B.N.M. Institute of Technology

An Autonomous Institution under VTU, Approved by AICTE

Department of Information Science and Engineering

Vidyayāmruthamashnuthe

22ISE136 – Web Technologies

Mini-Project Report

on

BITWISE – THE CODING PLATFORM

Submitted in partial fulfillment of the requirement
for the award of the degree of

Bachelor of Engineering

in

Information Science & Engineering

by

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B.N.M. Institute of Technology

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DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

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CERTIFICATE

Certified that the Mini-project entitled **BITWISE- THE CODING PLATFORM** is carried out by **Mr. Gagan Kumar B D 1BG22IS016, Mr. Yathin G Kummar 1BG22IS065** the bonafide student of **B.N.M Institute of Technology** in partial fulfillment for the award of **Bachelor of Engineering** in **Information Science & Engineering** of the **Visvesvaraya Technological University**, Belagavi during the year 2023-2024. It is certified that all corrections / suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The mini-project report has been approved as it satisfies the academic requirements in respect of mini-project prescribed for the said Degree.

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CHAPTER 1

INTRODUCTION

1.1 Objective

Codex is a dynamic and comprehensive coding platform designed to empower individuals on their coding journey. Our primary goal is to provide a centralized hub that seamlessly integrates a rich repository of coding resources, a curated collection of books, and an intuitive online compiler. With a focus on Python, Java, and C, our platform caters to learners of all levels, from beginners to advanced programmers.

1) **Extensive Resources:** Codex offers a vast array of coding resources, tutorials, and guides, ensuring users have access to high-quality learning materials to enhance their coding skills.
2) **Interactive Online Compiler:** Practice coding in real-time using our online compiler, which supports Python, Java, and C. With different difficulty levels, users can hone their skills through hands-on experience, making learning both engaging and effective.
3) **User-Friendly Interface:** Codex boasts an intuitive and user-friendly interface, ensuring a seamless and enjoyable learning experience. Navigating through resources, books, and the online compiler is easy, making it accessible for users of all proficiency levels.

1.2 Scope

The scope of Codex is defined by its commitment to fostering a robust learning environment for individuals at various stages of their coding journey.

1) **Skill-Level Differentiation:** The scope of Codex extends to accommodating users with varying skill levels. Whether one is a novice, an intermediate learner, or an experienced coder, the platform strives to offer tailored content and challenges. This ensures that individuals can progress at their own pace and continually advance their coding abilities.

2) **Community Engagement:** Codex goes beyond being a solitary learning platform by fostering a sense of community. The scope includes features for

users to engage with fellow learners, share insights, and collaborate on coding projects. This communal aspect enhances the learning experience, creating a supportive environment for knowledge exchange.

3) **Progress Tracking**: Codex aims to incorporate features for progress tracking and personalized learning paths. Users can monitor their coding journey, set goals, and receive recommendations based on their performance and areas for improvement. This enhances the overall learning experience and allows for targeted skill development.

1.3 Motivation

At Codex, our driving force is to inspire and empower individuals on their coding journey. We recognize that learning to code is a transformative experience, opening doors to innovation, problem-solving, and endless possibilities. The motivation behind creating Codex stems from a commitment to making this journey accessible, engaging, and rewarding for everyone, regardless of their starting point or background.

1) **Democratizing Coding Education:**
   Codex is motivated by the belief that coding education should be accessible to all. Whether you're a curious beginner or a seasoned professional seeking to expand your skills, our platform is designed to cater to a diverse audience. By providing a wealth of resources, curated books, and an interactive online compiler, we aim to break down barriers and make coding educationinclusive.

2) **Encouraging Confidence and Creativity:**
   Codex seeks to motivate individuals by instilling confidence in their coding abilities. We believe that coding is not just about syntax; it's a creative process that empowers individuals to turn ideas into reality. Codex encourages users to express their creativity through coding, fostering a sense of accomplishment and pride in their achievements.

3) **Natural Language Interface:**

   Codex serves as the underlying model for GitHub Copilot, a collaborative coding tool.

   Proficient in over a dozen programming languages (including Python, Java, and C), Codex interprets simple commands and executes them on behalf ofusers.

   It allows developers to build natural language interfaces for existing applications.

1.4 Application Development Need & Importance

In the rapidly evolving landscape of technology, the need for accessible and effective coding education has become paramount. Codex, as a comprehensive coding platform, addresses the growing demand for a centralized hub that caters to the diverse needs of individuals seeking to learn Python, Java, and C. The development of Codex is driven by several key factors highlighting its need and importance in the realm of application development:

1) **Community Collaboration and Networking:**

   Collaboration is integral to successful application development. Codex recognizes the importance of community collaboration and networking. By creating a space for users to engage with peers, seek mentorship, and participate in coding challenges, the platform fosters a collaborative environment, mirroring the teamwork often required in real-worlddevelopment projects.

2) **Diversity in Learning Levels:**

   Codex recognizes the diverse skill levels among learners. Its incorporation of different difficulty levels in Python, Java, and C caters to beginners, intermediate learners, and advanced programmers. This adaptability ensures that individuals can progress at their own pace, addressing the varied needsof the coding community.

3) **Skill Development for Future Careers:**

   The digital era demands a workforce equipped with coding skills. Codex recognizes the increasing importance of coding proficiency across various industries.

4) **Accessible Learning Resources:**

   Codex addresses the need for accessible and well-organized learning resources. Aspiring coders often face challenges in finding reliable materials. Codex, with its extensive collection of resources and curated books, ensures that learners have a one-stop destination for high-quality, organized, and up-to-date content, fostering a conducive environment for effective learning.

CHAPTER 2

METHODOLOGY

2.1 Techniques Used

Building a comprehensive coding platform like Codex involves employing various techniques and technologies to ensure a seamless user experience. Here are some essential techniques used for developing a website with resources, books, and an online compiler featuring different levels in Python, Java, and C:

Front-End Development:

HTML/CSS/JavaScript: Utilize these core technologies for building the website's front-end. HTML for structuring content, CSS for styling, and JavaScript for interactive features.

Responsive Design:

CSS Frameworks (e.g., Bootstrap): Implement responsive design principles to ensure the platform adapts to various screen sizes. CSS frameworks can expedite the development of a mobile-friendly and visually appealing interface.

User Interface (UI) and User Experience (UX) Design:

UI/UX Design Tools: Employ design tools like Adobe XD, Sketch, or Figma to create intuitive and visually appealing interfaces. Prioritize a user-centric approach to enhance the overall experience.

Back-End Development:

Server-Side Scripting (e.g., Node.js, Django): Choose a server-side scripting language and framework to handle server logic. Node.js (JavaScript) or Django (Python) are popular choices.

Database Management:

Database Systems (e.g., MySQL, MongoDB): Implement a robust database to store user data, coding challenges, and other dynamic content. Choose a database system based on the project's requirements.

Web Application Frameworks:

Implement secure user authentication and authorization mechanisms to protect user data and ensure a safe learning environment.

Content Management System (CMS):

Custom or Existing CMS: Depending on the scale and content complexity, consider integrating a CMS for efficient management of resources, books, and other content.

Online Compiler Integration:

Integrate code editors like CodeMirror or Ace Editor for the online compiler feature. These editors provide syntax highlighting, code completion, and a real-time coding experience.

Version Control System:

Git: Implement version control for tracking changes in code, collaborating on projects, and ensuring a reliable platform.

API Integration:

Third-Party APIs: Integrate third-party APIs for additional functionalities, such as social media login or external content sources.

Testing:

Unit Testing, Integration Testing: Implement rigorous testing methodologies to identify and fix bugs, ensuring a stable and reliable platform.

By employing these techniques and technologies, the development of Codex can achieve a feature-rich, secure, and user-friendly coding platform that caters to learners of different levels in Python, Java, and C.

2.2 Tools Used

Visual Studio Code (VSCode): A lightweight, highly customizable code editor. Supports various languages, including Python, Java, and C. Offers extensions for additional features and integrations.

Git: A distributed version control system. Enables tracking changes, collaboration, and code repository management.GitHub and GitLab are popular platforms for hosting Git repositories.

Bootstrap: A responsive front-end framework. Provides pre-designed components and styles. Simplifies the creation of visually appealing and mobile-friendly interfaces.

React.js: A JavaScript library for building user interfaces. Widely used for creating interactive and dynamic front-end components.

Node.js: Back-end frameworks for server-side development.Node.js with Express for JavaScript-based stacks. Flask/Django for Python, and Spring for Java.

MySQL: Databases for data storage. MongoDB is a NoSQL database for flexible and scalable storage. MySQL is a robust relational database management system.

CHAPTER 3

SYSTEM REQUIREMENTS SPECIFICATION

3.1 Software Requirements

1. Web Development Framework
2. Database Management System
3. Frontend Technologies
4. Code Editor
5. Authentication and Authorization
6. Online Compiler
7. XAMPP

3.2 Hardware Requirements

1) **Memory (RAM):**
   Allocate enough RAM to handle the concurrent users and the caching needs of your application.
   Recommended: Minimum 8 GB of RAM; higher for better performance.

2) **Storage:**
   Use fast and reliable storage for storing application files, databases, and user-uploaded content.
   SSDs (Solid State Drives) are preferred for faster read and write speeds.
   Recommended: At least 256 GB SSD storage.

3) **Networking:**

Ensure a reliable internet connection with sufficient bandwidth to handle incoming and outgoing data.

Recommended: High-speed internet connection with adequate bandwidth.

4) **Laptop:**

Intel Core i5 12th gen (16 GB/512 GB SSD/Win11 Home/4GB Graphics/RTX 2050)

3.3 Functional Requirements

1) **User Authentication:**

Users should be able to register, log in, and manage their accounts. Differentiate between regular users and administrators.

2) **User Profiles:**

Allow users to create and manage their profiles.

Profile information may include a profile picture, programming languages of interest, and achievements.

3) **Resource Management:**

Categorize and organize coding resources, including tutorials, articles, and documentation. Provide a search functionality for users to find specific resources. Allow users to bookmark or save their favourite resources.

4) **Book Catalogue:**

Maintain a catalogue of coding books. Include details such as title, author, description, and cover image. Users should be able to search for books and view detailed information.

5) **Code Challenges:**

Offer coding challenges at different difficulty levels. Allow users to submit solutions and receive feedback. Track and display users' performance in solving challenges.

6) **Online Compiler:**

Provide an online coding environment with support for Python, Java, and C. Allow users to write, compile, and execute code directly on the platform. Display compiler errors and output for user feedback.

7) **Learning Paths and Levels:**

Implement different learning paths for Python, Java, and C, catering to beginners, intermediate, and advanced users. Define levels within each path, and allow users to progress through them sequentially.Track and display user progress within each learning path and level.

8) **Interactive Learning Modules:**

Develop interactive modules that teach coding concepts. Include examples, quizzes, and exercises to reinforce learning. Users should be able to progress at their own pace.

9) **Progress Tracking:**

Implement a system to track and display user progress in different areas, such as resource consumption, books read, and completed code challenges.

Provide achievement badges for milestones achieved.

3.4 Non - Functional Requirements

Non-functional requirements describe the characteristics that are not related to specific behaviors or features of the system but are crucial for its overall performance, usability, and reliability. Here are non-functional requirements for building a coding website:

1) **Performance:**

Response Time: The website should have low latency, providing quick responses to user interactions.

2) **Availability:**

The website should be available 24/7 with minimal downtime for maintenance. Implement redundancy and failover mechanisms to ensure continuous availability.

3) **Usability:**

Provide an intuitive and user-friendly interface. Ensure accessibility for users with disabilities. Perform usability testing to validate the design and flow of the website.

4) **Compatibility:**

Ensure compatibility with various web browsers (Chrome, Firefox, Safari, and Edge) and devices (desktops, tablets, mobile phones).Validate compatibility with different operating systems.

5) **Maintainability:**

The code base should be well-documented and follow coding standards. Implement version control for source code management. Plan for easy maintenance and future updates.

6) **Portability:**

The website should be deployable on different hosting environments. Ensure compatibility with various cloud platforms.

CHAPTER 4

SYSTEM DESIGN AND DEVELOPMENT

4.1 Architectural Design

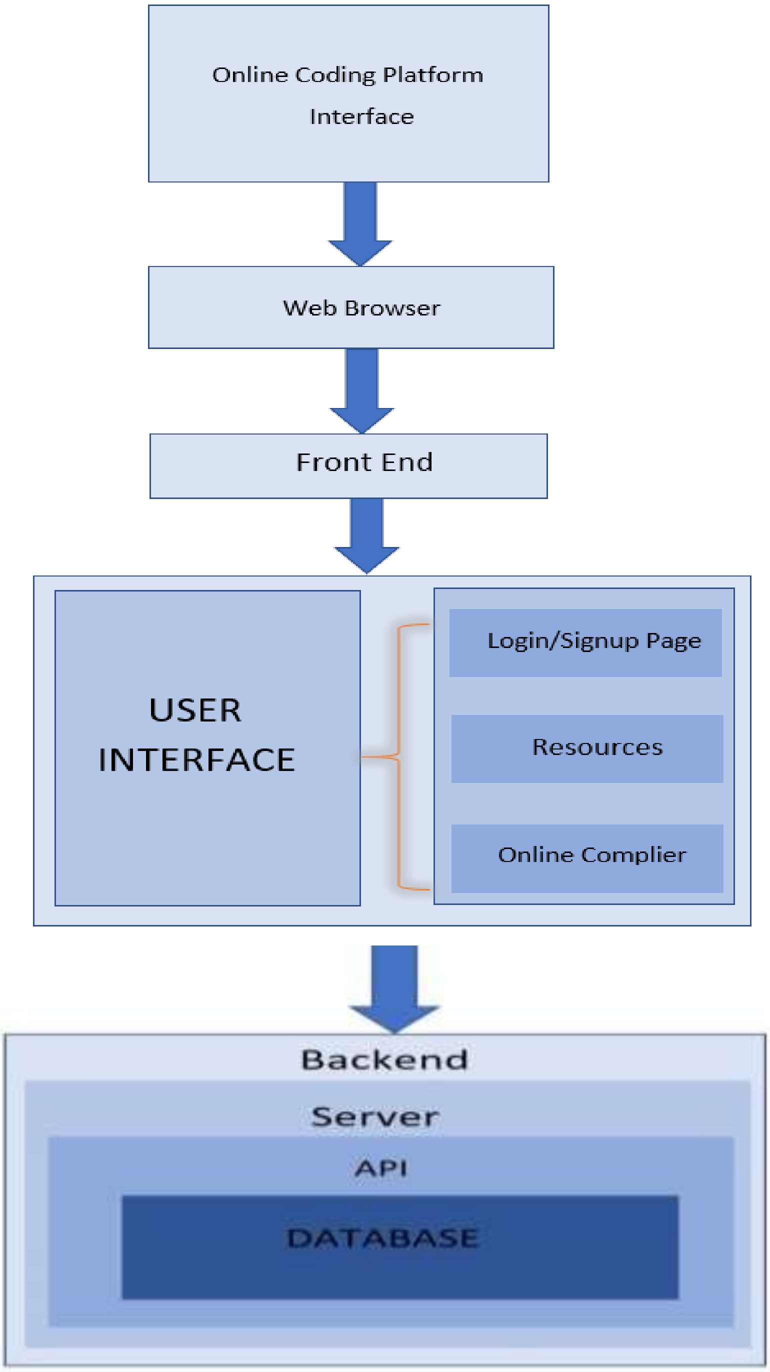


Fig 4.1 Flowchart

As represented in Fig 4.1, the system design and development of the Codex project involves a systematic approach to meet the requirements and goals of the platform. Beginning with thorough requirements gathering from stakeholders, including potential users and administrators, the development team outlines the features, functionality, and objectives of Codex. Architectural decisions are made to ensure scalability, performance, and security, with considerations for frontend and backend technologies, database design, and overall system structure. Frontend development focuses on creating an intuitive user interface using HTML, CSS, and JavaScript, while backend development implements server-side logic, data management, and APIs using technologies like Python or Node.js. Integration with third-party tools and APIs, such as online compilers or version control systems, enhances the platform's functionality. Rigorous testing, including unit testing and user acceptance testing, ensures the quality and reliability of the platform. Upon completion, Codex is deployed to a production environment, where ongoing maintenance and updates are performed to address bugs, add new features, and ensure optimal performance. Through this comprehensive approach, Codex aims to provide users with a robust and user-friendly coding platform conducive to learning and skill development.

CHAPTER 5

IMPLEMENTATION

5.1 Modules Implemented

Pseudocode:

Module 1: Homepage

- Welcome message.
- Navigation to different sections like Resources, Books, Online Compiler, and Coding Levels.
- <div class="bottom-links">
  <div class="links">
  <a href="#">Home</a>

Module 2: Resources:

Categories:

- Divide resources into categories such as Python, Java, C, Algorithms, Data Structures, etc.
- Subcategories may include beginner, intermediate, and advanced topics

Tutorials and Guides:

- Provide step-by-step tutorials and guides for different topics.
- Include video tutorials if possible.

Documentation:

- Link to official documentation for Python, Java, and C.
- <div id="content4" class="content-box"><div id="content5" class="content-box">
  <h2>Course Certificate</h2>

Module 3: Books:

- function display Booklist(language):
- Fetch and display recommended books for the specified programming language

Module 4: Online Compiler

- function select Language(language):
- Set the programming language for the online compiler

- <ul class="menu"> <li><a href="#">Bitwise</a></li>
  <li><a href="#">Your course</a></li>

Module 5: Coding Platform

- module Coding Platform:
- function set Difficulty Level(level):
- Set the difficulty level for coding exercises
- This can range from beginner to advanced

Module 6: Coding Challenge(language):

- Fetch a coding challenge for the specified programming language and difficulty level
- Display the problem statement and provide an input code editor
- function submit Code(solution):
- Submit the user's solution for evaluation
- Provide feedback and score based on correctness and efficiency

Module 7: Coding Levels

- Beginner, Intermediate, Advanced:
- Create different levels of coding challenges and exercises.
- Each level should progressively increase in difficulty.
- Progress Tracking:
- Implement a system to track users' progress through the coding levels.

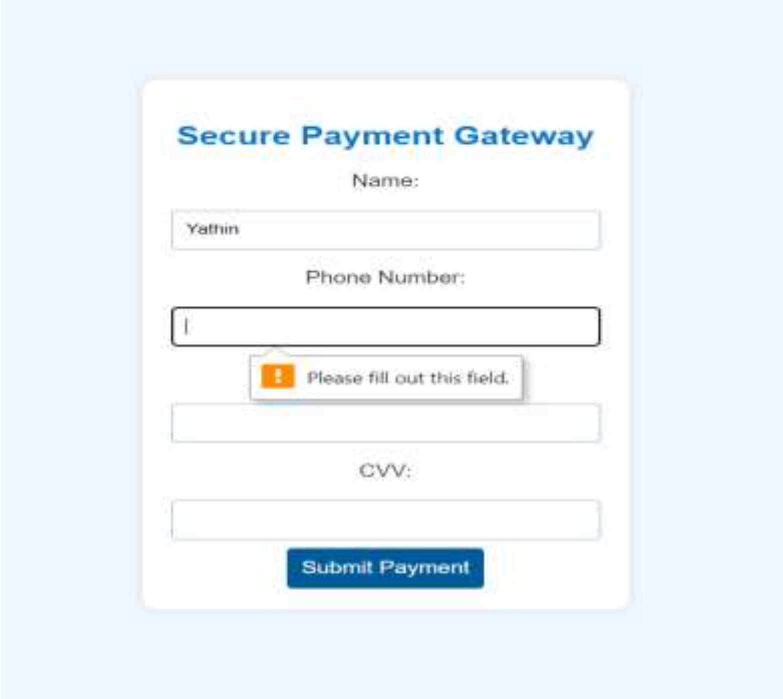
Module 8 : Registration and Login:

- Allow users to create accounts and log in.
- Profile Page:
- Users can track their progress, achievements, and saved resources.
- <label><input for="name" type="text" placeholder="Name" id="name" name="name" autocomplete="off" required/> </label>
- <form action="#" name="frmContact" class="needs-validation" method="post" action="contact.php">

CHAPTER 6

TESTING AND RESULTS

6.1 Snapshots of the Test Cases and Description



Secure Payment Gateway

Name:

Yathin

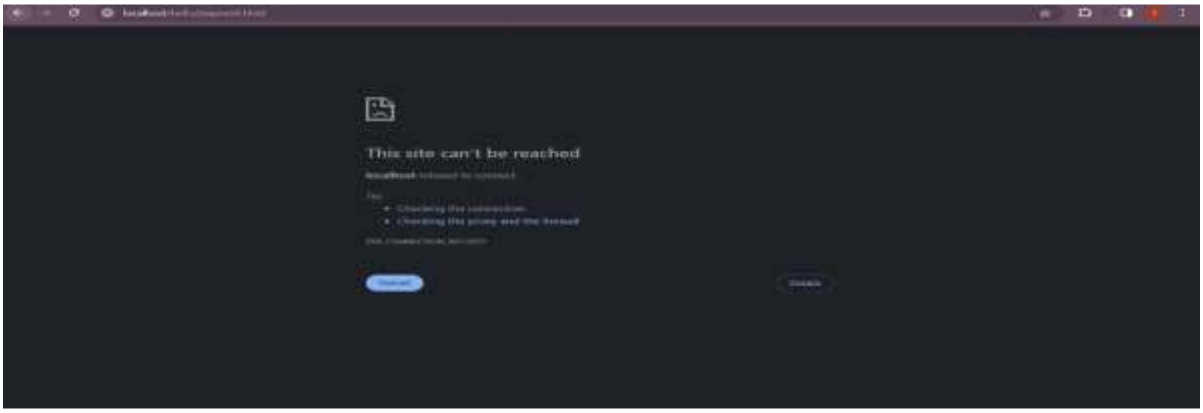
Phone Number:

Please fill out this field.

CVV:

Fig 6.1 Validation of format

The provided Fig 6.1 demonstrates form validation, prohibiting submission if fields are incomplete or incorrectly filled. JavaScript functions validate each input, displaying error messages for necessary corrections. This ensures data integrity and enhances user experience by guiding accurate form completion.



This site can't be reached

localhost refused to connect.

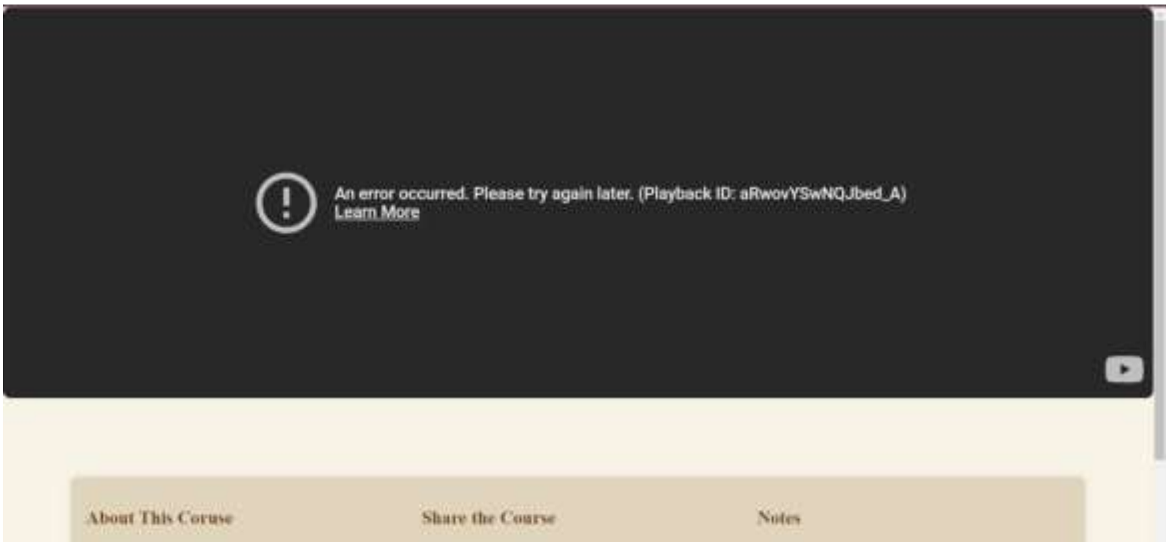
Try:

- Checking the connection
- Checking the proxy and the firewall

ERR_CONNECTION_REFUSED

Fig 6.2 Testing of Connection to Database

The subsequent Fig 6.2 depicts that the Codex webpage fails to establish a connection with the database if it encounters difficulties storing user information. Additionally, connectivity to the local host is disrupted, indicating potential issues with server communication. This safeguards data integrity and system reliability by preventing erroneous data storage and ensuring seamless user experience.

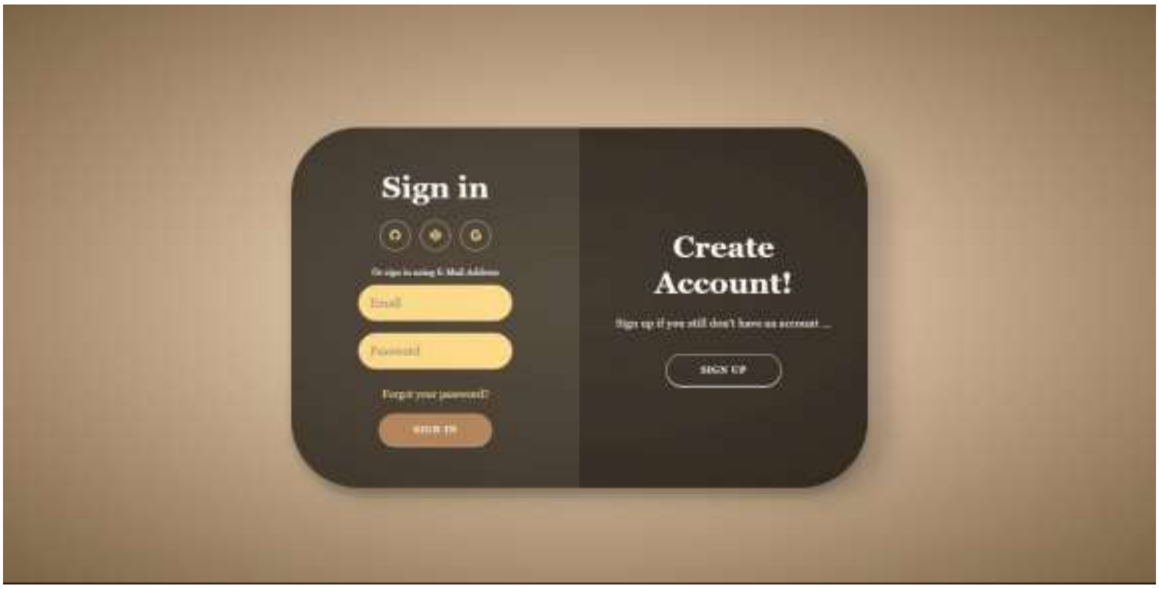


An error occurred. Please try again later. (Playback ID: aRwovYSwNQJbed_A)

Fig 6.3 Validation for connection

As shown in Fig 6.3 , if there is any disruption in network connectivity or other external factors, the YouTube course videos fail to play on the Codex platform. This highlights the necessity of stable network connections and effective error handling mechanisms to maintain uninterrupted access to learning resources.

6.2 Snapshots of the mini project and description



Sign in

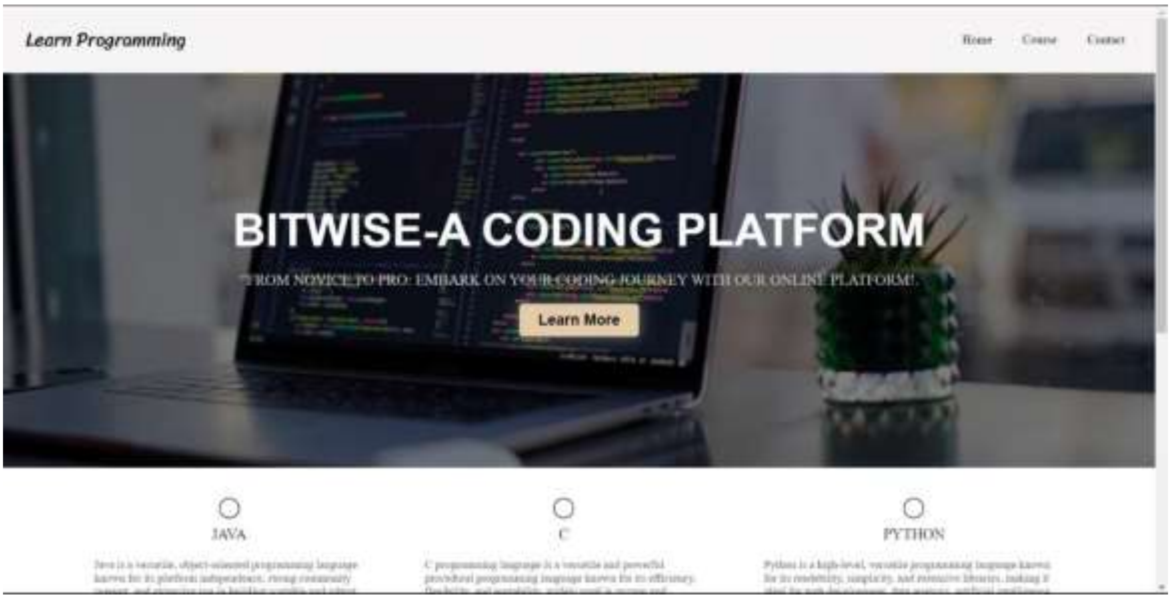
Or sign in using E-Mail Address

Create Account!

Sign up if you still don't have an account ...

Fig 6.4 Login page

The Fig 6.1 shows the login page of the Codex project offers users the option to sign in or create a new account. It features convenient icons for quick access to sign-in options via popular platforms like GitHub and Google. This streamlined interface enhances user convenience and accessibility, facilitating a smooth authentication process for users.


Learn Programming
Home
Course
Contact
BITWISE-A CODING PLATFORM
"FROM NOVICE TO PRO: EMBARK ON YOUR CODING JOURNEY WITH OUR ONLINE PLATFORM!
Learn More

○ JAVA

Java is a versatile, object-oriented programming language known for its platform independence, strong community support, and [illegible]

○ C

C programming language is a versatile and powerful procedural programming language known for its efficiency, flexibility, and portability, [illegible]

○ PYTHON

Python is a high-level, versatile programming language known for its readability, simplicity, and extensive libraries, making it [illegible]

Fig 6.5 Bitwise-Coding Page

As shown in Fig 6.2, Upon signing in, users are presented with three checkboxes for selecting their preferred programming language among Java, Python, or C. They can also explore further information about the website through a "Learn More" button. Upon selecting a language, users are seamlessly redirected to their chosen coding channel, streamlining access to relevant learning resources and enhancing the overall user experience.

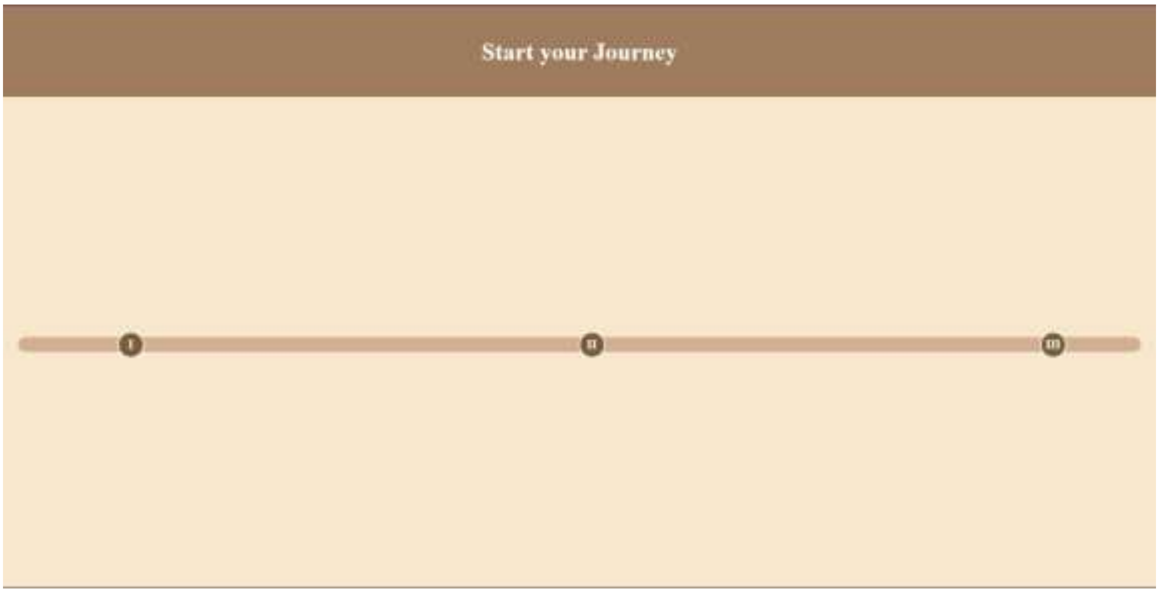
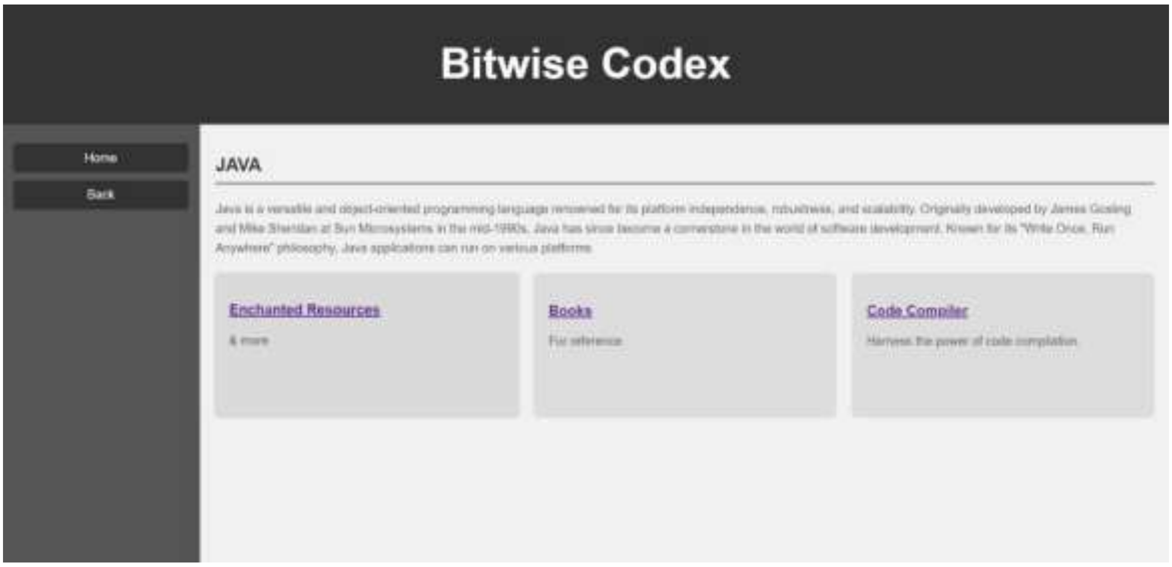


Fig 6.6 Beginning of the Course

As shown in Fig 6.3, after selecting a programming language, users are directed to the "Start your journey" page, featuring three levels tailored to different coding proficiencies. Users can choose the level that best aligns with their coding expertise, allowing for a personalized learning experience.



JAVA

Java is a versatile and object-oriented programming language renowned for its platform independence, robustness, and scalability. Originally developed by James Gosling and Mike Sheridan at Sun Microsystems in the mid-1990s, Java has since become a cornerstone in the world of software development. Known for its "Write Once, Run Anywhere" philosophy, Java applications can run on various platforms.

Enchanted Resources

& more

Books

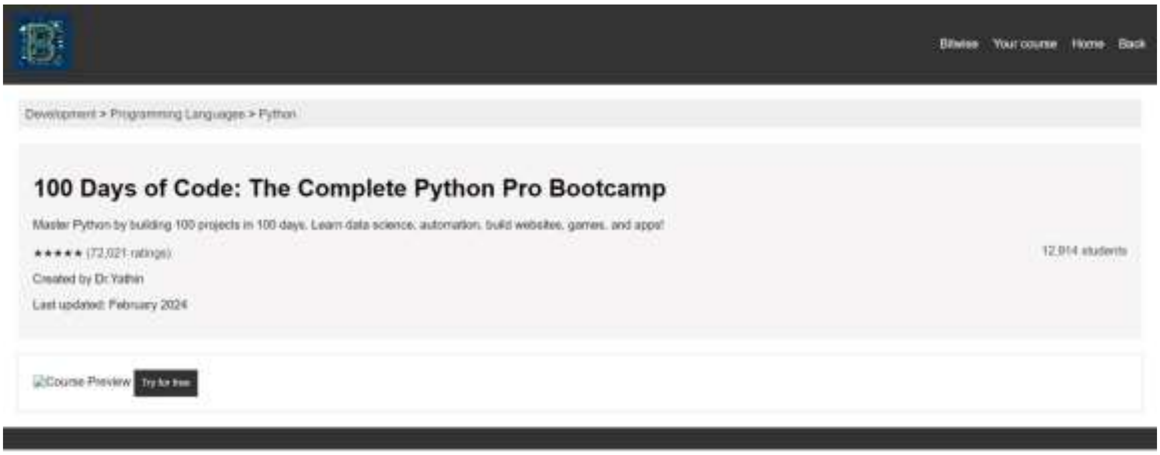
For reference

Code Compiler

Harness the power of code compilation

Fig 6.7 Course Materials

For users selecting Level 1, As depicted in Fig 6.4, the course offers three access options: "Enchanted Sources" for video lessons, "Books" for textbooks, and "Compiler" for coding practice.



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★★★★★ (72,021 ratings)

12,914 students

Created by Dr.Yathin

Last updated: February 2024

Fig 6.8 Redirect to the Coruse

As depicted in Fig 6.5, Users can access the course and all the facilities after the subscription but a free trial option is also available; these can be availed through Enchanted Resources section.

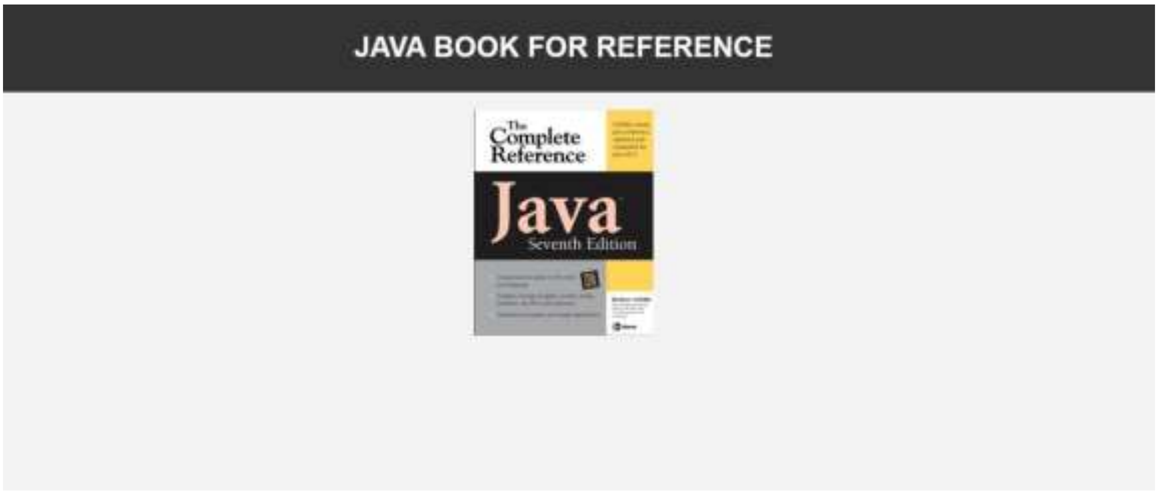
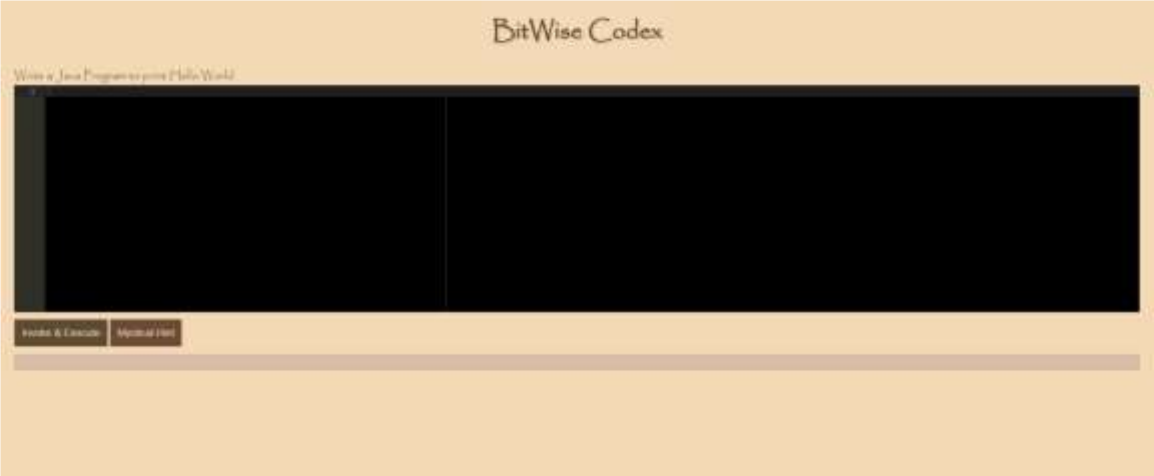


Fig 6.9 Books Secyion

As shown in Fig 6.6, within the "Books" page, users are presented with a curated collection of relevant textbooks, offering comprehensive resources to deepen understanding and proficiency in the chosen programming language. Clicking on a book opens a PDF version for immediate reference.



Write a Java Program to print Hello World

Fig 6.10 Complier Page

Upon selecting the "Compiler" option, users are directed to a dedicated page featuring a text area for coding practice. As shown in Fig 6.7 The page includes a compiler specific to the programming language chosen in the previous step. This setup enables users to write and execute code directly within the platform, facilitating hands-on learning and immediate feedback on code correctness.

6.3 Observation about the mini project

The Codex website exhibits a professional login interface, ensuring a secure and user-friendly authentication process. Upon logging in, users encounter a streamlined webpage presenting checkboxes for selecting programming languages. This layout facilitates intuitive language selection, enhancing user experience. The transition to the levels page is seamless, with clear demarcation of proficiency levels, accommodating users with diverse skill sets.

The course page offers a range of resources to support learning, including "Enchanted Resources" featuring tutorial videos and programming books. This variety caters to different learning preferences, enriching the learning experience. Notably, the integrated code compiler allows users to practice coding directly within the platform, fostering hands-on learning and immediate feedback.

Overall, the Codex project demonstrates a thoughtful approach to coding education, providing a structured and interactive platform for learners. Its intuitive interface,structured content, and diverse resources contribute to its potential as a valuable tool for coding skill development.

CHAPTER 7

CONCLUSION AND FUTURE ENHANCEMENT

In conclusion, Codex stands as a robust and comprehensive coding platform designed to empower learners of all levels in their coding journey. With its wide array of resources, including books, online compilers, and support for multiple programming languages, Codex offers a rich learning experience. The proposed future enhancements, such as interactive coding challenges, community features, personalized learning paths, and gamification elements, promise to further elevate the platform's effectiveness and engagement. Moreover, ensuring mobile compatibility, integration with version control systems, regular content updates, accessibility features, and analytics tools will enhance usability, relevance, inclusivity, and progress tracking. By embracing these enhancements, Codex is poised to strengthen its position as a leading destination for individuals seeking to develop their coding skills in an interactive, supportive, and dynamic environment.

Future Enhancement

To enhance Codex as a leading coding platform, several future enhancements can be implemented. These include expanding language support to encompass languages like JavaScript, Ruby, and Swift, thus catering to a broader audience of learners. Introducing interactive coding challenges and exercises within the platform would provide hands-on learning opportunities, reinforcing concepts covered in the resources. Community features such as forums, discussion boards, and live chat support would facilitate interaction among users, fostering collaboration on coding projects and knowledge sharing. Personalized learning paths, driven by algorithms analyzing user progress and preferences, would tailor the learning experience to individual needs and styles. Ensuring mobile compatibility would enhance accessibility and flexibility, allowing users to access Codex anytime, anywhere. Integration with version control systems such as Git would streamline project management and collaboration. Regular content updates would keep the platform relevant and up-to-date with the latest programming developments, while accessibility features would promote inclusivity among users with disabilities. Finally, providing analytics and reporting tools would enable users to track progress, identify areas for improvement, and set goals effectively. Through these enhancements, Codex aims to solidify its position as a premier coding platform, offering a dynamic and enriching learning experience tailored to diverse user needs and aspirations.

REFERENCES

- Web Development and Design Foundations with HTML(10th.ed.) by Terry Felke-Morris
- “Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics" by Jennifer Niederst Robbins
- https://www.geeksforgeeks.org/javascript
- https://developer.mozilla.org/en-US/docs/Web/javascript
- https://www.codewars.com
- "Clean Code: A Handbook of Agile Software Craftsmanship" by Robert C. Martin.