall" attempt quizzes associated with their courses.	B1	Attempt Quiz	Online
6	Medium	Students "shall" use a compiler to write, run, and test code snippets within the course environment.	B1	Use Compiler	Online
7	Medium	Students "shall" engage in interactive exercises and coding challenges related to their courses.	B1	Exercises	Online
8	Medium	Students "shall" receive feedback on their quiz and course performance.	B1	Receive Feedback	Online

8 USER MANUAL

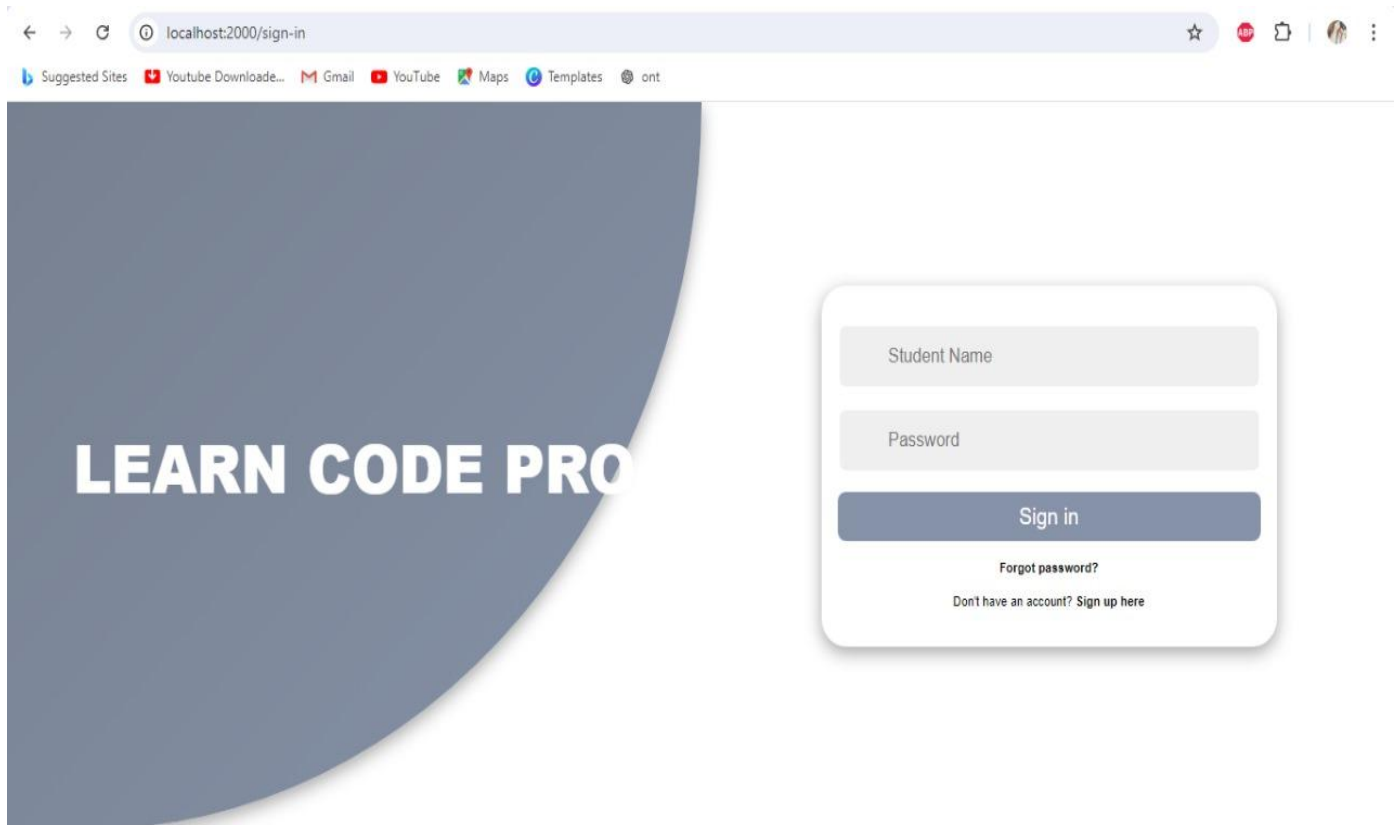
8.1 Home Page



8.2 Courses List



8.3 Sign In Page



localhost:2000/sign-in

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Student Name

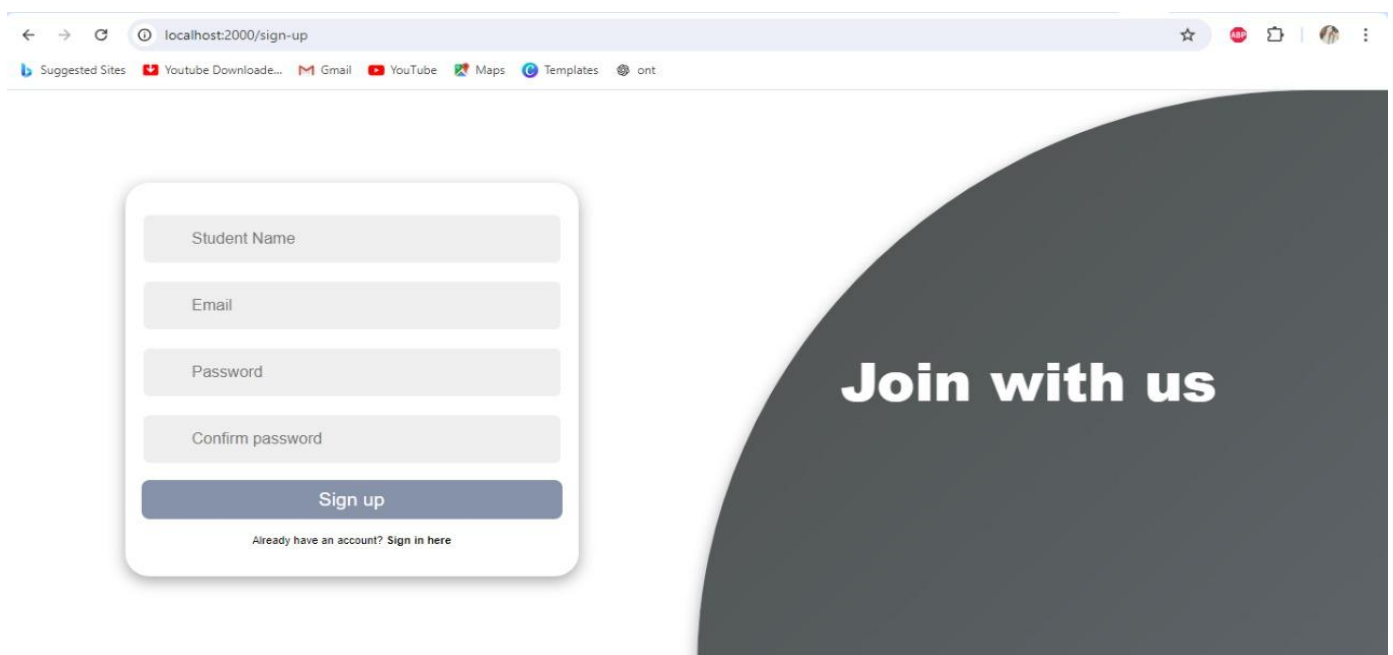
Password

Sign in

Forgot password?

Don't have an account? Sign up here

8.4 Sign Up Page



localhost:2000/sign-up

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Student Name

Email

Password

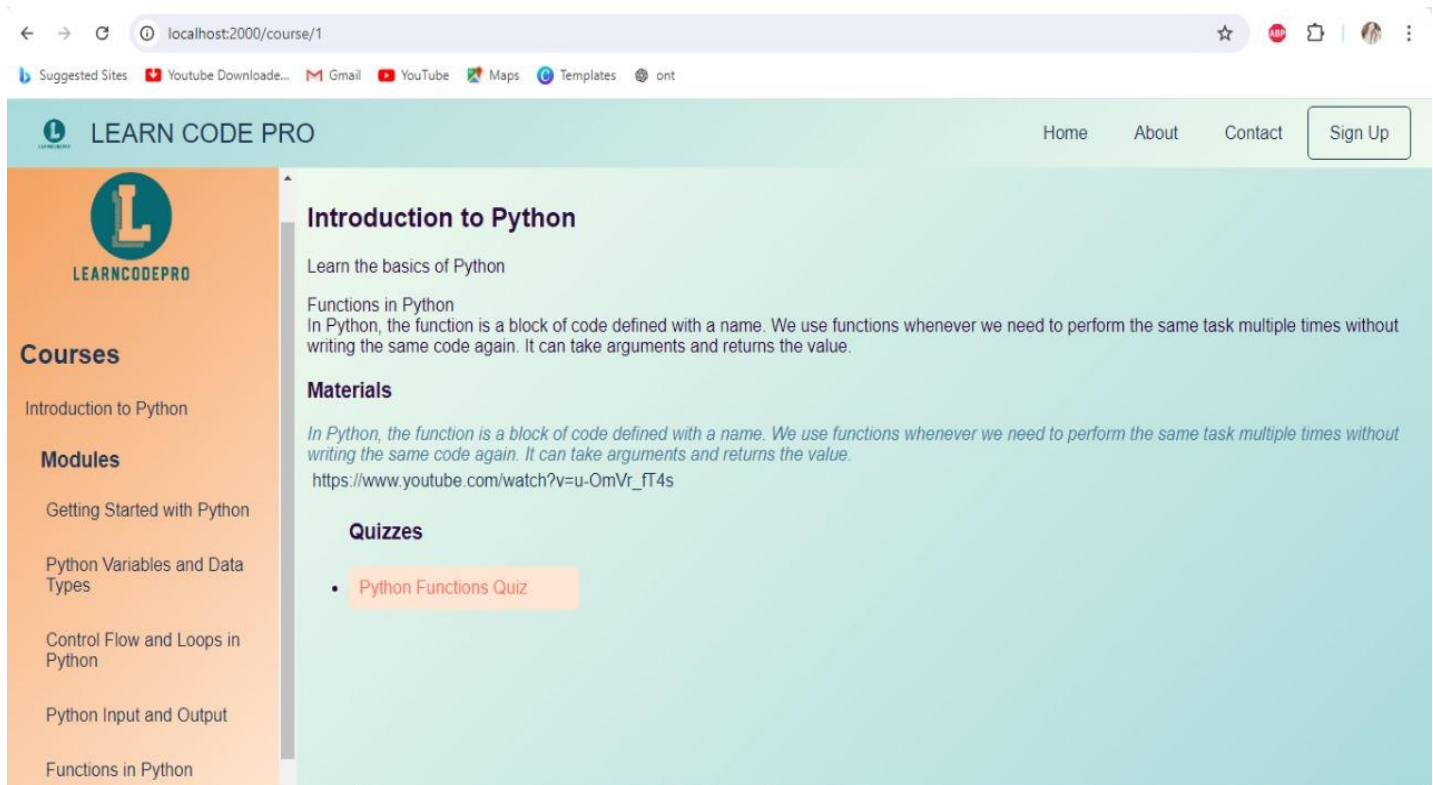
Confirm password

Sign up

Already have an account? Sign in here

Join with us

8.5 Courses Detail



← → ↻ localhost:2000/course/1 ☆ ABP | | |

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LEARN CODE PRO Home About Contact Sign Up

LEARNCODEPRO

Courses

Introduction to Python

Modules

Getting Started with Python

Python Variables and Data Types

Control Flow and Loops in Python

Python Input and Output

Functions in Python

Introduction to Python

Learn the basics of Python

Functions in Python
In Python, the function is a block of code defined with a name. We use functions whenever we need to perform the same task multiple times without writing the same code again. It can take arguments and returns the value.

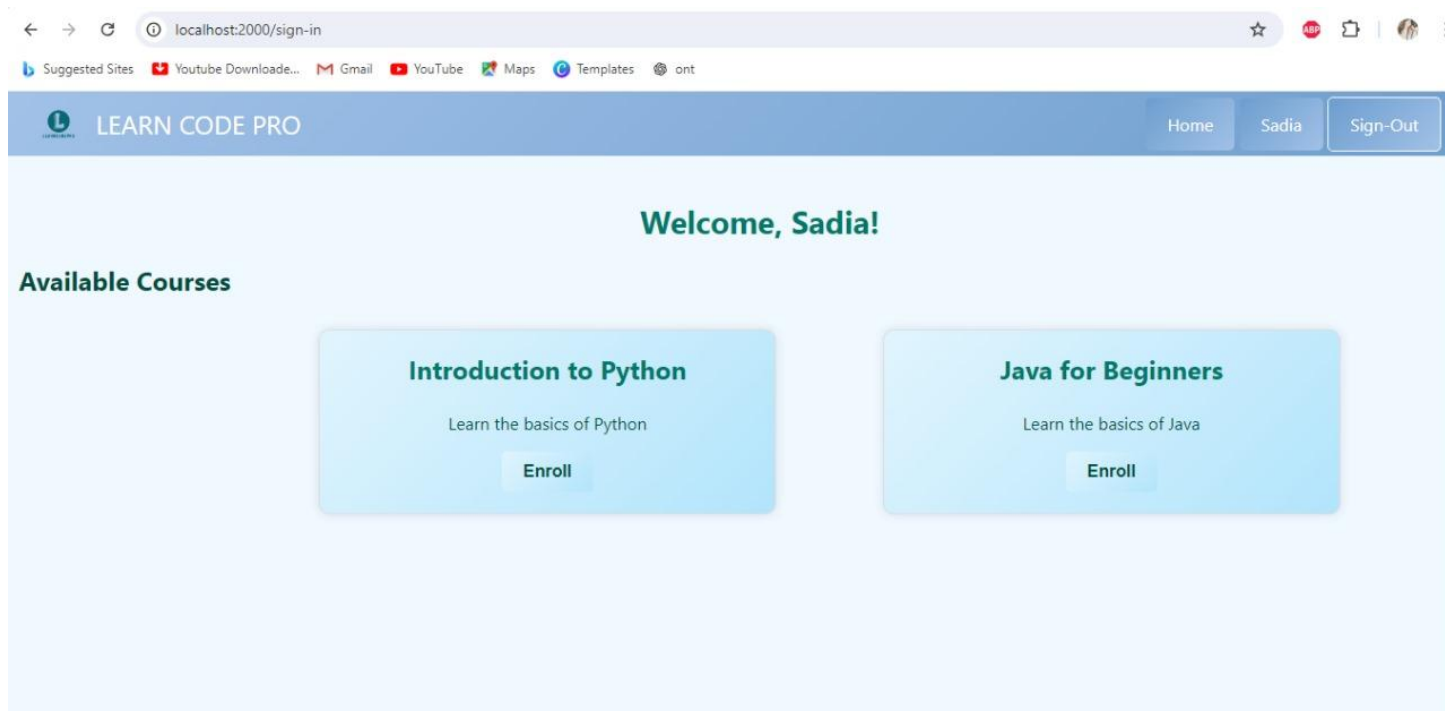
Materials

In Python, the function is a block of code defined with a name. We use functions whenever we need to perform the same task multiple times without writing the same code again. It can take arguments and returns the value.
https://www.youtube.com/watch?v=u-OmVr_ft4s

Quizzes

- Python Functions Quiz

8.6 Course Dashboard



← → ↻ localhost:2000/sign-in ☆ ABP | | |

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LEARN CODE PRO Home Sadia Sign-Out

Welcome, Sadia!

Available Courses

Introduction to Python

Learn the basics of Python

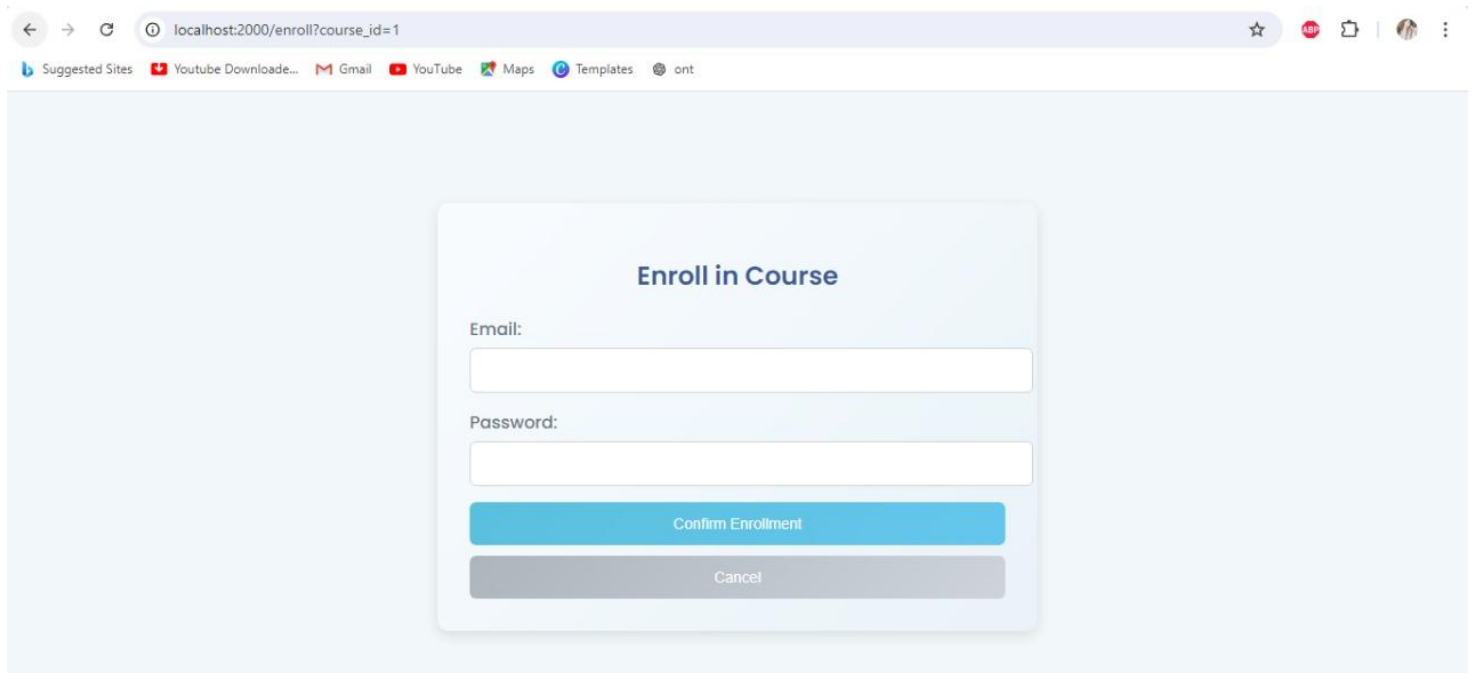
Enroll

Java for Beginners

Learn the basics of Java

Enroll

8.7 Course Enrollment



localhost:2000/enroll?course_id=1

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Enroll in Course

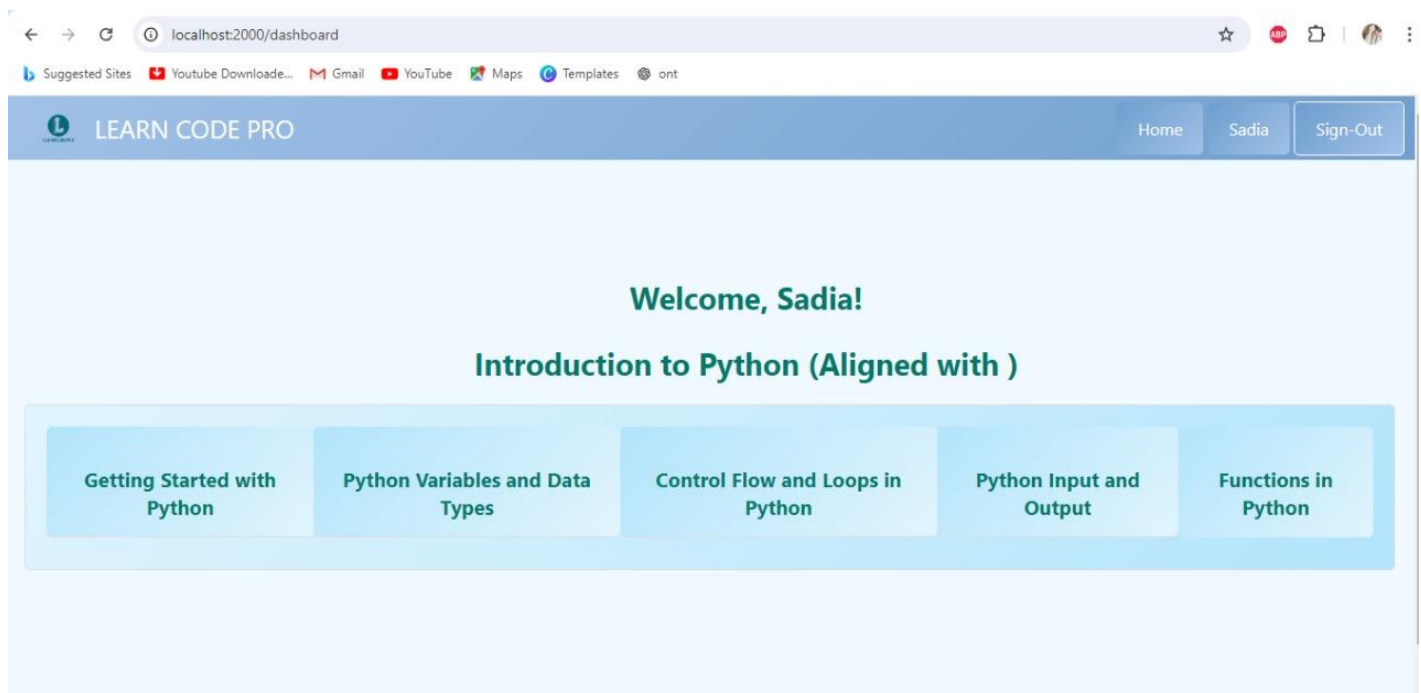
Email:

Password:

Confirm Enrollment

Cancel

8.8 Specific Module Of Course



localhost:2000/dashboard

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Home Sadia Sign-Out

Welcome, Sadia!

Introduction to Python (Aligned with)

Getting Started with Python

Python Variables and Data Types

Control Flow and Loops in Python

Python Input and Output

Functions in Python



8.9 Detail of modules

localhost:2000/sign-in

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Introduction to Python

Getting Started with Python

Python Variables and Data Types

Control Flow and Loops in Python

Python Input and Output

Functions in Python

Open Compiler

Python Functions

Type: Video

Description: In Python, the function is a block of code defined with a name. We use function: times without writing the same code again. It can take arguments and returns the value.

[Link](#)

Python Functions Quiz

Total Marks: 25

[Python Functions Quiz](#)

C Reset Compile

Enter your code here...

Input (Optional):

Enter input (optional)



9 FINAL CONCLUSION

Learn Code Pro is at the forefront of modern programming education, offering a dynamic and comprehensive platform designed to cater to learners across all skill levels. From novice coders to seasoned developers, this platform provides an extensive catalog of courses in essential programming languages, including Python, JavaScript, Java, and C++. With its commitment to delivering industry-competitive learning materials, Learn Code Pro ensures a rigorous and engaging educational journey. Interactive programming challenges, exercises, quizzes, and an integrated compiler are key features that enhance the hands-on learning experience, allowing users to apply their knowledge practically and effectively.

The platform's primary mission is to empower individuals by providing a flexible, high-quality programming education that aligns with current industry standards. This focus on adaptability and excellence supports learners in advancing their tech careers, equipping them with the skills necessary to navigate and succeed in an ever-evolving technological landscape. Additionally, Learn Code Pro fosters a supportive community where learners can collaborate and exchange insights, further enriching the educational experience.

By bridging theoretical knowledge with real-world application, Learn Code Pro not only prepares users for immediate challenges but also positions them for long-term success in the tech industry. Its user-friendly interface and comprehensive resources make it an indispensable tool for anyone looking to elevate their programming expertise and achieve their career goals. As a result, Learn Code Pro is more than just an educational platform; it is a gateway to innovation and professional growth in the world of technology.



10 FUTURE WORK

It can be summarized that the future scope of the project circles around maintaining information regarding:

Expand Course Offerings: Continuously add new programming languages and advanced topics.

Personalized Learning: Develop AI-driven paths tailored to individual progress.

Mobile App Development: Create a mobile app for convenient, on-the-go learning.

Community Engagement: Foster interaction through forums and mentorship programs.

Global Reach: Offer courses in multiple languages to attract international learning.

Certification Partnerships: Collaborate with industry leaders to provide recognized certificate.

Accessibility Enhancements: Improve accessibility features for learners with disabilities.



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