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A PROJECT REPORT

ON

CipherWeb

Submitted By

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(46421601988)

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TILAK MAHARASHTRA VIDYAPEETH, PUNE

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VIDYAPEETHBHAVAN, GULTEKDI, PUNE-411 037

DEPARTMENT OF COMPUTER SCIENCE

Estd.1921

CERTIFICATE

This is to certify that the project entitled, **CipherWeb**, is the bonafide work of **Mr. Mohd Kalam Aslam Pinjar** bearing Seat. No: **5732** submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of Computer Application, **PRN** **46421601988** under Tilak Maharashtra Vidyapeeth, in the year 2023-2024.

Internal Guide **Coordinator**

External Examiner

Date: **College Seal**

ACKNOWLEDGEMENT

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Thank you all for your invaluable contributions and support. This project would not have been possible without every one of you.

DECLARATION

I, Mohd Kalam Aslam Pinjar, hereby declare that the project titled CipherWeb, submitted as part of BCA Cyber Security is my original work. All the information, data, code, and content included in this project are authentic and have been generated by me during my studies.

I further declare that any external sources, including but not limited to books, articles, websites, and software, used in the development of this project have been properly cited and acknowledged in the bibliography section. Any contributions from individuals or organizations have been duly recognized in the acknowledgements.

I affirm that this project has not been submitted for assessment in any other course or academic program. Any similarities found with other works are purely coincidental, and any instances of collaboration or assistance from fellow students or colleagues have been appropriately acknowledged.

I understand that any attempt to misrepresent the originality or authenticity of this project may result in disciplinary action by the policies of TILAK MAHARASHTRA VIDYAPEETH.

Date -

Name and Signature of the Student

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Chapter-1
Introduction

In an era defined by digital connectivity and data exchange, ensuring the confidentiality and integrity of information has become paramount. The increasing prevalence of cyber threats underscores the need for robust cryptographic solutions to safeguard sensitive data from unauthorized access and interception.

In response to this imperative, I have developed CipherWeb, a versatile web platform dedicated to providing users with powerful encryption capabilities. CipherWeb offers a comprehensive suite of 10 cryptographic algorithms, ranging from time-honored methods like Caesar Cipher to sophisticated modern techniques like RSA**.**

Driven by a commitment to accessibility and user-friendliness, CipherWeb integrates seamlessly with Firebase backend services, ensuring scalability, reliability, and data security. Developed with Tailwind CSS and JavaScript Canvas, the platform boasts an intuitive interface and dynamic functionality, empowering users to encrypt and decrypt messages with ease.

In this project, I delve into the architecture, design, and implementation of CipherWeb, exploring its features, functionalities, and the technical intricacies behind its cryptographic algorithms. Through CipherWeb, I aim to democratize the power of encryption, empowering individuals and organizations to protect their digital privacy and security in an increasingly interconnected world.

Background of the Project

In today's digit all and scape, the exchange of sensitive information over the internet has become ubiquitous. However, this convenience comes with inherent risks, as malicious actors continuously seek to exploit vulnerabilities and intercept confidential data. Cryptography emerges as a critical defense mechanism, providing a means to secure communication channels and protect sensitive information from unauthorized access.

Against this backdrop, the idea for CipherWeb was conceived. Recognizing the need for accessible and user-friendly cryptographic solutions, CipherWeb aims to empower individuals and organizations with the tools to encrypt and decrypt messages securely. By offering a diverse range of cryptographic algorithms, CipherWeb caters to users with varying security requirements, from casual encryption enthusiasts to cybersecurity professionals.

Scope of the Project:

The scope of CipherWeb encompasses the development of a web-based platform that provides users with the ability to perform cryptographic operations seamlessly. Key aspects of the project include:

1. Algorithmic Diversity: CipherWeb offers a selection of 10 cryptographic algorithms, spanning classic ciphers to modern encryption methods. Users can choose the algorithm that best suits their security needs and preferences.

2. User Authentication and Data Security: CipherWeb implements robust user authentication mechanisms to ensure that only authorized users can access its cryptographic functionalities. Additionally, the platform prioritizes data security, employing encryption techniques to safeguard user information and communications.

3. Integration with Firebase Backend Services: To streamline development and

enhance scalability, CipherWeb integrates with Firebase backend services. This integration facilitates user authentication, real-time database management, and cloud storage functionalities.

4. User Experience and Accessibility: CipherWeb prioritizes user experience, offering an intuitive interface and interactive features for seamless navigation and usage. The platform is designed to be accessible to users of all levels of technical expertise, from beginners to experienced cryptographers.

Objective:

The primary objective of CipherWeb is to provide users with a secure and user-friendly platform for encrypting and decrypting messages. The project aims to achieve the following specific objectives:

1. Algorithmic Diversity: Offer a diverse selection of 10 cryptographic algorithms, ranging from classic ciphers to modern encryption methods, to cater to users with varying security requirements and preferences.

2. User Authentication and Data Security: Implement robust user authentication mechanisms to ensure that only authorized users can access CipherWeb cryptographic functionalities. Prioritize data security by employing encryption techniques to safeguard user information and communications.

3. Integration with Firebase Backend Services: Streamline development and enhance scalability by integrating CipherWeb with Firebase backend services. This integration facilitates user authentication, real-time database management, and cloud storage functionalities, ensuring seamless operation and reliability.

3. User Experience and Accessibility: Prioritize user experience by offering an intuitive interface and interactive features for seamless navigation and usage. Ensure that CipherWeb is accessible to users of all levels of technical expertise, from

beginners to experienced cryptographers, thereby democratizing the power of encryption.

4. Educational Resource: Serve as an educational resource for individuals interested in learning about cryptography by providing detailed documentation, explanations, and examples of each cryptographic algorithm implemented in CipherWeb. Empower users to understand and utilize cryptographic techniques effectively for securing their digital communications.

Purpose:

The purpose of CipherWeb is to address the growing need for accessible and user-friendly cryptographic solutions in today's digital landscape. With the proliferation of digital communication and the increasing prevalence of cyber threats, there is a heightened demand for tools that enable individuals and organizations to secure their sensitive information effectively.

CipherWeb seeks to fulfil this need by providing a versatile web platform that empowers users with the ability to encrypt and decrypt messages using a diverse range of cryptographic algorithms. By offering a selection of 10 algorithms, spanning from classic ciphers to modern encryption methods, CipherWeb caters to users with varying security requirements and preferences.

The overarching purpose of CipherWeb is to democratize the power of encryption, making it accessible to users of all levels of technical expertise. Whether used for personal communication, professional collaboration, or educational purposes, CipherWeb aims to empower individuals and organizations to protect their digital privacy and security effectively.

Chapter 2

System Analysis

System analysis is a crucial phase in the development of CipherWeb, aimed at understanding the requirements, objectives, and constraints of the project. This chapter delves into the systematic examination of CipherWeb functional and non-functional requirements, user interactions, and system architecture.

2.1 Functional Requirements:

- Cryptographic Algorithms: Identify and define the 10 cryptographic algorithms to be implemented in CipherWeb, including their encryption and decryption processes.
- User Authentication: Specify the user authentication mechanisms to ensure secure access control to CipherWeb functionalities.
- Data Management: Determine the requirements for storing and managing user data, cryptographic keys, and encryption histories.
- User Interface: Define the layout, design, and interactive features of the CipherWeb user interface to facilitate intuitive navigation and usage.

2.2 Non-Functional Requirements:

- Security: Establish security measures to safeguard user data, communications, and system integrity against unauthorized access and cyber threats.
- Scalability: Ensure that CipherWeb can accommodate a growing user base and evolving security requirements without compromising performance or reliability.
- Usability: Strive for an intuitive and user-friendly interface, allowing users of all levels of technical expertise to utilize CipherWeb cryptographic functionalities effectively.

- Performance: Define performance metrics and objectives to ensure that CipherWeb operates efficiently and responds promptly to user interactions.

2.3 User Interactions:

- User Registration and Authentication: Analyze the user authentication process, including registration, login, and password recovery mechanisms.
- Encryption and Decryption: Examine the user workflow for encrypting and decrypting messages using CipherWeb cryptographic algorithms.
- Data Management: Assess how users interact with CipherWeb data management features, including storing and retrieving cryptographic keys and encryption histories.

2.4 System Architecture:

- Client-Server Model: Define the architecture of CipherWeb as a client-server application, with the frontend and backend components interacting to provide cryptographic functionalities.
- Firebase Integration: Outline the integration of CipherWeb with Firebase backend services, including authentication, real-time database management, and cloud storage.

Through systematic analysis, CipherWeb functional and non-functional requirements, user interactions, and system architecture are delineated, laying the groundwork for the subsequent phases of development and implementation.

2.1 Existing System

Before the development of CipherWeb, it's essential to understand the limitations and challenges posed by existing cryptographic systems. This analysis provides insights into the shortcomings that CipherWeb aims to address.

1. Limited Algorithm Selection: Many existing cryptographic systems offer a limited selection of algorithms, restricting users' options for securing their data. This limitation may result in users being unable to choose the most suitable algorithm for their specific security requirements.

2. Complex User Interfaces: Some cryptographic systems have complex and unintuitive user interfaces, making it challenging for users, especially those with limited technical expertise, to navigate and utilize the system effectively.

3. Security Concerns: The security of existing cryptographic systems may be compromised due to vulnerabilities in the algorithms or implementation flaws. These vulnerabilities could potentially expose sensitive data to unauthorized access or interception.

4. Inefficient Data Management: Managing cryptographic keys, user profiles, and encryption histories in existing systems may be cumber some and inefficient, leading to delays in operations and potential data loss.

5. Lack of Real-Time Updates: Without real-time updates and synchronization, users may encounter inconsistencies in their cryptographic histories, making it difficult to track their past encryption activities accurately.

6. Scalability Challenges: Existing cryptographic systems may face scalability challenges, particularly concerning accommodating a growing user base or evolving security requirements. This limitation hinders the system's ability to meet users' needs effectively.

2.1 Proposed System: CipherWeb

CipherWeb is a revolutionary cryptographic platform designed to address the limitations of existing systems while providing users with a comprehensive suite of cryptographic functionalities. The proposed system offers a range of innovative features aimed at enhancing security, usability, and scalability.

1. Expanded Algorithm Selection:

- CipherWeb offers users a diverse selection of 10 cryptographic algorithms, ranging from classic ciphers like Caesar Cipher to modern encryption methods like **RSA.** This expanded selection ensures that users have access to the most suitable algorithm for their specific security requirements.

2. User-Friendly Interface:

- CipherWeb boasts an intuitive and user-friendly interface designed to streamline cryptographic operations. With clear navigation and interactive elements, users can easily encrypt and decrypt messages without the need for extensive technical knowledge.

3. Robust Security Measures:

- Security is paramount in CipherWeb, with robust encryption techniques and best practices implemented to safeguard user data and communications from unauthorized access and interception. Advanced security measures ensure the confidentiality and integrity of user information.

4. Efficient Data Management:

- CipherWeb incorporates efficient data management capabilities, allowing users to securely store cryptographic keys, manage their profiles, and track their encryption histories. Real-time updates and synchronization ensure accuracy and reliability in data management.

5. Seamless Integration with Firebase:
   - CipherWeb seamlessly integrates with Firebase backend services, including authentication, real-time database management, and cloud storage. platforms.

6. Scalability and Flexibility:
   - Built on a scalable architecture, CipherWeb can accommodate a growing user base and evolving security requirements. Whether used by individuals, businesses, or organizations, CipherWeb offers scalability and flexibility to meet diverse needs.

7. Educational Resource:
   - CipherWeb serves as an educational resource, providing users with detailed documentation, explanations, and examples of each cryptographic algorithm implemented. Users can learn about cryptography while utilizing CipherWeb encryption capabilities.

By combining innovative features, robust security measures, and seamless integration with Firebase backend services, CipherWeb emerges as a groundbreaking cryptographic platform, empowering users to protect their digital privacy and security with confidence and ease.

2.2 Requirement Analysis

Requirement analysis is a critical phase in the development of CipherWeb, focusing on gathering, analyzing, and documenting the functional and non-functional requirements of the system. This process involves collaboration with stakeholders to ensure that CipherWeb meets their needs effectively. The following aspects are considered during requirement analysis:

1. Functional Requirements:

   - Cryptographic Algorithms: Identify the 10 cryptographic algorithms to be implemented in CipherWeb, including their encryption and decryption processes.
   - User Authentication: Specify the user authentication mechanisms, including registration, login, and password recovery, to ensure secure access control to CipherWeb functionalities.
   - Data Management: Determine their requirements for storing and managing user data, cryptographic keys, and encryption histories within CipherWeb.
   - User Interface: Define the layout, design, and interactive features of CipherWeb user interface to facilitate intuitive navigation and usage.

2. Non-Functional Requirements:

   - Security: Establish security measures to safeguard user data, communications, and system integrity against unauthorized access and cyber threats.
   - Scalability: Ensure that CipherWeb can accommodate a growing user base and evolving security requirements without compromising performance or reliability.
   - Usability: Strive for an intuitive and user-friendly interface, allowing users of all levels of technical expertise to utilize CipherWeb cryptographic effectively.
   - Performance: Define performance metrics and objectives to ensure that CipherWeb operates efficiently and responds promptly to user interactions.

3. User Interactions:

   - User Registration and Authentication: Analyze the user authentication process, including registration, login, and password recovery mechanisms, to ensure a seamless user experience.

- Encryption and Decryption: Examine the user workflow for encrypting and decrypting messages using CipherWeb cryptographic algorithms, identifying any potential usability challenges.
- Data Management: Assess how users interact with CipherWeb data management features, including storing and retrieving cryptographic keys and encryption histories, to streamline operations and enhance user satisfaction.

4. System Architecture:

- Client-Server Model: Define the architecture of CipherWeb as a client-server application, outlining the interaction between the frontend and backend components.
- Firebase Integration: Specify the integration of CipherWeb with Firebase backend services, including authentication, real-time database management, and cloud storage, to ensure seamless operation and scalability.

Through comprehensive requirement analysis, CipherWeb aims to gather and document the needs and expectations of stakeholders effectively, laying the foundation for the subsequent phases of development and implementation.

2.2 Hardware Requirements

CipherWeb is a web-based cryptographic platform that primarily relies on software components for its operation. However, certain hardware requirements are necessary to support the deployment and usage of CipherWeb effectively. The hardware requirements for CipherWeb are as follows:

1. Client Devices:

- Desktop/Laptop Computers: Users can access CipherWeb using desktop or laptop computers running modern web browsers such as Google Chrome, Mozilla Firefox, Safari, or Microsoft Edge.
- Mobile Devices: CipherWeb should also be accessible on mobile devices such as smartphones and tablets, providing users with flexibility and convenience in accessing the platform.

2. Internet Connectivity:

- Stable Internet Connection: Users require a stable Internet connection to access CipherWeb and perform cryptographic operations seamlessly. A reliable internet connection ensures smooth communication between the client device and the CipherWeb server.

3. Server Infrastructure:

- Web Server: CipherWeb requires a web server to host the frontend components of the platform, including HTML, CSS, and JavaScript files. Commonly used web servers such as Apache HTTP Server can fulfil this requirement.
- Firebase Backend Services: Since CipherWeb integrates with Firebase backend services for authentication, real-time database management, and cloud storage, access to Firebase's server infrastructure is necessary for seamless operation.

4. Storage:

- Firebase Cloud Storage: CipherWeb utilizes Firebase Cloud Storage for securely storing user profile pictures and media assets. Access to Firebase Cloud Storage infrastructure is required to ensure reliable storage and retrieval of user data.

5. Security Considerations:
   - SSL/TLS Certificate: To ensure secure communication between client devices and the CipherWeb server, an SSL/TLS certificate is recommended. This certificate encrypts data transmitted over the network, protecting it from interception and unauthorized access.
   - Firewall and Intrusion Detection System (IDS): Implementing firewall and IDS measures on the server infrastructure help protect against unauthorized access and cyber threats, ensuring the security of user data stored in CipherWeb.

By meeting these hardware requirements, CipherWeb can be deployed and utilized effectively, providing users with a secure and reliable platform for cryptographic operations.

2.3 Software Requirements

CipherWeb, as a web-based cryptographic platform, relies on a combination of frontend and backend software components to deliver its functionalities securely and efficiently. The software requirements for CipherWeb are as follows:

1. Frontend Technologies:

- **HTML, CSS,** and JavaScript: These fundamental web development languages are used to create the structure, style, and interactivity of the user interface.
- Tailwind **CSS: A** utility-first CSS framework used to streamline the design process and ensure responsiveness across devices, enhancing the visual aesthetics and user experience of CipherWeb.
- JavaScript Canvas: Utilized for dynamic rendering of cryptographic algorithms, allowing users to visualize and interact with the encryption and decryption processes in real time.

2. Backend Technologies:

- Firebase: A comprehensive platform provided by Google, offering backend services including authentication, real-time database management, and cloud storage. CipherWeb integrates with Firebase to ensure seamless operation and scalability.
- Firebase Authentication: Provides secure user authentication mechanisms, allowing users to register, log in, and access cryptographic functionalities.
- Firebase Real-Time Database: Offers a scalable No SQL cloud database for storing and synchronizing user data, cryptographic keys, and encryption histories in real-time.
- Firebase Cloud Storage: Facilitates secure storage and retrieval of user profile pictures and media assets, enhancing the overall user experience of CipherWeb.

3. Integrated Development Environment(IDE):

- Visual Studio Code: A versatile code editor with built-in support for HTML, CSS, JavaScript, and various plugins for Firebase integration and development efficiency. Visual Studio Code streamlines the development process of CipherWeb and provides essential tools for debugging and testing.

4. Version Control:

   - Git: A distributed version control system used to track changes in the codebase and collaborate with team members efficiently. Git enables developers to manage code changes, merge branches, and maintain a history of revisions effectively.

By leveraging these software technologies, CipherWeb ensures a seamless and secure platform for cryptographic operations, meeting the needs of individual users and enterprises alike.

2.4 Justification of Platform

The selection of the Firebase platform for integrating backend services into CipherWeb is based on several compelling justifications:

1. Comprehensive Suite of Services: Firebase offers a comprehensive suite of backend services, including authentication, real-time database management, and cloud storage. This integrated approach streamlines development, reduces complexity, and ensures seamless interoperability between different components of CipherWeb.

2. Scalability and Reliability: Firebase provides scalable and reliable backend infrastructure, capable of handling a growing user base and fluctuating demands without compromising performance or reliability. This scalability ensures that CipherWeb can accommodate increasing usage and evolving requirements over time.

3. Real-Time Data Synchronization: Firebase's real-time database enables seamless data synchronization across multiple clients in real time, ensuring that changes made by one user are immediately reflected to others.

4. Authentication and Security: Firebase Authentication offers robust authentication mechanisms, including email/password authentication, social login options, and federated identity providers.

5. Cloud-Based Storage: Firebase Cloud Storage provides reliable and scalable cloud-based storage for user profile pictures, media assets, and other user-generated content within CipherWeb. This ensures efficient storage and retrieval of data while maintaining data integrity and availability.

6. Integration with JavaScript: Firebase offers seamless integration with JavaScript, the primary language used for frontend development in CipherWeb.

Chapter 3

System Design

System design is a critical phase in the development of CipherWeb, focusing on translating the requirements gathered during the analysis phase into a well-structured and efficient system architecture. This chapter provides a detailed overview of the system design for CipherWeb, encompass the frontend and backend components, database structure, security considerations, and integration with Firebase backend services.

3.1 Frontend Design:

The frontend design of CipherWeb focuses on creating an intuitive and user-friendly interface that enables users to access and utilize the platform's cryptographic functionalities seamlessly. Key aspects of the frontend design include:

- User Interface (UI): UI is designed to be visually appealing and responsive, ensuring optimal usability across desktop and mobile devices. Tailwind CSS is utilized to streamline the design process and ensure consistency in styling.
- Interactive Features: The frontend incorporates interactive features using JavaScript and JavaScript Canvas to enable users to visualize and interact with the encryption and decryption processes in real-time.
- User Authentication The frontend includes user authentication mechanisms, allowing users to register, log in, and access cryptographic functionalities securely.

3.2 Backend Design:

The backend design of CipherWeb encompasses the server-side components responsible for handling user requests, processing cryptographic operations, and managing data. Key aspects of the backend design include:

- Server Architecture: CipherWeb adopts a client-server architecture, where the frontend communicates with the backend server to perform cryptographic operations and retrieve data. Node.js is used as the runtime environment for the backend server.

- Firebase Integration: CipherWeb integrates with Firebase backend services, including authentication, real-time database management, and cloud storage, to ensure seamless operation and scalability. Firebase Authentication handles user authentication, while Firebase Realtime Database and Firebase Cloud Storage manage user data and media assets, respectively.

3.3 **Database Design:**

The database design of CipherWeb focuses on defining the structure and organization of data within the Firebase Real Time Database. Key aspects of the database design include:

- Data Model: data model is designed to store user profiles, cryptographic keys, encryption histories, and other relevant data in a structured format within the Firebase Real-Time Database.
- Real-Time Data Synchronization: Firebase's real-time database enables seamless data synchronization across multiple clients in real-time, ensuring that changes made by one user are immediately reflected to others. This capability enhances collaboration and user engagement within CipherWeb.

3.4 Security Considerations:

Security is a paramount concern in the design of CipherWeb, with robust measures implemented to safeguard user data, communications, and system integrity. Key security considerations include:

- Encryption: All sensitive data, including user passwords and cryptographic keys, are encrypted using strong encryption algorithms to prevent unauthorized access and interception.
- Authentication: Firebase Authentication provides robust authentication mechanisms, including email/password authentication and social login options, to ensure secure access control to cryptographic functionalities.
- Secure Communication: CipherWeb utilizes SSL/TLS encryption to secure

communication between client devices and the backend server, protecting data from interception and unauthorized access.

- Data Protection: Firebase Cloud Storage employs advanced security features such as access controls and encryption at rest to protect user profile pictures and media assets stored within CipherWeb.

3.5 Integration with Firebase: Integration with Firebase backend services is a key component of design, providing scalability, reliability, and seamless operation. Integration points include:

- Authentication Integration: CipherWeb integrates with Firebase Authentication to handle user registration, login, and access control, ensuring secure authentication mechanisms are in place.
- Real-Time Database Integration: Firebase Real-Time Database manages user data, cryptographic keys, and encryption histories, enabling seamless data synchronization and collaboration within CipherWeb.
- Cloud Storage Integration: Firebase Cloud Storage securely stores user profile pictures and media assets, ensuring efficient storage and retrieval while maintaining data integrity and availability.

Through comprehensive system design, CipherWeb aims to provide users with a robust, scalable, and secure cryptographic platform that meets their needs effectively and ensures a seamless user experience.

3.5 Module Division

1. Authentication Module:
   - Responsible for user authentication mechanisms, including registration, login, and password recovery.
   - Integrates with Firebase Authentication to ensure secure access control to CipherWeb's functionalities.
   - Provides options for email/password authentication, social login, and federated identity providers.

2. Cryptographic Algorithms Module:
   - Implements the 10 cryptographic algorithms offered by CipherWeb, including encryption and decryption processes.
   - Each algorithm is encapsulated with in its module, allowing for easy integration and extensibility.
   - Provides functionalities for users to select the desired algorithm and perform cryptographic operations.

- User Profile Module:
  - Manages user profile information, including user details, preferences, and settings.
  - Allows users to update their profile information, change passwords, and manage account settings.
  - Integrates with Firebase Authentication to synchronize user profile data securely.

3. Encryption History Module:
   - Tracks and manages the encryption histories of users, recording details such as timestamp, the algorithm used, and encrypted messages.
   - Enables users to view their encryption history, search for specific entries, and manage historical records.

4. User Interface (UI) Module:

- Designs and implements the user interface of CipherWeb, focusing on visual aesthetics, responsiveness, and usability.
- Incorporates interactive features using JavaScript and JavaScript Canvas to Enhance user engagement and experience.
- Ensures compatibility across desktop and mobile devices catering to the diverse needs of users.

5. Data Management Module:

- Handles the storage and retrieval of user data, cryptographic keys, and encryption histories within CipherWeb.
- Integrates with Firebase Realtime Database and Firebase Cloud Storage for efficient data management and synchronization.
- Implements data validation and error handling mechanisms to ensure data integrity and reliability.

6. Security Module:

- Implements security measures to safeguard user data, communications and system integrity.
- Utilizes encryption techniques to protect sensitive data including user passwords and cryptographic keys.
- Ensures secure communication between client devices and the backend server using **SSL/TLS** encryption.

7. Integration Module:

- Facilitates integration with Firebase backend services including authentication, real-time database management, and cloud storage.
- Handles communication between frontend and backend components ensuring seamless operation and scalability.

3.6 **Data Dictionary**

1. User Profile Data:

- Fields:
- Username: The unique identifier for each user.
- Email: The email address associated with the user's account.
- Password: The hashed password for user authentication.
- Profile Picture: The image uploaded by the user to represent their profile.
- Description: Stores user profile information, including username, email, password, and profile picture.

2. Cryptographic Key Data:

- Fields:
- Algorithm: The cryptographic algorithm used for encryption and decryption.
- Key**:** The cryptographic key generated for the selected algorithm.
- Description: Stores cryptographic keys generated by CipherWeb for encrypting and decrypting messages.

3. Encryption History Data:

- Fields:
- Timestamp: The date and time when the encryption was performed.
- Algorithm: The cryptographic algorithm used for encryption.
- Encrypted Message: The cipher text resulting from the encryption process.
- Description: Records the encryption history of users, including details such as timestamp, algorithm used, and encrypted message.

4. User Session Data:

- Fields:
- SessionID: The unique identifier for each user session.
- UserID: The identifier for the user associated with the session.
- Last Active: The time stamp indicating the last activity time for the session.

- Description: Tracks active user sessions within CipherWeb, enabling session management and authentication.

5. Error Log Data:
   - Fields:
     - ErrorID: The unique identifier for each error log entry.
     - Timestamp: The date and time when the error occurred.
     - Error Message: The description of the error encountered.
     - Description: Stores error log entries generated by CipherWeb, including details such as timestamp and error message for troubleshooting and debugging purposes.

6. System Configuration Data:
   - Fields
     - ConfigurationID: The unique identifier for each system configuration entry.
     - Setting Name: The name of the configuration setting.
     - Setting Value: The value assigned to the configuration setting.
     - Description: Stores system configuration settings for CipherWeb, allowing for customization and adjustment of various system parameters.

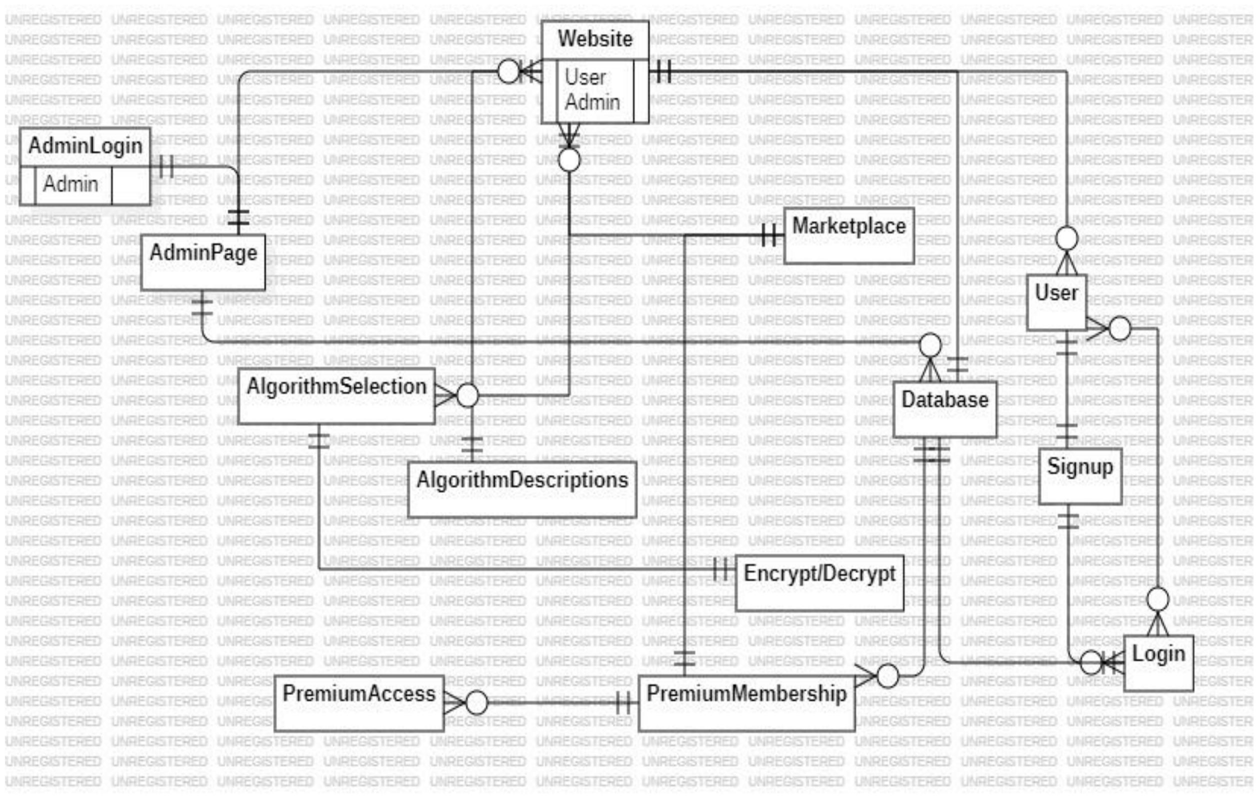
7. Session Token Data:
   - Fields:
     - Token**ID:** The unique identifier for each session token.
     - UserID: The identifier for the user associated with the token.
     - Expiry Time: The time stamp indicating the expiration time for the token.
     - Description: Stores session tokens generated for user authentication and authorization within CipherWeb.

CHAPTER 3

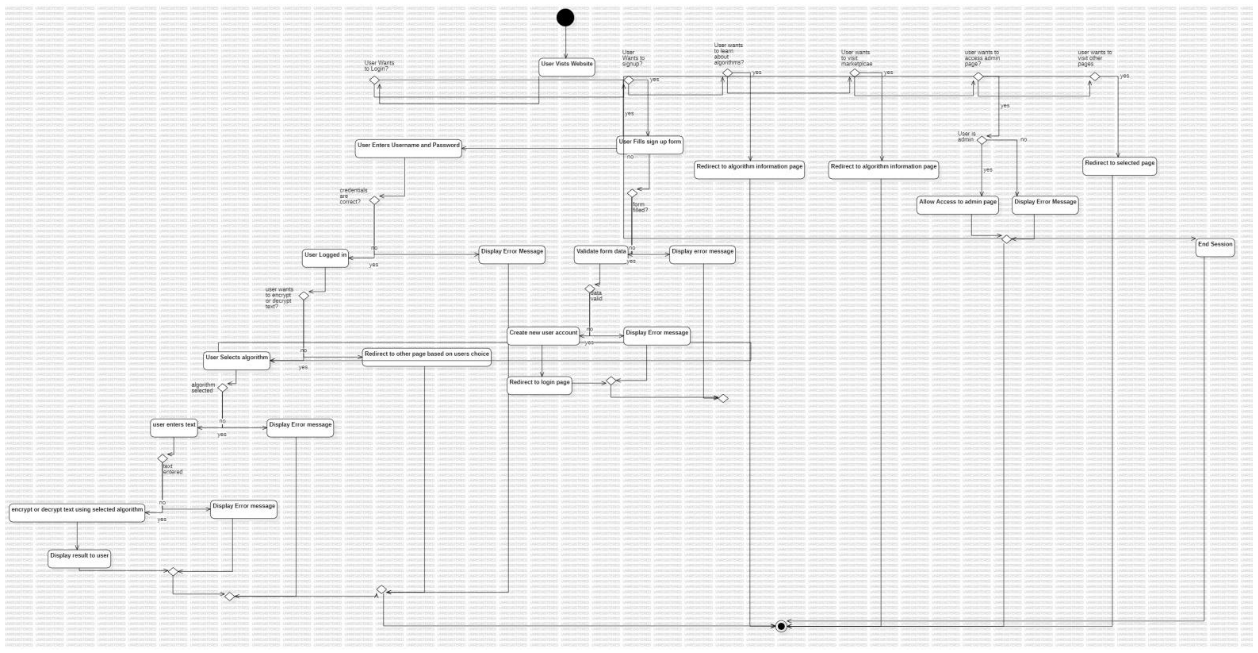
SYSTEM DESIGN

Sr.No	**Diagram**
1.	E-R Diagram
2.	Activity Diagram
3.	Class Diagram
4.	Use Case Diagram
5.	Sequence Diagram
6.	DFD Diagram

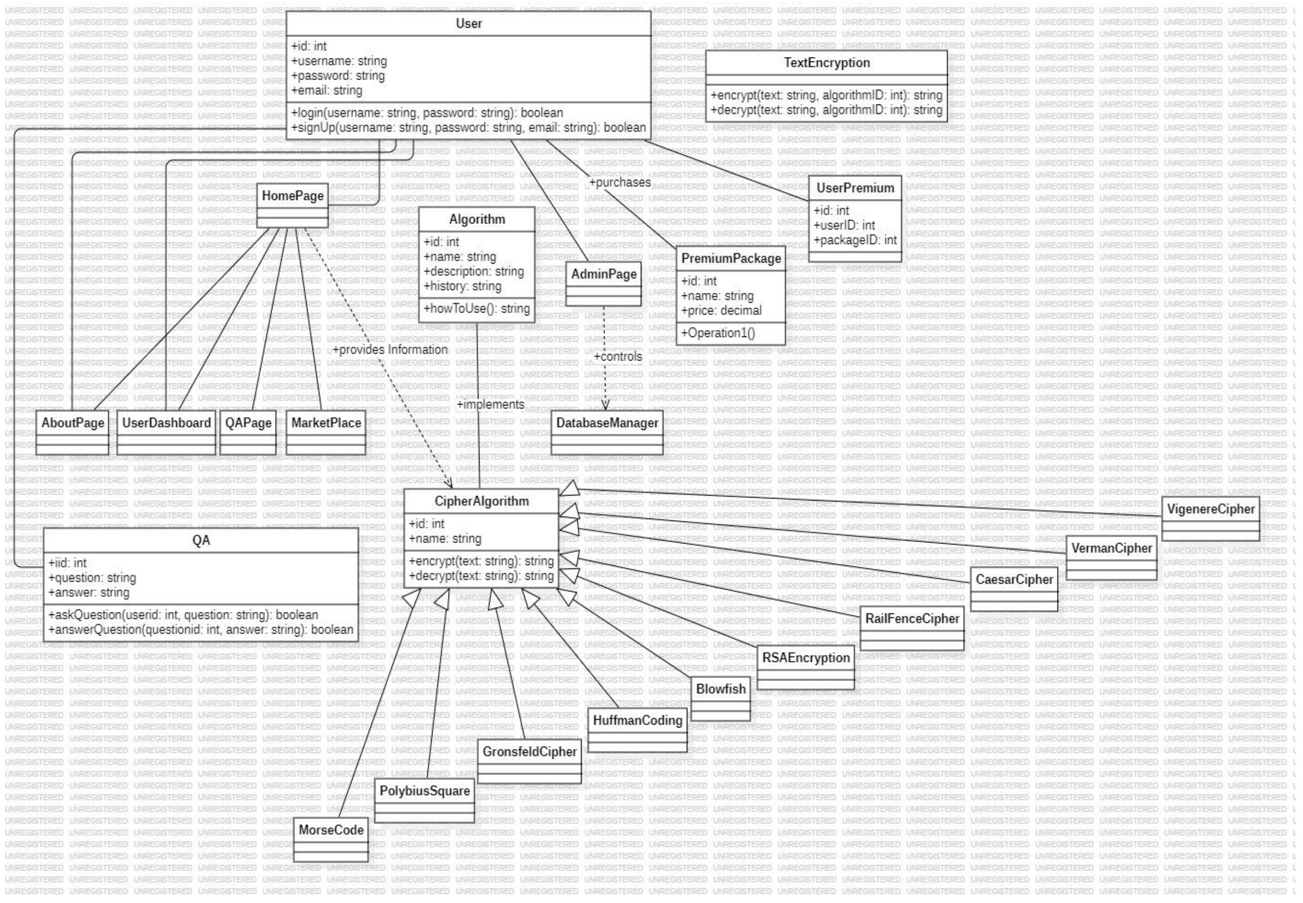
1. E-R Diagrams



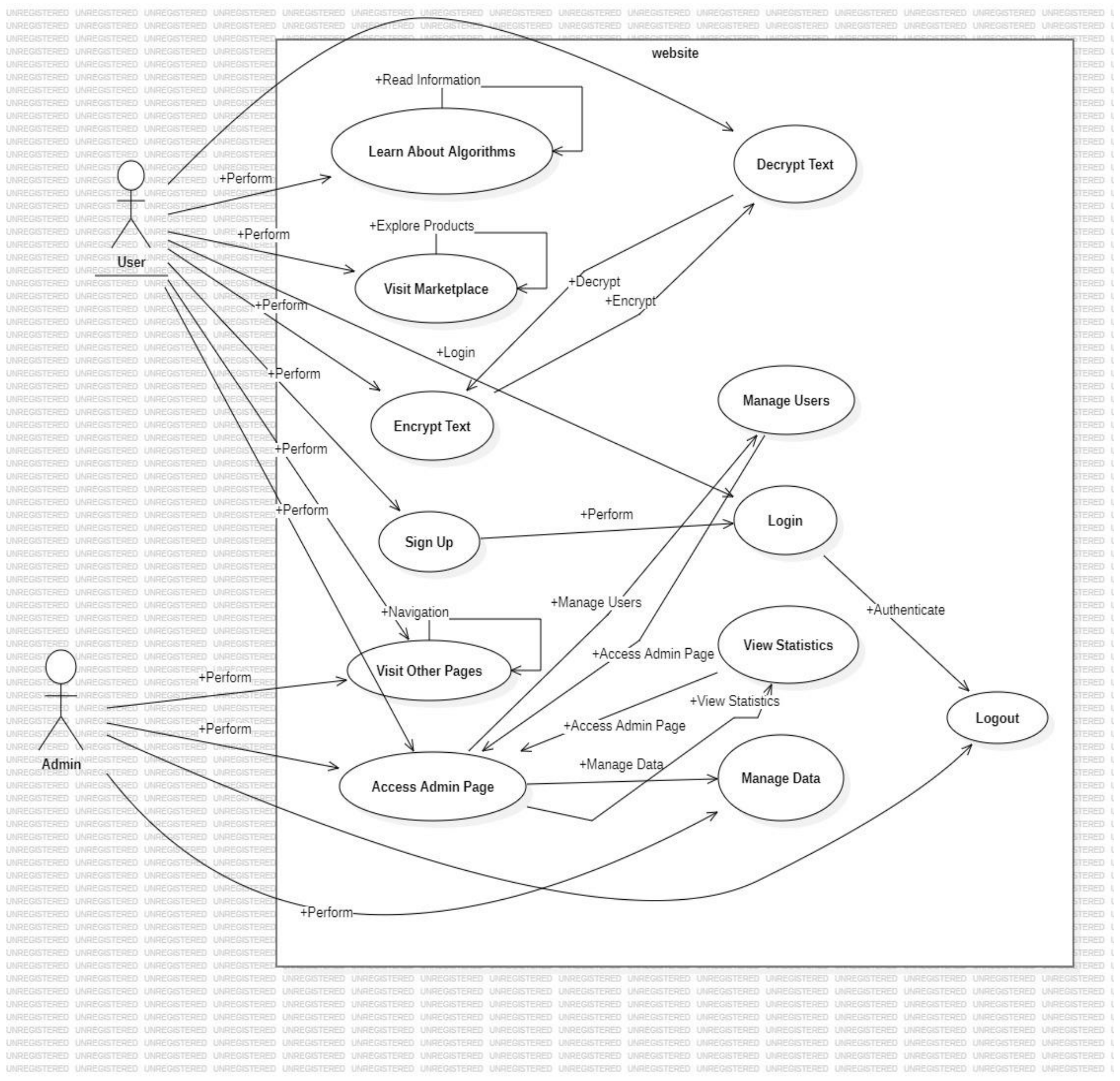
2. Activity Diagram



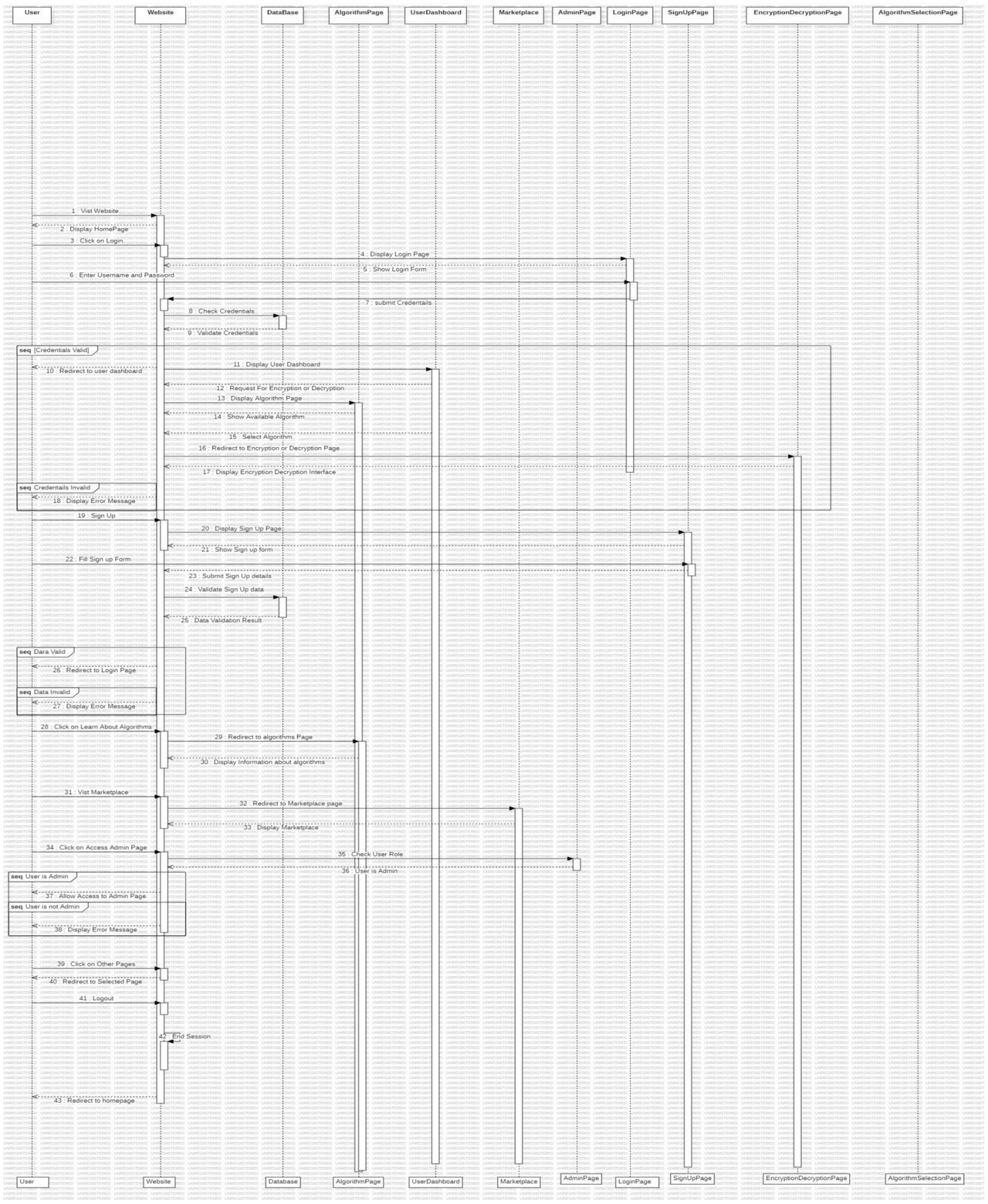
3. Class Diagram



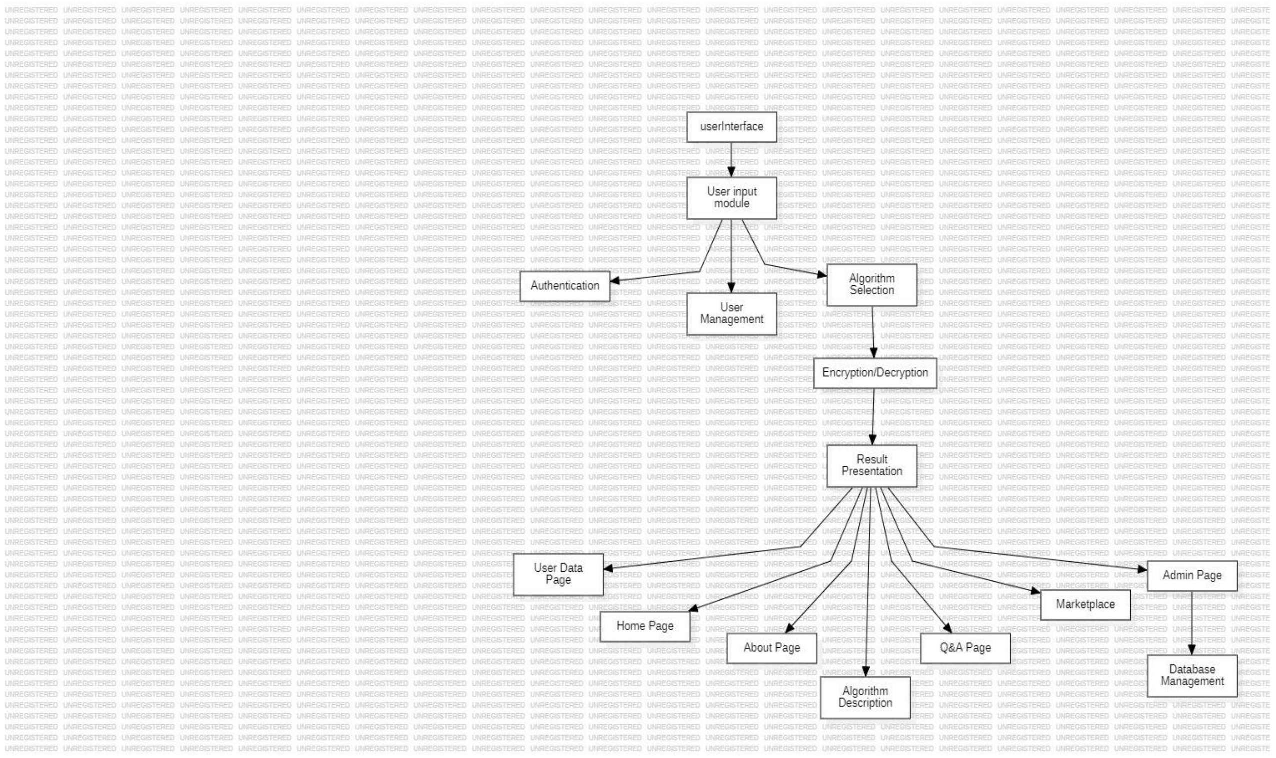
4.Use Case Diagram



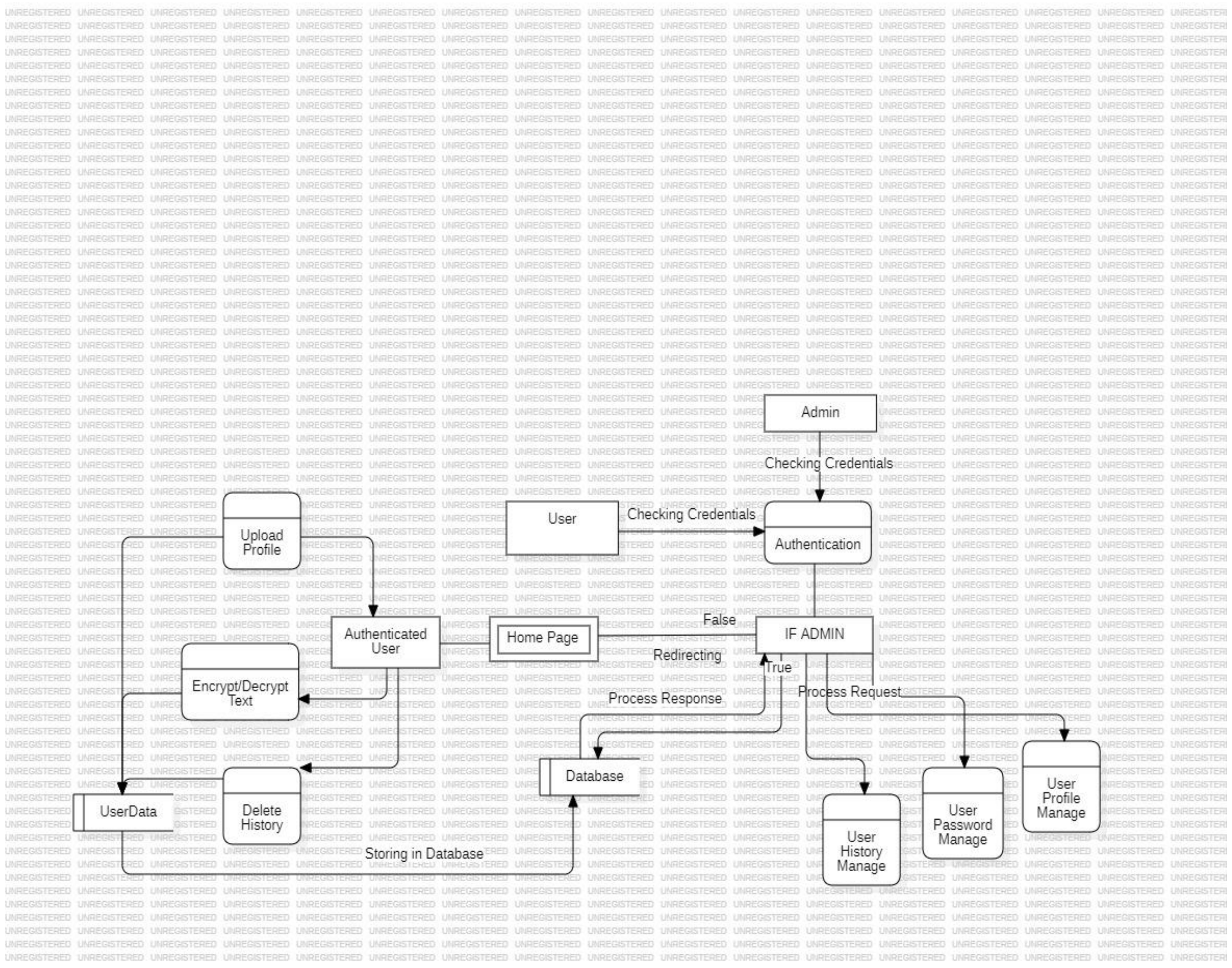
5.Sequence Diagram


User
Website
DataBase
AlgorithmPage
UserDashboard
Marketplace
AdminPage
LoginPage
SignUpPage
EncryptionDecryptionPage
AlgorithmSelectionPage
1 : Vist Website
2 : Display HomePage
3 : Click on Login
4 : Display Login Page
5 : Show Login Form
6 : Enter Username and Password
7 : submit Credentails
8 : Check Credentials
9 : Validate Credentials
seq [Credentials Valid]
10 : Redirect to user dashboard
11 : Display User Dashboard
12 : Request For Encryption or Decryption
13 : Display Algorithm Page
14 : Show Available Algorithm
15 : Select Algorithm
16 : Redirect to Encryption or Decryption Page
17 : Display Encryption Decryption Interface
seq Credentails Invalid
18 : Display Error Message
19 : Sign Up
20 : Display Sign Up Page
21 : Show Sign up form
22 : Fill Sign up Form
23 : Submit Sign Up details
24 : Validate Sign Up data
25 : Data Validation Result
seq Dara Valid
26 : Redirect to Login Page
seq Data Invalid
27 : Display Error Message
28 : Click on Learn About Algorithms
29 : Redirect to algorithms Page
30 : Display Information about algorithms
31 : Vist Marketplace
32 : Redirect to Marketplace page
33 : Display Marketplace
34 : Click on Access Admin Page
35 : Check User Role
36 : User is Admin
seq User is Admin
37 : Allow Access to Admin Page
seq User is not Admin
38 : Display Error Message
39 : Click on Other Pages
40 : Redirect to Selected Page
41 : Logout
42 : End Session
43 : Redirect to homepage
User
Website
Database
AlgorithmPage
UserDashboard
Marketplace
AdminPage
LoginPage
SignUpPage
EncryptionDecryptionPage
AlgorithmSelectionPage

4. DFD Diagram(Level-0)



4.1 DFD Diagram(Level-1)



Chapter 4

Implementation and Testing

4.1 Code

1. Landing Page Code

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>CipherWeb</title>
    <link rel="icon" href="/images/optimized-img/othersideicon.png"
type="image/icon type">
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/6.5.1/css/all.min.css"
        integrity="sha512-
DTOQO9RWCH3ppGqcWaEA1BIZOC6xxalwEsw9c2QQeAIftl+Vegovlnee1c9QX4TctnWMn13TZye+giMm8
e2LwA=="
        crossorigin="anonymous" referrerpolicy="no-referrer" />
    <script src="https://cdn.tailwindcss.com"></script>

    <link rel="stylesheet" href="css/formstyle1.css">
    <link rel="stylesheet" href="css/main.css">

</head>

<body id="body">



    <header class="header">
        <nav class="navbar">
            <h2 class="logo">
                <a href="/LandingPage/landing-page.html">
                    <canvas id="canvas1"></canvas>


                </a>
            </h2>


            <input type="checkbox" id="menu-toggle" />
            <label for="menu-toggle" id="hamburger-btn">
                <svg xmlns="http://www.w3.org/2000/svg" height="24" viewBox="0 0
24 24" width="24">
                    <path d="M3 12h18M3 6h18M3 18h18" stroke="currentColor"
stroke-width="2" stroke-linecap="round" />
                </svg>
            </label>

            <img id="avatarButton" type="button" data-dropdown-
toggle="userDropdown"
                data-dropdown-placement="bottom-start" class="rounded-full w-10
h-10 cursor-pointer ring-[green] ring-2"
                src="https://media.istockphoto.com/id/1130884625/vector/user-
member-vector-icon-for-ui-user-interface-or-profile-face-avatar-app-in-circle-
design.jpg?s=612x612&w=0&k=20&c=1ky-gNHiS2iyLsUPQkxAtPBWH1BZt0PKBB1WBtxQJRE="
                alt="User dropdown">

            <!-- Dropdown menu -->
            <div class="userDropdownShow" id="userDropdown" class="z-10 shadow
rounded-lg">
                <div class="px-4 py-3 text-gray-900 text-sm dark:text-white">
                    <div id="user-email" class="font-medium truncate">User Not
Login! </div>
                    <hr color="white">
                </div>
                <ul id="userloggedin" class="py-2 text-gray-700 text-sm
dark:text-gray-200"
                    aria-labelledby="avatarButton">
                    <li>
                        <a href="/dashboard.html" class="block px-4 py-
2">Dashboard</a>
                        <hr color="white">
                    </li>
                    <li>
                        <a href="/history.html" class="block px-4 py-
2">History</a>
                        <hr color="white">
                    </li>

                </ul>
                <div id="signout" class="py-1">
                    <li class="block px-4 py-2 text-sm">Sign
                        out</li>
                </div>
            </div>
            <ul class="links">


                <li><a href="/LandingPage/landing-page.html">Home</a></li>
                <li><a href="/About/about.html">About Us</a></li>
                <li><a href="/Services/services.html">Services</a></li>
                <li><a href="/MarketPlace/marketplace.html">Marketplace</a></li>
                <li><a href="/Contact/contact.html">Contact Us</a></li>
                <li><a href="/Contact/contact.html"></a></li>
                <li id="menu-products">
                    <a href="#">Products</a>
                    <ul id="dropdown-products">
                        <li><a href="/Cryptography-text-all-files/Caesar
cipher.html">Caesar-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-
files/RSA/rsa.html">RSA-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-
files/Morse/morse.html">Morse-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-
files/Vernam.html">Vernam-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-files/Vigenère
cipher.html">Vigenère-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-files/RailFence
Trail.html">RailFence-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-files/Polybius
Square/index.html">Polybius
                                Square-Cipher</a>
                        </li>
                        <li><a href="/Cryptography-text-all-
files/Huffman/huffman.html">Huffman-Cipher</a></li>
                        <li><a href="/Cryptography-text-all-
files/blowfish/BlowfishCipher.html">Blowfish-Cipher</a>
                        </li>
                        <li><a href="/Cryptography-text-all-
files/Gronsfeld/Gronsfeld.html">Gronsfeld-Cipher</a>
                        </li>
                    </ul>
                </li>
                <li><a href="/documentation/index.html">Docs</a></li>
                <form action="https://duckduckgo.com/" class="md:w-40 lg:w-66">
                    <span class="relative flex items-center group">
                        <svg aria-hidden="true" viewBox="0 0 20 20"
                            class="group-hover:fill-lime-500 group-focus:fill-
lime-500 absolute ml-3 w-4 h-4 fill-lime-400">
                            <path
                                d="M16.293 17.707a1 1 0 0 0 1.414-1.414l-1.414
1.414ZM9 14a5 5 0 0 1-5-5H2a7 7 0 0 0 7 7v-2ZM4 9a5 5 0 0 1 5-5V2a7 7 0 0 0-7
7h2Zm5-5a5 5 0 0 1 5 5h2a7 7 0 0 0-7-7v2Zm8.707 12.293-3.757-3.757-1.414 1.414
3.757 3.757 1.414-1.414ZM14 9a4.98 4.98 0 0 1-1.464 3.536l1.414 1.414A6.98 6.98 0
```

```
0 0 16 9h-2Zm-1.464 3.536A4.98 4.98 0 0 1 9 14v2a6.98 6.98 0 0 0 4.95-2.05l-
1.414-1.414Z">
                            </path>
                        </svg>
                        <input type="text" name="q" placeholder="Search docs…"
                            class="bg-lime-100 py-2 pr-2 pl-10 border border-
lime-100 hover:border-lime-200 focus:border-lime-200 rounded w-full text-lime-800
outline outline-2 outline-offset-2 outline-transparent placeholder-lime-400
focus:outline-lime-600" />
                    </span>
                    <input type="hidden" name="sites" value="spinalcms.com">
                    <input type="submit" value="Search" class="sr-only" />
                </form>


            </ul>
            <div id="nav-login" class="buttons">
                <a href="/Login/Form.html" class="login-btn1 signup">Login In</a>
            </div>
        </nav>

        <div id="toast-signout"
            class="flex items-center bg-white dark:bg-gray-800 shadow p-4
rounded-lg w-full max-w-xs text-gray-500 dark:text-gray-400"
            role="alert">
    </header>
```

2.GSAP Animation For Landing Page

```
const tl = gsap.timeline({ default: { duration: 1, ease: Expo.easeInOut, } })
tl.to(".header", {
    opacity: 1
}, 'a')

    .from(".navbar", {
        yPercent: -100,
        opacity: 0
    }, 'a').to('.navbar', {
        opacity: 1,
        yPercent: 0,
        stagger: 1,
        duration: 1,
        ease: Expo.easeInOut,
        opacity: 1,
    }, 'a')

tl.from('#hero-sect', {
    opacity: 0,
    xPercent: 100

}, 'b').to('#hero-sect', {
    xPercent: 0,
    opacity: 1,
    stagger: .1,
    duration: 1,
    ease: Power4,
}, 'b')

tl.from("#canvas2", {
    scale: 0,
}, 'c').to("#canvas2", {
    scale: 1,
    duration: 1,
    ease: Power2,
}, 'c')

const tl2 = gsap.timeline({
    scrollTrigger: {
        trigger: "#hero-sect",
        start: "top top",
        end: "bottom top",
        scrub: 2,
    },
})
tl2.to("#canvas2", {
    scale: 5,
    opacity: 0,
    stagger: .03,
    ease: Power4,
})

const tl3 = gsap.timeline({
    scrollTrigger: {
        trigger: ".main",
        start: "top top",
        end: "bottom top",
        pin: true,
        scrub: 2,
    },
})

tl3.to(".main", {
    '--circle': "0%",
    ease: Power2,
}, 'tl3a').to(".video", {
    opacity: 0.3
}, 'tl3a').from("#circularTextCanvas", {
    scale: 0.5
}, "tl3a").to("#circularTextCanvas", {
    scale: 10,
    delay: 3,
    display:"none"
})

const tl4 = gsap.timeline({
    scrollTrigger: {
        trigger: ".container3",
        start: "top top",
        end: "bottom top",
        pin: true,
        scrub: 2,
    },
})
tl4.to(".col3", {
    yPercent: -100,
    opacity: 0
})
const tl5 = gsap.timeline({
    scrollTrigger: {
        trigger: ".container2-bg",
        start: "top 100px",
        end: "-100px top",
        pin: true,
        scrub: 2,
    },
})

tl5.from(".odd", {
    xPercent: -110,
}).to(".odd", {
    xPercent: 0,
    stagger: true
})
tl5.from(".even", {
    xPercent: 110,
}).to(".even", {
    xPercent: 0,
    stagger: true
})
```

3.**Form Page :**

```
    <div id="toast-default"
        class="flex items-center bg-white dark:bg-gray-800 shadow p-4 rounded-lg
w-full max-w-xs text-gray-500 dark:text-gray-400"
        role="alert">

    </div>

    <div id="container-body">

        <div class="ocean">

            <div class="wave">

            </div>
            <div class="wave">

            </div>
        </div>
        <!-- Log In Form Section -->
        <section>

            <div id="message"></div>


            <div class="container" id="container">
                <div class="form-container sign-up-container">
                    <form action="#">
                        <h1 class="form-head">Sign Up</h1>
                        <div class="social-container">
                            <a id="githubredirect-signup" class="social"><i
class="fa-github fab"></i></a>
                            <a id="facebookredirect-signup" class="social"><i
class="fa-facebook fab"></i></a>
                            <a id="googleredirect-signup" class="social"><i
class="fa-google fab"></i></a>
                        </div>
                        <span>Or use your Email for registration</span>
                        <label>
                            <input id="name" type="text" name="username"
placeholder="Name" />
                        </label>
                        <label>
```

```
                            <input id="email" type="email" name="email"
placeholder="Email" required />
                        </label>
                        <label>
                            <input id="password" type="password" name="password"
placeholder="Password" required />
                        </label>
                        <button class="bg-green-800 pt-3 pr-8 pb-3 pl-8 text-
white" id="signup-btn" name="signup">Sign
                            Up</button>
                    </form>
                </div>
                <div class="form-container sign-in-container">
                    <form action="#">
                        <h1 class="form-head">Log In</h1>
                        <div class="social-container">
                            <a id="githubredirect-signin" class="social"><i
class="fa-github fab"></i></a>
                            <a id="facebookredirect-signin" class="social"><i
class="fa-facebook fab"></i></a>
                            <a id="googleredirect-signin" class="social"><i
class="fa-google fab"></i></a>
                        </div>
                        <span> Or log In using E-Mail Address</span>
                        <label>
                            <input type="email" id="login_email"
name="login_email" placeholder="Email" required />
                        </label>
                        <label>
                            <input type="password" id="login_password"
name="login_password" placeholder="Password"
                                required />
                        </label>
                        <a href="#">Forgot your password?</a>
                        <button name="login" id="signin" class="bg-green-800 pt-3
pr-8 pb-3 pl-8 text-white">Log
                            In</button>
                    </form>
                </div>
                <div class="overlay-container">
                    <div class="overlay">
                        <div class="overlay-left overlay-panel">
                            <h1>Log in</h1>
                            <p>Log In here if you already have an account </p>
                            <button class="mt-5 ghost" id="signIn">Log
In</button>
                        </div>
                        <div class="overlay-right overlay-panel">
                            <h1>Create, Account!</h1>
                            <p>Sign up if you still don't have an account ...
</p>
                            <button class="mt-5 ghost" id="signUp">Sign
Up</button>
                        </div>
                    </div>
                </div>
            </div>
        </section>


    </div>
```

4.DashBoard Page :

```
<div class="container">


     <h1>Dashboard</h1>

     <li>

         <img id="avatar" type="button" data-dropdown-toggle="userDropdown"
data-dropdown-placement="bottom-start"
             class="rounded-full w-20 h-20 cursor-pointer ring-[green] ring-2"
             src="https://media.istockphoto.com/id/1130884625/vector/user-
member-vector-icon-for-ui-user-interface-or-profile-face-avatar-app-in-circle-
design.jpg?s=612x612&w=0&k=20&c=1ky-gNHiS2iyLsUPQkxAtPBWH1BZt0PKBB1WBtxQJRE="
             alt="User dropdown">

         <label for="file" class="block relative m-2 px-4 py-2">
             <h2>Change Profile Pic</h2>
             <input class="cursor-pointer" accept="image/png, image/jpeg"
type="file" id="photo" /></br>
         </label>
         <div class="flex justify-center m-2">
             <button id="btn-profile-dashboard"
                 class="block relative bg-white hover:bg-[#5ffc16] rounded
text-black transition-all duration-300">Upload</button>

         </div>
         <hr color="white">
     </li>
     <div class="userdetailsdashboard">
         <li id="email-dashboard">Email: Dummy@gmail.com</li>

         <textarea name="userpersonal" class="mt-2 p-3 text-black" id=""
cols="40" rows="2"
             placeholder="Personal Information"></textarea>
     </div>
     <div class="controls-dashboard">
         <a href="/history.html"><button
                 class="block relative bg-white hover:bg-[#5ffc16] px-4 py-2
rounded text-black transition-all duration-300">Histroy
                 Tab</button></a>
     </div>
 </div>
```

Backend

1. **Firebase Authentication For Anonymous Sign in & Login :**

```
const signupBtn = document.getElementById("signup-btn")

signupBtn.addEventListener("click", (e) => {
    e.preventDefault()
    const name = document.getElementById("name").value
    const email = document.getElementById("email").value
    const password = document.getElementById("password").value

    const toastMsg = document.getElementById("toast-default")

    createUserWithEmailAndPassword(auth, email, password)
        .then((userCredential) => {
            // Signed up
            const user = userCredential.user;
            // ...

            toastMsg.innerHTML = `<div
            class="inline-flex flex-shrink-0 justify-center items-center bg-blue-100 dark:bg-blue-800 rounded-lg w-8 h-8 text-blue-500 dark:text-blue-200">
            <svg class="w-4 h-4" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 18 20">
                <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                    d="M15.147 15.085a7.159 7.159 0 0 1-6.189 3.307A6.713 6.713 0 0 1 3.1 15.444c-2.679-4.513.287-8.737.888-9.548A4.373 4.373 0 0 0 5 1.608c1.287.953 6.445 3.218 5.537 10.5 1.5-1.122 2.706-3.01 2.853-6.14 1.433 1.049 3.993 5.395 1.757 9.117Z" />
            </svg>
            <span class="sr-only">Fire icon</span>
        </div>
        <div class="font-normal text-sm ms-3">User Created !</div>
        <button type="button"
            class="inline-flex justify-center items-center bg-white hover:bg-gray-100 dark:hover:bg-gray-700 dark:bg-gray-800 -mx-1.5 -my-1.5 p-1.5 rounded-lg w-8 h-8 text-gray-400 hover:text-gray-900 dark:hover:text-white ms-auto focus:ring-2 focus:ring-gray-300 dark:text-gray-500"
            data-dismiss-target="#toast-default" aria-label="Close">
            <span class="sr-only">Close</span>
            <svg class="w-3 h-3" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 14 14">
                <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                    d="m1 1 6 6m0 0 6 6M7 7l6-6M7 7l-6 6" />
            </svg>
        </button>`
            toastMsg.classList.add("toastanime")

            setTimeout(() => {
                toastMsg.classList.remove("toastanime")
            }, 3000)

            set(ref(database, 'user/' + name), {
                name: name,
                email: email,
                password: "Hidden"
            })

            setTimeout(() => {
                window.location.href = "/LandingPage/landing-page.html"
            }, 4000)
        })
        .catch((error) => {
            const errorCode = error.code;
            const errorMessage = error.message;
            // ..
            toastMsg.innerHTML = `<div
            class="inline-flex flex-shrink-0 justify-center items-center bg-blue-100 dark:bg-blue-800 rounded-lg w-8 h-8 text-blue-500 dark:text-blue-200">
            <svg class="w-4 h-4" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 18 20">
                <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                    d="M15.147 15.085a7.159 7.159 0 0 1-6.189 3.307A6.713 6.713 0 0 1 3.1 15.444c-2.679-4.513.287-8.737.888-9.548A4.373 4.373 0 0 0 5 1.608c1.287.953 6.445 3.218 5.537 10.5 1.5-1.122 2.706-3.01 2.853-6.14 1.433 1.049 3.993 5.395 1.757 9.117Z" />
            </svg>
            <span class="sr-only">Fire icon</span>
        </div>
        <div class="font-normal text-sm ms-3">${errorMessage}</div>
        <button type="button"
            class="inline-flex justify-center items-center bg-white hover:bg-gray-100 dark:hover:bg-gray-700 dark:bg-gray-800 -mx-1.5 -my-1.5 p-1.5 rounded-lg w-8 h-8 text-gray-400 hover:text-gray-900 dark:hover:text-white ms-auto focus:ring-2 focus:ring-gray-300 dark:text-gray-500"
            data-dismiss-target="#toast-default" aria-label="Close">
            <span class="sr-only">Close</span>
            <svg class="w-3 h-3" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 14 14">
                <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                    d="m1 1 6 6m0 0 6 6M7 7l6-6M7 7l-6 6" />
            </svg>
        </button>`
            toastMsg.classList.add("toastanime")

            setTimeout(() => {
                toastMsg.classList.remove("toastanime")
            }, 3000)
        });
})

const signinBtn = document.getElementById("signin")

signinBtn.addEventListener("click", (e) => {
    e.preventDefault()

    const login_email = document.getElementById("login_email").value
    const login_password = document.getElementById("login_password").value

    const toastMsg = document.getElementById("toast-default")

    signInWithEmailAndPassword(auth, login_email, login_password)
        .then((userCredential) => {
            // Signed up
            const user = userCredential.user;
            // ...
            toastMsg.innerHTML = `<div
            class="inline-flex flex-shrink-0 justify-center items-center bg-blue-100 dark:bg-blue-800 rounded-lg w-8 h-8 text-blue-500 dark:text-blue-200">
            <svg class="w-4 h-4" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 18 20">
                      <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                          d="M15.147 15.085a7.159 7.159 0 0 1-6.189 3.307A6.713 6.713 0 0 1 3.1 15.444c-2.679-4.513.287-8.737.888-9.548A4.373 4.373 0 0 0 5 1.608c1.287.953 6.445 3.218 5.537 10.5 1.5-1.122 2.706-3.01 2.853-6.14 1.433 1.049 3.993 5.395 1.757 9.117Z" />
                  </svg>
                  <span class="sr-only">Fire icon</span>
              </div>
              <div class="font-normal text-sm ms-3">User Logged In !</div>
              <button type="button"
```

```
                    class="inline-flex justify-center items-center bg-white hover:bg-gray-100 dark:hover:bg-gray-700 dark:bg-gray-800 -mx-1.5 -my-1.5 p-1.5 rounded-lg w-8 h-8 text-gray-400 hover:text-gray-900 dark:hover:text-white ms-auto focus:ring-2 focus:ring-gray-300 dark:text-gray-500"
                    data-dismiss-target="#toast-default" aria-label="Close">
                    <span class="sr-only">Close</span>
                    <svg class="w-3 h-3" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 14 14">
                        <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                            d="m1 1 6 6m0 0 6 6M7 7l6-6M7 7l-6 6" />
                    </svg>
                </button>`
                    toastMsg.classList.add("toastanime")

                    setTimeout(() => {
                        toastMsg.classList.remove("toastanime")
                    }, 3000)
                    setTimeout(() => {
                        window.location.href = "/LandingPage/landing-page.html"
                    }, 4000)
                })
                .catch((error) => {
                    const errorCode = error.code;
                    const errorMessage = error.message;
                    toastMsg.innerHTML = `<div
                    class="inline-flex flex-shrink-0 justify-center items-center bg-blue-100 dark:bg-blue-800 rounded-lg w-8 h-8 text-blue-500 dark:text-blue-200">
                    <svg class="w-4 h-4" aria-hidden="true" xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 18 20">
                        <path stroke="currentColor" stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                            d="M15.147 15.085a7.159 7.159 0 0 1-6.189 3.307A6.713 6.713 0 0 1 3.1 15.444c-2.679-4.513.287-8.737.888-9.548A4.373 4.373 0 0 0 5 1.608c1.287.953 6.445 3.218 5.537 10.5 1.5-1.122 2.706-3.01 2.853-6.14 1.433 1.049 3.993 5.395 1.757 9.117Z" />
                    </svg>
                    <span class="sr-only">Fire icon</span>
                </div>
                <div class="font-normal text-sm ms-3">${errorMessage}</div>
                <button type="button"
                    class="inline-flex justify-center items-center bg-white hover:bg-gray-100 dark:hover:bg-gray-700 dark:bg-gray-800 -mx-1.5 -my-1.5 p-1.5 rounded-lg w-8 h-8 text-gray-400 hover:text-gray-900 dark:hover:text-white ms-auto focus:ring-2 focus:ring-gray-300 dark:text-gray-500"
                    data-dismiss-target="#toast-default" aria-label="Close">
                    <span class="sr-only">Close</span>
                    <svg class="w-3 h-3" aria-hidden="true"
xmlns="http://www.w3.org/2000/svg" fill="none" viewBox="0 0 14 14">
                        <path stroke="currentColor" stroke-linecap="round"
stroke-linejoin="round" stroke-width="2"
                            d="m1 1 6 6m0 0 6 6M7 7l6-6M7 7l-6 6" />
                    </svg>
                </button>`
                    toastMsg.classList.add("toastanime")

                    setTimeout(() => {
                        toastMsg.classList.remove("toastanime")
                    }, 3000)
                });

        })
```

2. Firebase Authentication with Google Authentication

```
const googleredirect = document.getElementById("googleredirect-signin")
const googleredirectSignup = document.getElementById("googleredirect-signup")
googleredirect.addEventListener('click', (e) => {
    signInWithRedirect(auth, provider);

    getRedirectResult(auth)
        .then((result) => {
            // This gives you a Google Access Token. You can use it to access
Google APIs.
            const credential = GoogleAuthProvider.credentialFromResult(result);
            const token = credential.accessToken;

            // The signed-in user info.
            const user = result.user;
            // IdP data available using getAdditionalUserInfo(result)
            // ...
            // console.log(user)
            setTimeout(() => {

                window.location.href = "/LandingPage/landing-page.html"
            }, 3000)

        }).catch((error) => {
            // Handle Errors here.
            const errorCode = error.code;
            const errorMessage = error.message;
            // The email of the user's account used.
            const email = error.customData.email;
            // The AuthCredential type that was used.
            const credential = GoogleAuthProvider.credentialFromError(error);
            // ...
            // console.log(errorMessage, email, credential)
        });

})
googleredirectSignup.addEventListener('click', (e) => {
    signInWithRedirect(auth, provider);

    getRedirectResult(auth)
        .then((result) => {
            // This gives you a Google Access Token. You can use it to access
Google APIs.
            const credential = GoogleAuthProvider.credentialFromResult(result);
            const token = credential.accessToken;
```

```
                // The signed-in user info.
                const user = result.user;
                // IdP data available using getAdditionalUserInfo(result)
                // ...
                // console.log(user)

            }).catch((error) => {
                // Handle Errors here.
                const errorCode = error.code;
                const errorMessage = error.message;
                // The email of the user's account used.
                const email = error.customData.email;
                // The AuthCredential type that was used.
                const credential = GoogleAuthProvider.credentialFromError(error);
                // ...
                // console.log(errorMessage, email, credential)
            });

        })
```

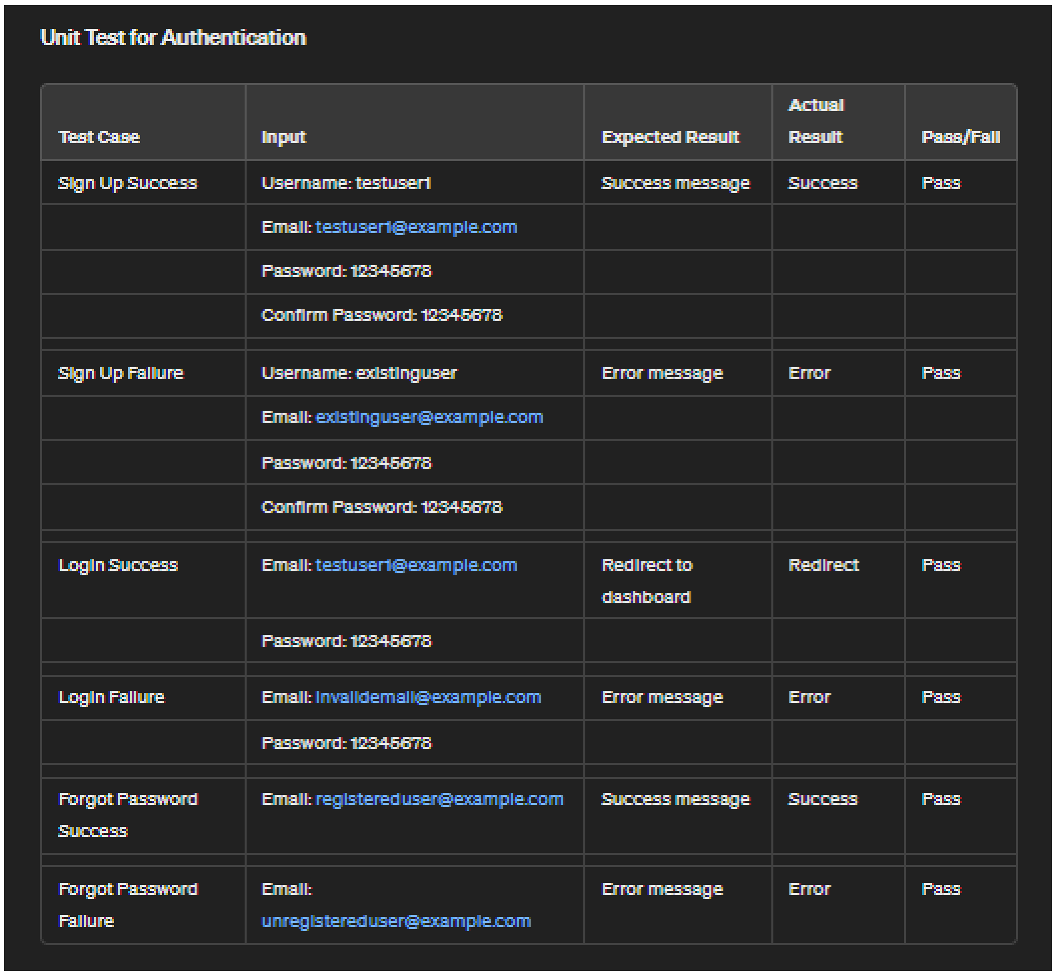
4.2 Testing Approach

4.2.1 Unit Testing

SYSTEM TESTING

Test for User Login:

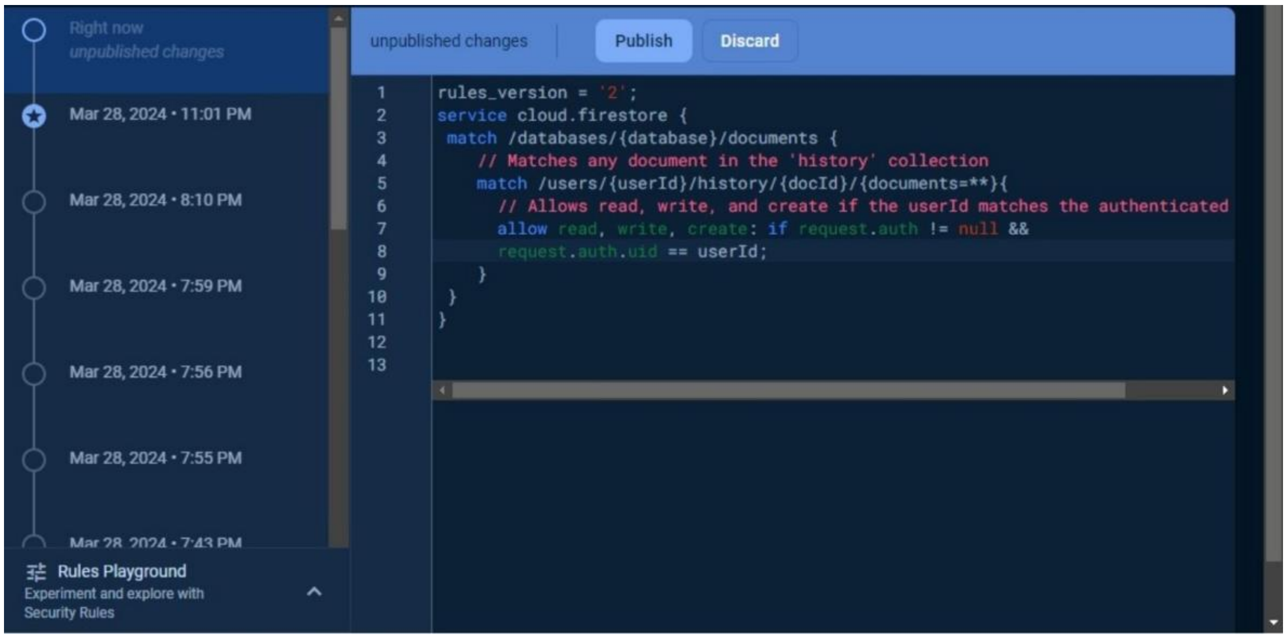
Testing admin login form: This Form is used for login of user. In this we enter user email and password if both are correct then page will open otherwise if any data is wrong it will redirect to login page and ask for user email and password.



Unit Test for Authentication

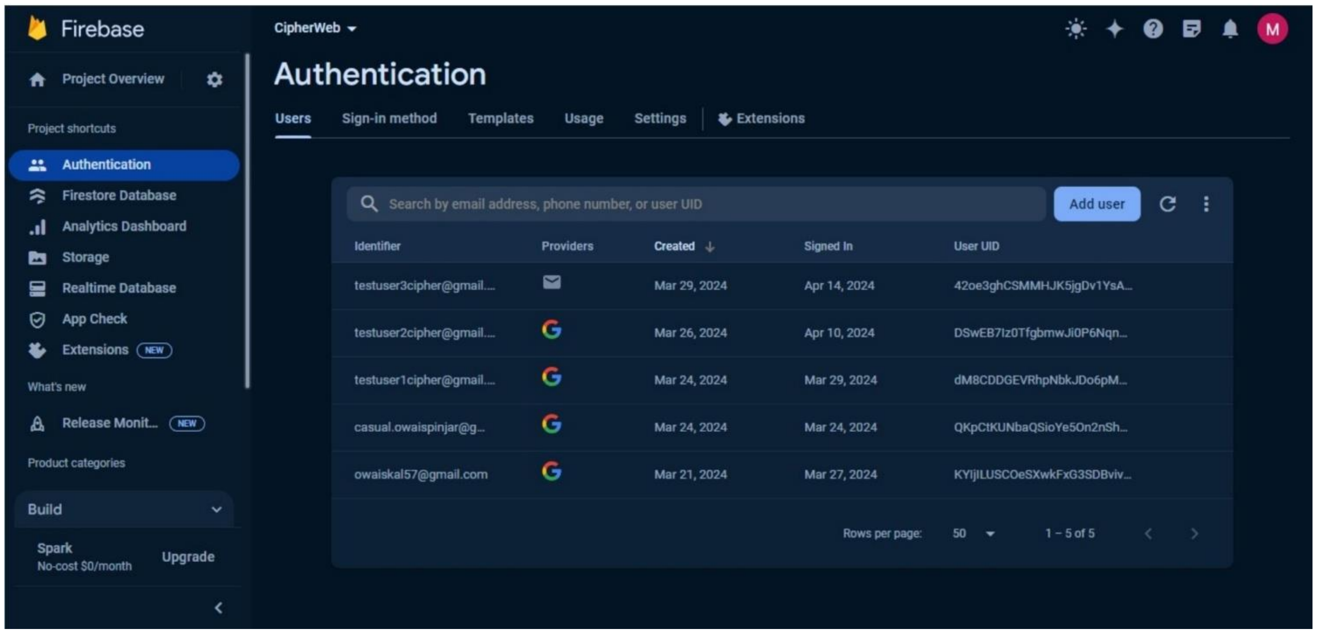
Test Case	Input	Expected Result	Actual Result	Pass/Fail
Sign Up Success	Username: testuser1	Success message	Success	Pass
	Email: testuser1@example.com			
	Password: 12345678			
	Confirm Password: 12345678			
Sign Up Failure	Username: existinguser	Error message	Error	Pass
	Email: existinguser@example.com			
	Password: 12345678			
	Confirm Password: 12345678			
Login Success	Email: testuser1@example.com	Redirect to dashboard	Redirect	Pass
	Password: 12345678			
Login Failure	Email: invalidemail@example.com	Error message	Error	Pass
	Password: 12345678			
Forgot Password Success	Email: registereduser@example.com	Success message	Success	Pass
Forgot Password Failure	Email: unregistereduser@example.com	Error message	Error	Pass

Firebase Authentication Rule



```
rules_version = '2';
service cloud.firestore {
 match /databases/{database}/documents {
    // Matches any document in the 'history' collection
    match /users/{userId}/history/{docId}/{documents=**}{
      // Allows read, write, and create if the userId matches the authenticated
      allow read, write, create: if request.auth != null &&
      request.auth.uid == userId;
    }
  }
}
```

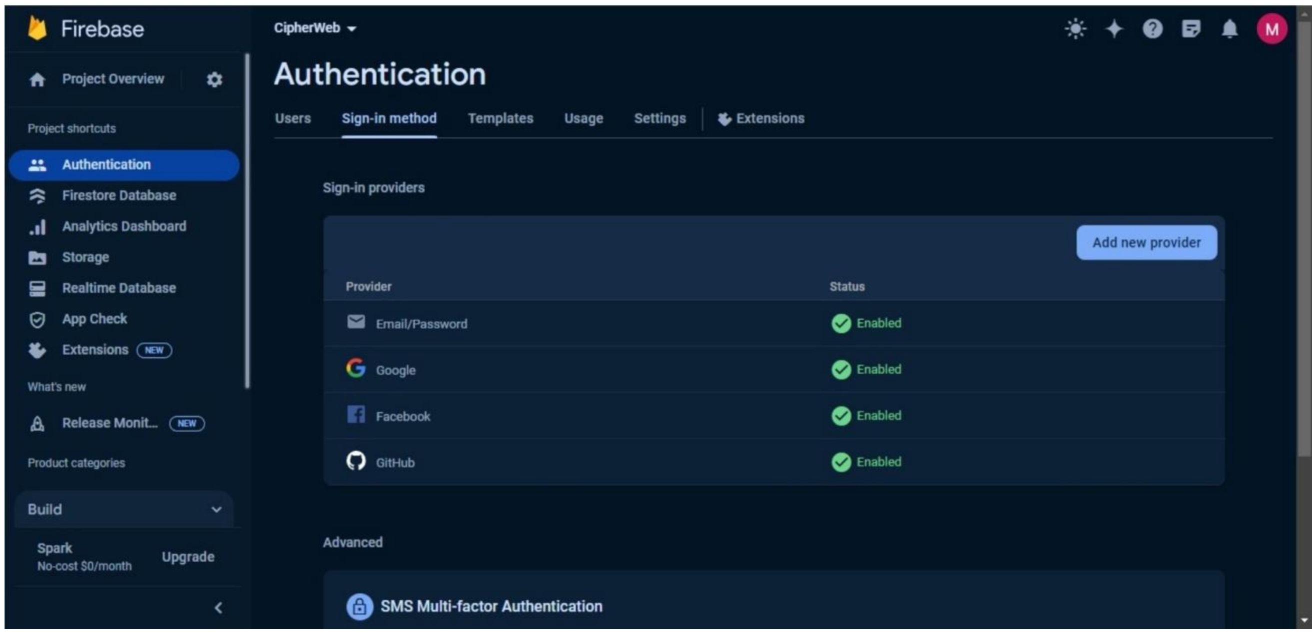
User Table in Firebase Admin Console



Identifier	Providers	Created ↓	Signed In	User UID
testuser3cipher@gmail....	✉	Mar 29, 2024	Apr 14, 2024	42oe3ghCSMMHJK5jgDv1YsA...
testuser2cipher@gmail....	G	Mar 26, 2024	Apr 10, 2024	DSwEB7Iz0TfgbmwJi0P6Nqn...
testuser1cipher@gmail....	G	Mar 24, 2024	Mar 29, 2024	dM8CDDGEVRhpNbkJDo6pM...
casual.owaispinjar@g...	G	Mar 24, 2024	Mar 24, 2024	QKpCtKUNbaQSioYe5On2nSh...
owaiskal57@gmail.com	G	Mar 21, 2024	Mar 27, 2024	KYIjILUSCOeSXwkFxG3SDBviv...

Rows per page: 50 1 – 5 of 5

Firebase Authentication Provider

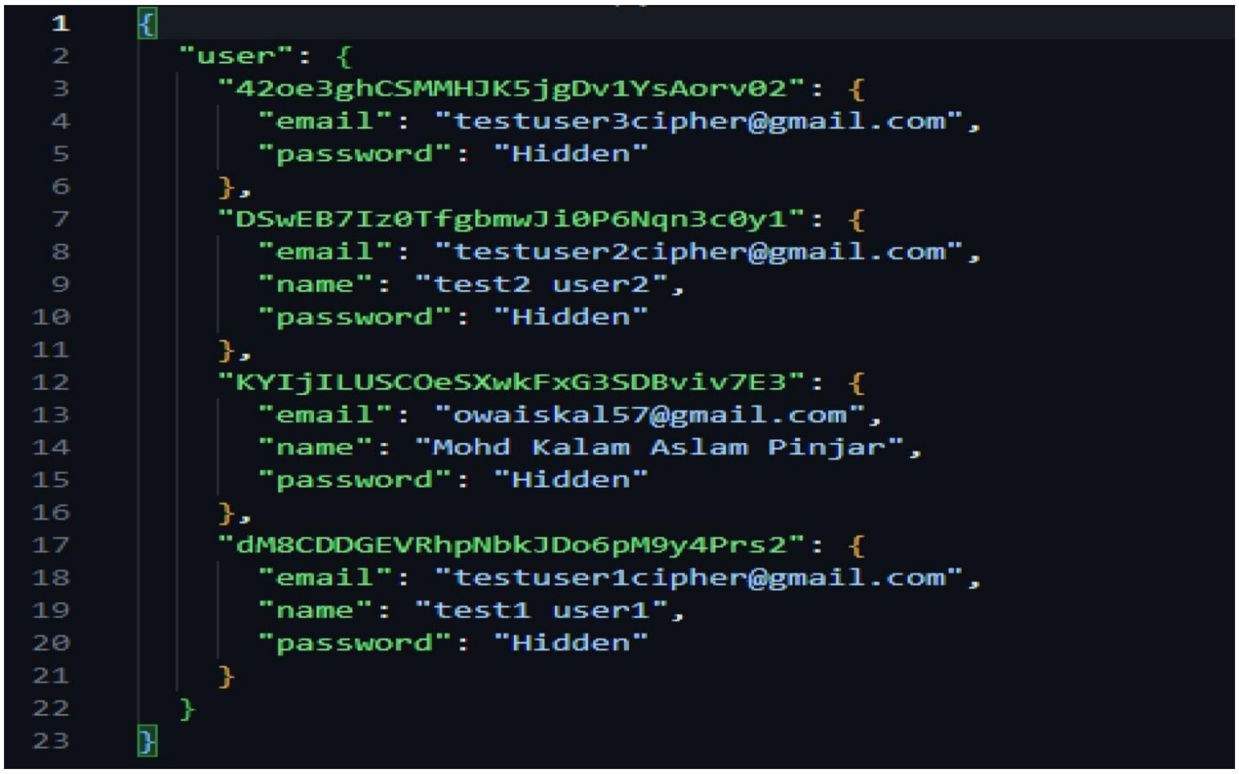


Authentication

Sign-in providers

Provider	Status
Email/Password	Enabled
Google	Enabled
Facebook	Enabled
GitHub	Enabled

Firebase Database Data(JSON Format)

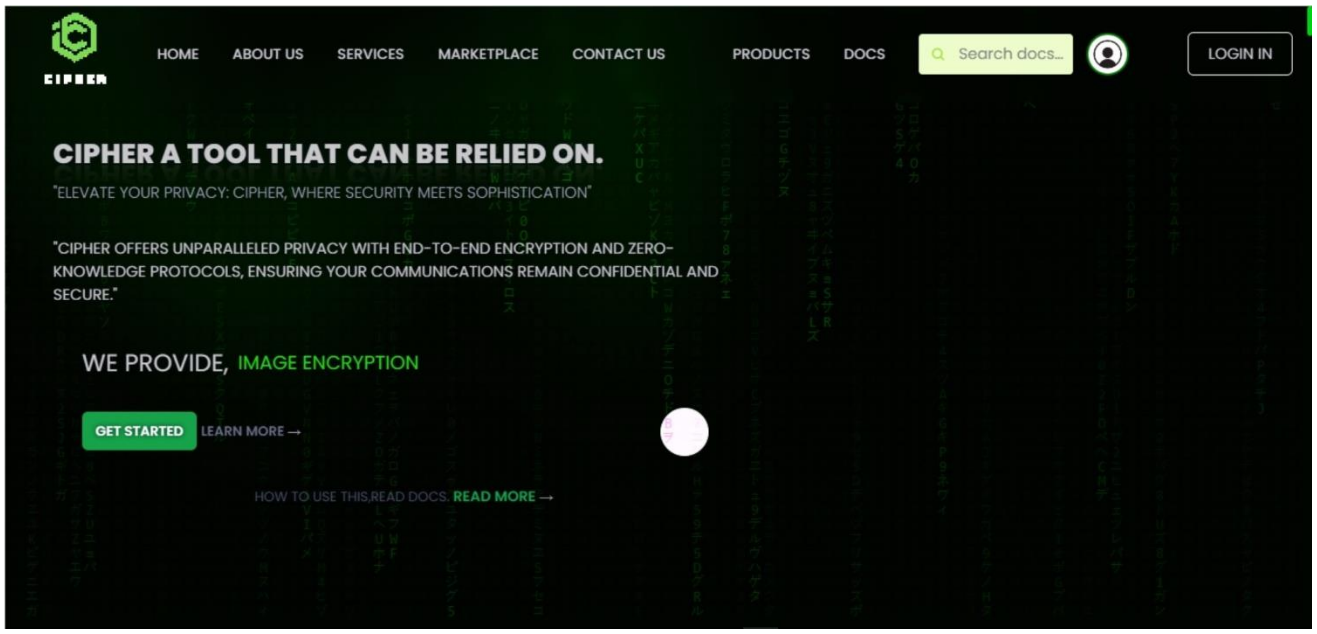


```
{
  "user": {
    "42oe3ghCSMMHJK5jgDv1YsAorv02": {
      "email": "testuser3cipher@gmail.com",
      "password": "Hidden"
    },
    "DSwEB7Iz0TfgbmwJi0P6Nqn3c0y1": {
      "email": "testuser2cipher@gmail.com",
      "name": "test2 user2",
      "password": "Hidden"
    },
    "KYIjILUSCOeSXwkFxG3SDBviv7E3": {
      "email": "owaiskal57@gmail.com",
      "name": "Mohd Kalam Aslam Pinjar",
      "password": "Hidden"
    },
    "dM8CDDGEVRhpNbkJDo6pM9y4Prs2": {
      "email": "testuser1cipher@gmail.com",
      "name": "test1 user1",
      "password": "Hidden"
    }
  }
}
```

Chapter 5

Results and Discussions

1. Homepage



CIPHER A TOOL THAT CAN BE RELIED ON.

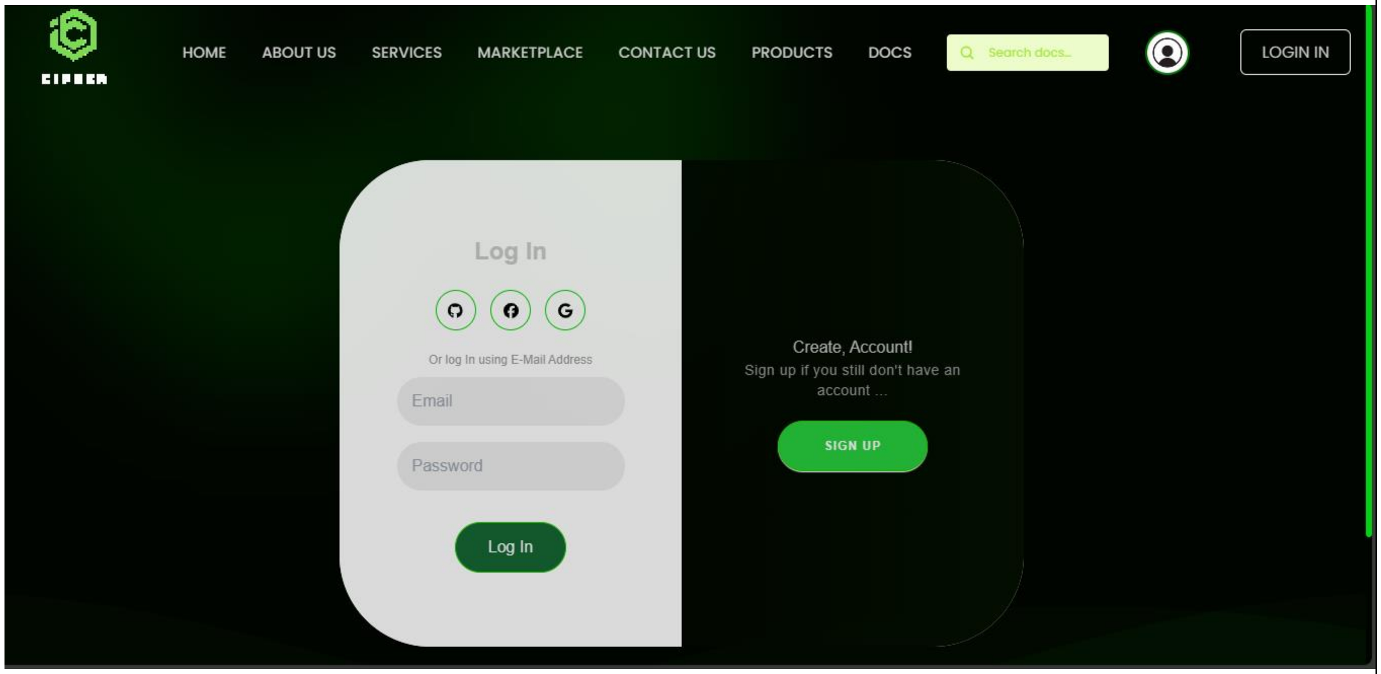
"ELEVATE YOUR PRIVACY: CIPHER, WHERE SECURITY MEETS SOPHISTICATION"

"CIPHER OFFERS UNPARALLELED PRIVACY WITH END-TO-END ENCRYPTION AND ZERO-KNOWLEDGE PROTOCOLS, ENSURING YOUR COMMUNICATIONS REMAIN CONFIDENTIAL AND SECURE."

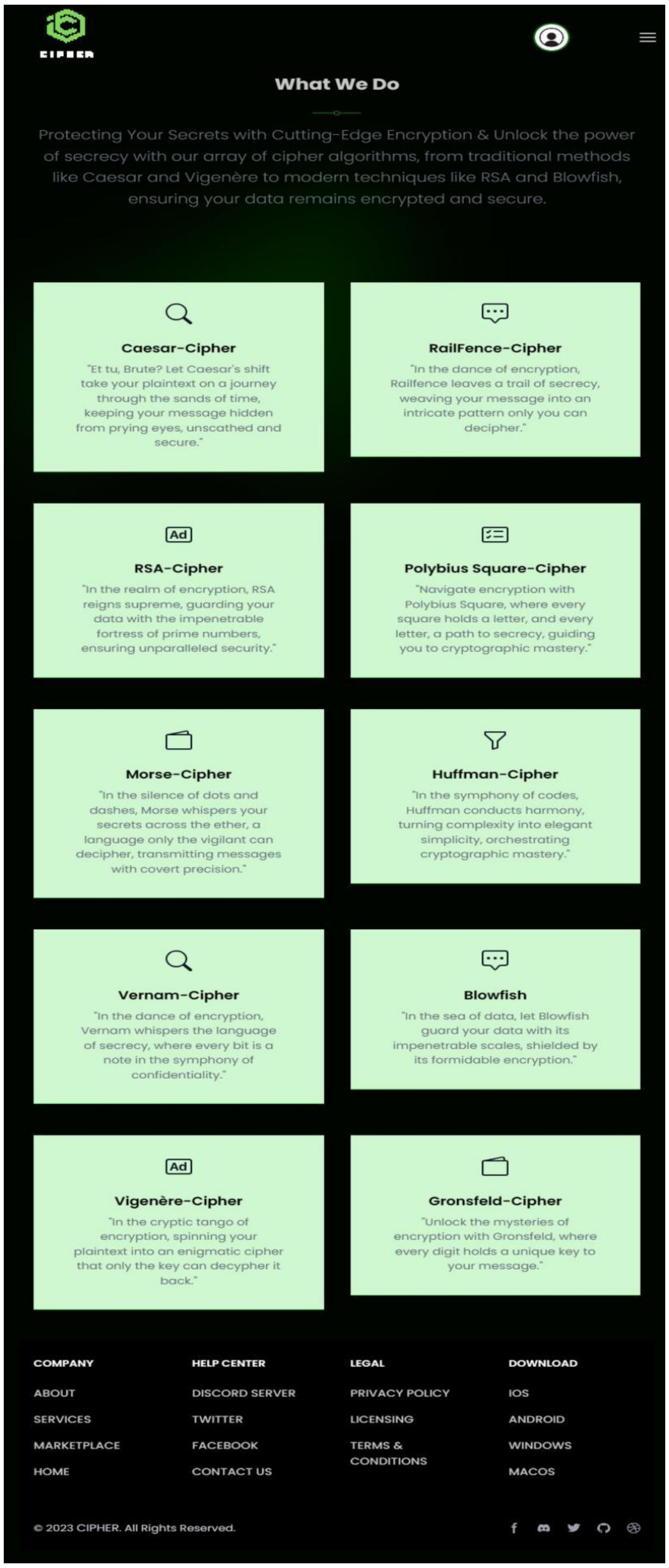
WE PROVIDE, IMAGE ENCRYPTION

HOW TO USE THIS,READ DOCS. READ MORE →

2. Login & Sign-in Page



3. Service Page



What We Do

Protecting Your Secrets with Cutting-Edge Encryption & Unlock the power of secrecy with our array of cipher algorithms, from traditional methods like Caesar and Vigenère to modern techniques like RSA and Blowfish, ensuring your data remains encrypted and secure.

Caesar-Cipher
"Et tu, Brute? Let Caesar's shift take your plaintext on a journey through the sands of time, keeping your message hidden from prying eyes, unscathed and secure."

RailFence-Cipher
"In the dance of encryption, Railfence leaves a trail of secrecy, weaving your message into an intricate pattern only you can decipher."

RSA-Cipher
"In the realm of encryption, RSA reigns supreme, guarding your data with the impenetrable fortress of prime numbers, ensuring unparalleled security."

Polybius Square-Cipher
"Navigate encryption with Polybius Square, where every square holds a letter, and every letter, a path to secrecy, guiding you to cryptographic mastery."

Morse-Cipher
"In the silence of dots and dashes, Morse whispers your secrets across the ether, a language only the vigilant can decipher, transmitting messages with covert precision."

Huffman-Cipher
"In the symphony of codes, Huffman conducts harmony, turning complexity into elegant simplicity, orchestrating cryptographic mastery."

Vernam-Cipher
"In the dance of encryption, Vernam whispers the language of secrecy, where every bit is a note in the symphony of confidentiality."

Blowfish
"In the sea of data, let Blowfish guard your data with its impenetrable scales, shielded by its formidable encryption."

Vigenère-Cipher
"In the cryptic tango of encryption, spinning your plaintext into an enigmatic cipher that only the key can decypher it back."

Gronsfeld-Cipher
"Unlock the mysteries of encryption with Gronsfeld, where every digit holds a unique key to your message."

COMPANY	HELP CENTER	LEGAL	DOWNLOAD
ABOUT	DISCORD SERVER	PRIVACY POLICY	IOS
SERVICES	TWITTER	LICENSING	ANDROID
MARKETPLACE	FACEBOOK	TERMS & CONDITIONS	WINDOWS
HOME	CONTACT US		MACOS

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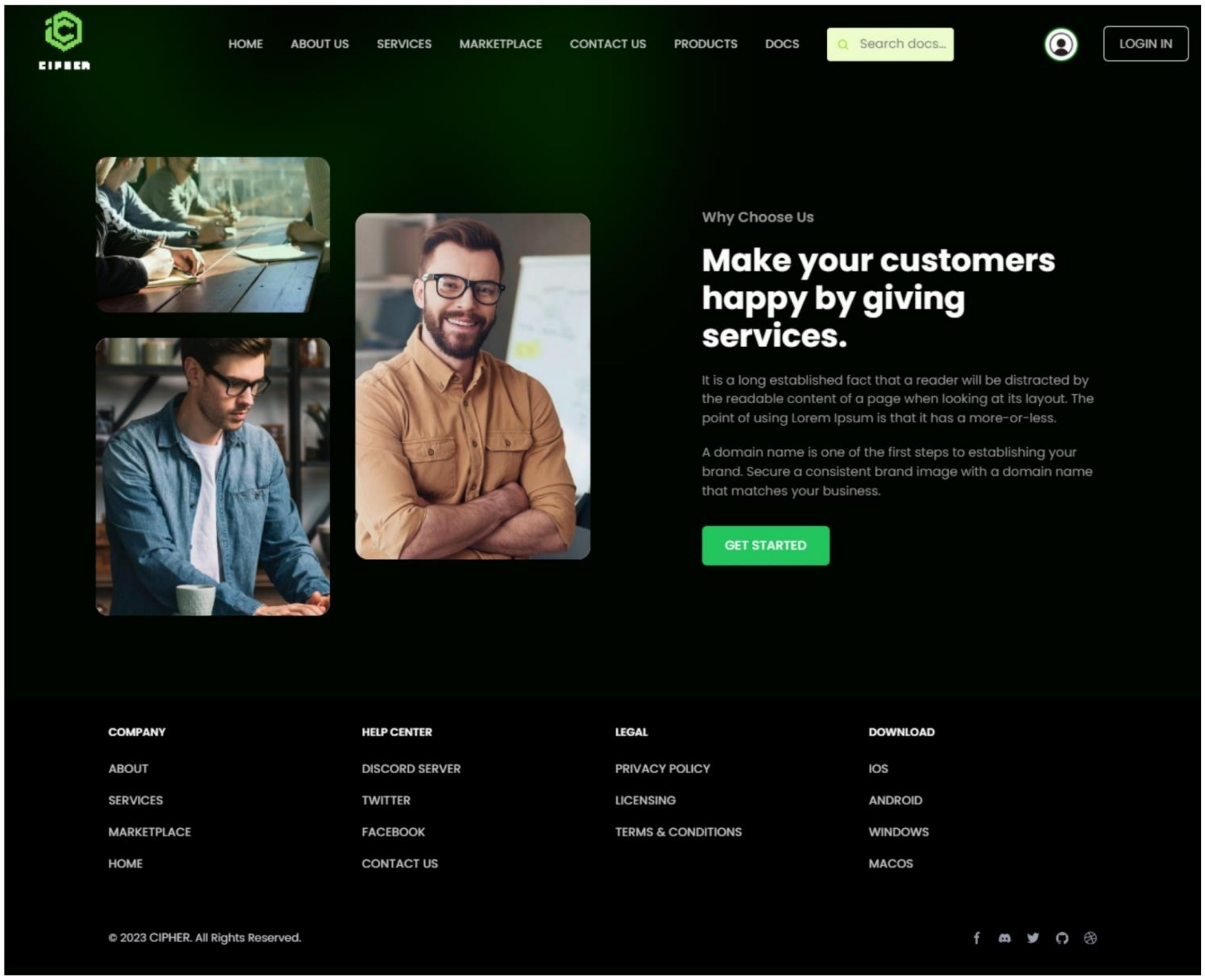
4. About Page



Why Choose Us

Make your customers happy by giving services.

It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less.

A domain name is one of the first steps to establishing your brand. Secure a consistent brand image with a domain name that matches your business.

COMPANY	HELP CENTER	LEGAL	DOWNLOAD
ABOUT	DISCORD SERVER	PRIVACY POLICY	IOS
SERVICES	TWITTER	LICENSING	ANDROID
MARKETPLACE	FACEBOOK	TERMS & CONDITIONS	WINDOWS
HOME	CONTACT US		MACOS

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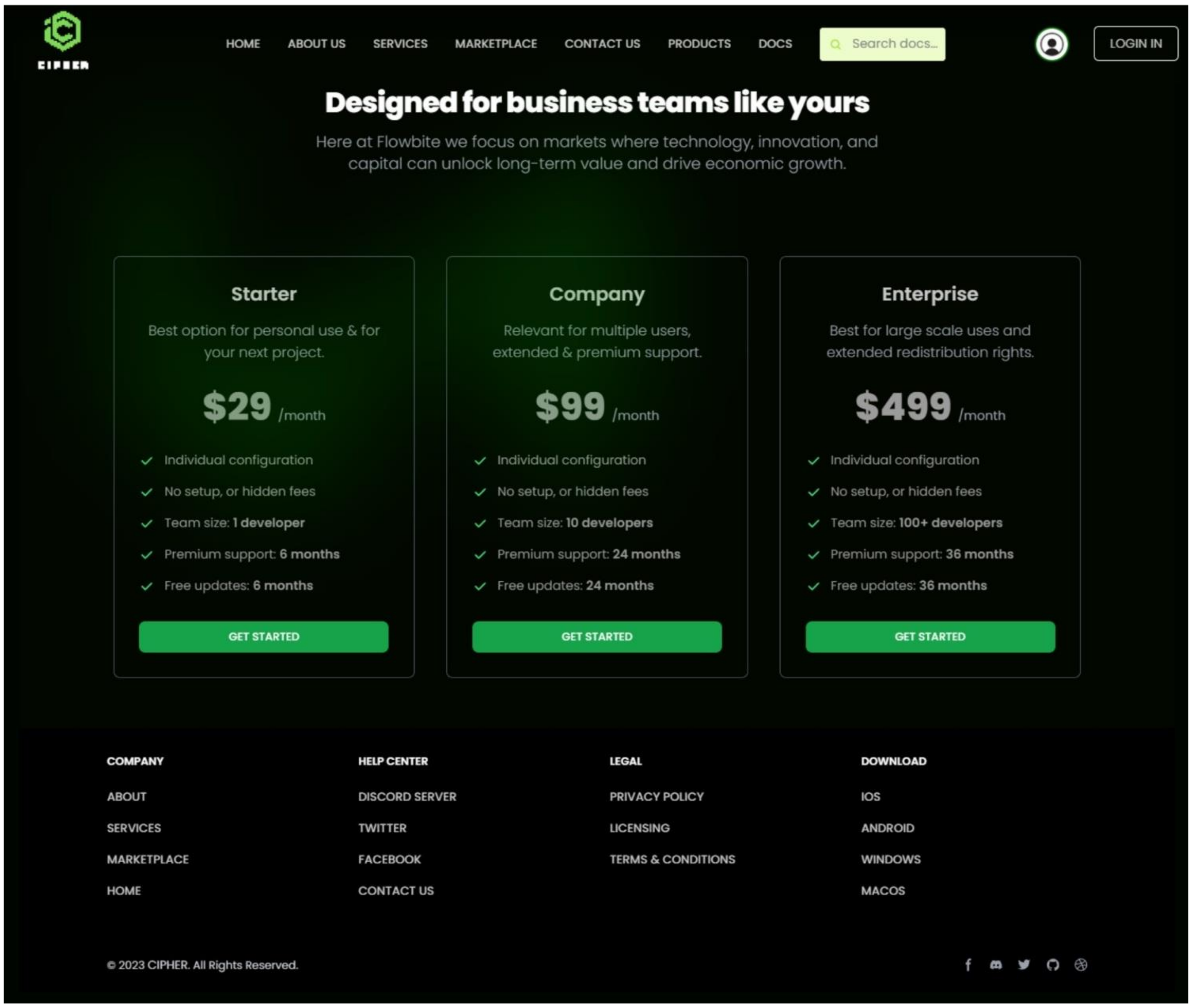
5. Marketplace Page



Designed for business teams like yours

Here at Flowbite we focus on markets where technology, innovation, and capital can unlock long-term value and drive economic growth.

Starter

Best option for personal use & for your next project.

$29 /month

- ✓ Individual configuration
- ✓ No setup, or hidden fees
- ✓ Team size: **1 developer**
- ✓ Premium support: **6 months**
- ✓ Free updates: **6 months**

GET STARTED

Company

Relevant for multiple users, extended & premium support.

$99 /month

- ✓ Individual configuration
- ✓ No setup, or hidden fees
- ✓ Team size: **10 developers**
- ✓ Premium support: **24 months**
- ✓ Free updates: **24 months**

GET STARTED

Enterprise

Best for large scale uses and extended redistribution rights.

$499 /month

- ✓ Individual configuration
- ✓ No setup, or hidden fees
- ✓ Team size: **100+ developers**
- ✓ Premium support: **36 months**
- ✓ Free updates: **36 months**

GET STARTED

COMPANY	HELP CENTER	LEGAL	DOWNLOAD
ABOUT	DISCORD SERVER	PRIVACY POLICY	IOS
SERVICES	TWITTER	LICENSING	ANDROID
MARKETPLACE	FACEBOOK	TERMS & CONDITIONS	WINDOWS
HOME	CONTACT US		MACOS

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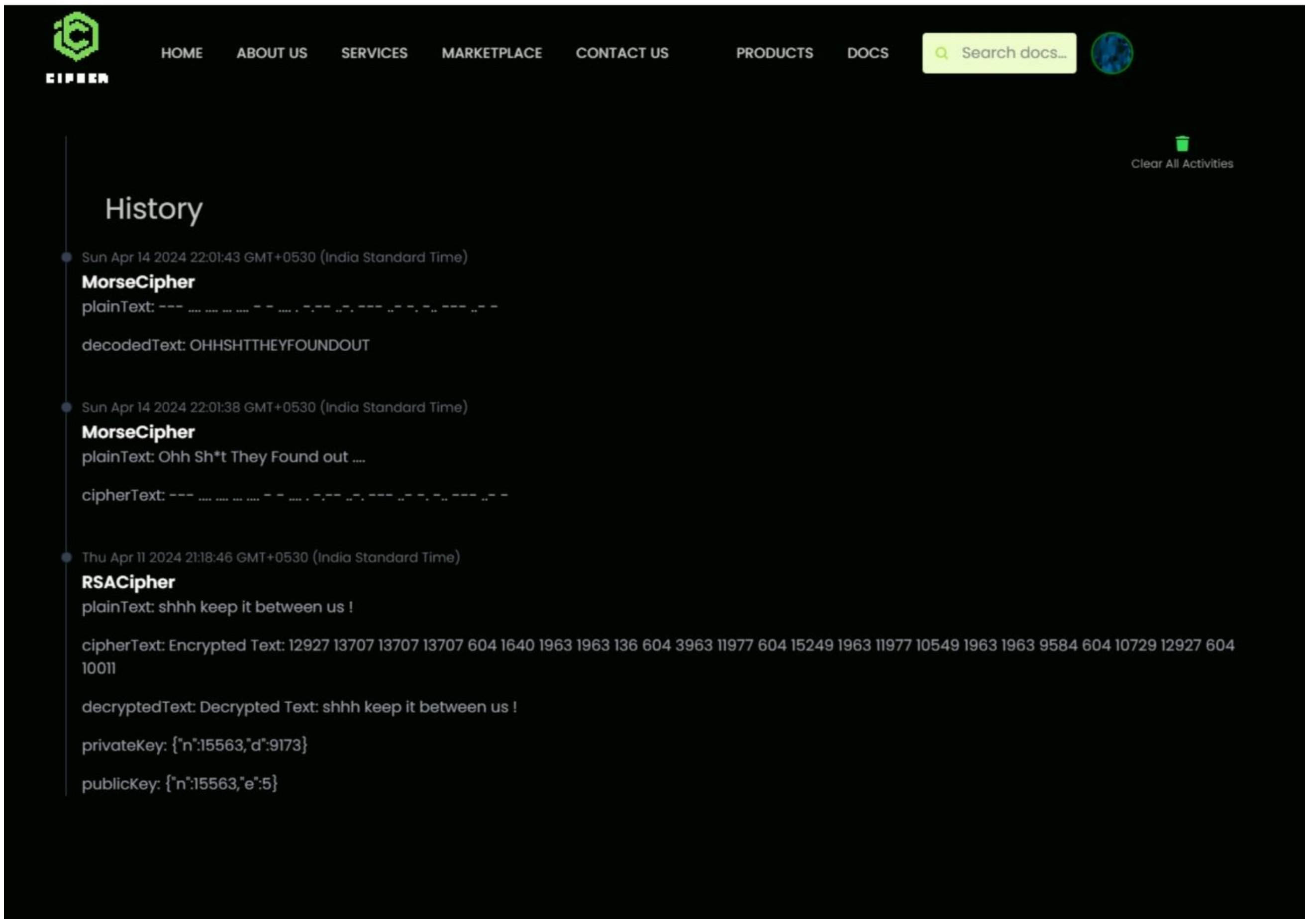
5. History Page



History

Sun Apr 14 2024 22:01:43 GMT+0530 (India Standard Time)
MorseCipher
plainText: --- .... - - .... . -.-- ..-. --- ..- -. -.. --- ..- -

decodedText: OHHSHTTHEYFOUNDOUT

Sun Apr 14 2024 22:01:38 GMT+0530 (India Standard Time)
MorseCipher
plainText: Ohh Sh*t They Found out ....

cipherText: --- .... - - .... . -.-- ..-. --- ..- -. -.. --- ..- -

Thu Apr 11 2024 21:18:46 GMT+0530 (India Standard Time)
RSACipher
plainText: shhh keep it between us !

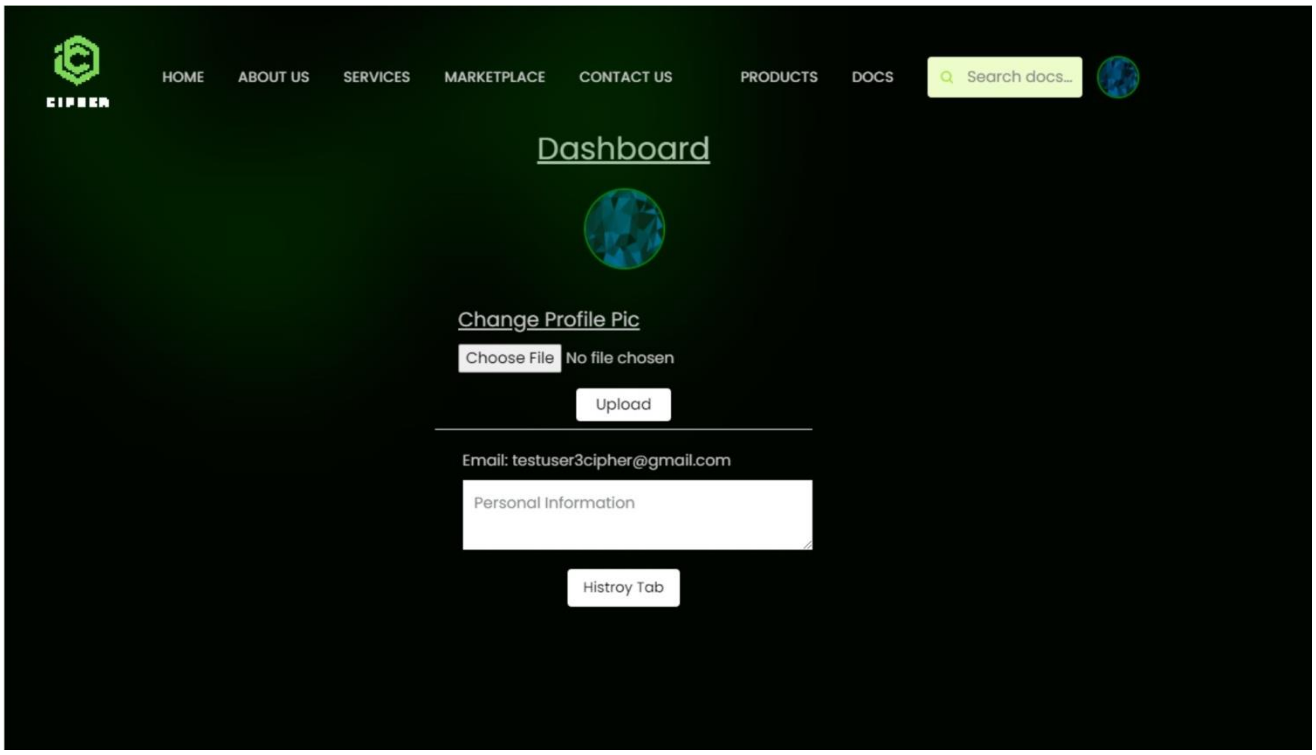
cipherText: Encrypted Text: 12927 13707 13707 13707 604 1640 1963 1963 136 604 3963 11977 604 15249 1963 11977 10549 1963 1963 9584 604 10729 12927 604 10011

decryptedText: Decrypted Text: shhh keep it between us !

privateKey: {"n":15563,"d":9173}

publicKey: {"n":15563,"e":5}

6. Dashboard Page



Email: testuser3cipher@gmail.com

SYSTEM PLANNING (GRANTT CHART).

System planning involves outlining the project's scope, objectives, tasks, and timelines to ensure efficient execution and successful completion. In the context of a Gantt chart, system planning refers to the process of creating a visual representation of the project timeline, task dependencies, and resource allocation.

The Gantt chart serves as a value able tool in system planning by providing a clear overview of the project schedule and task assignments. It helps project managers and team members understand the sequence of tasks, identify critical milestones, and allocate resources effectively. Additionally, the Gantt chart allows for the identification of potential bottlenecks or delays, enabling proactive mitigation measures to be implemented.

During system planning, key considerations include:

1. Task Identification: Determine the specific tasks required to achieve project objectives, breaking down the project into manageable components.

2. Task Sequencing: Establish the sequence in which tasks need to be completed, considering dependencies and logical order.

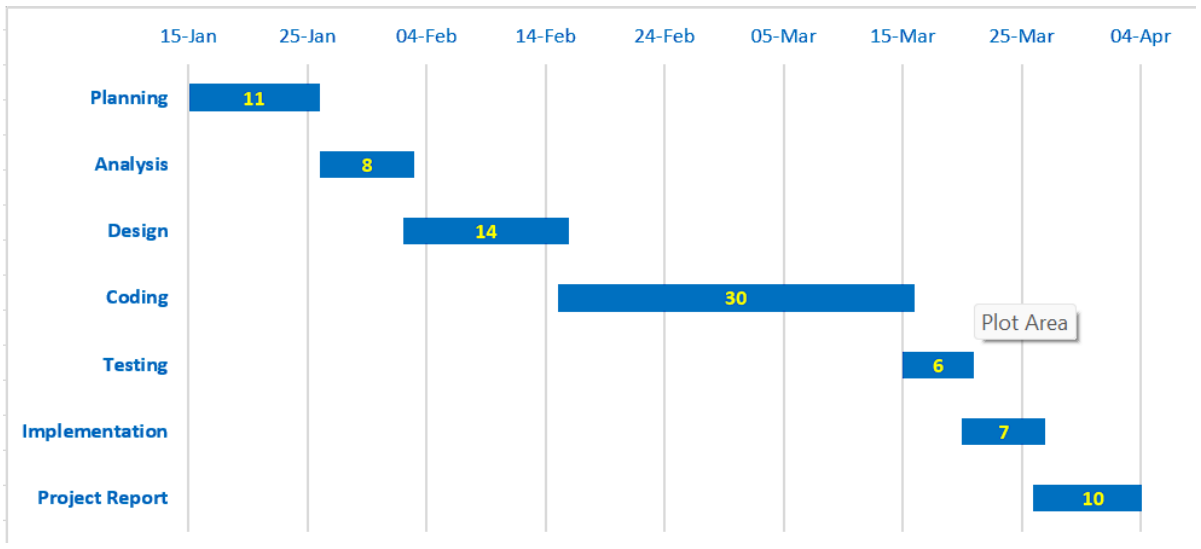
3. Resource Allocation: Assign resources, such as personnel, equipment, and budget, to each task based on availability and requirements.

4. Timeline Estimation: Estimate the duration of each task and define start and end dates, considering factors such as complexity, dependencies, and resource constraints.

5. Milestone Definition: Identify key milestones or checkpoints in the project timeline to track progress and ensure alignment with project objectives.

6. Task Dependencies: Determine dependencies between tasks, such as those that must be completed before others can start or those that can be performed concurrently.

Task	Start Date	End Date	Duration
Planning	15-Jan	25-Jan	11
Analysis	26-Jan	02-Feb	8
Design	02-Feb	15-Feb	14
Coding	15-Feb	15-Mar	30
Testing	15-Mar	20-Mar	6
Implementation	20-Mar	26-Mar	7
Project Report	26-Mar	04-Apr	10



Chapter 6

Conclusion and Future Work

In conclusion, the development of CipherWeb, a web-based cryptographic platform, has been a significant endeavour aimed at providing users with secure and user-friendly cryptographic functionalities. Throughout the development process, several key achievements have been made:

1. Comprehensive Feature Set: CipherWeb offers users a diverse selection of 10 cryptographic algorithms, ranging from classic ciphers to modern encryption methods. Users can securely encrypt and decrypt messages, manage cryptographic keys, and track their encryption histories within the platform.

2. Intuitive User Interface: The user interface of CipherWeb is designed to be intuitive and responsive, ensuring of navigation and usage across desktop and mobile devices. Tailwind CSS and JavaScript Canvas are utilized to enhance the visual aesthetics and interactivity of the platform.

3. Robust Security Measures: Security is a top priority in CipherWeb, with encryption techniques, user authentication mechanisms, and secure communication protocols implemented to safe guard user data and communications from unauthorized access and interception.

4. Seamless Integration with Firebase: CipherWeb seamlessly integrates with Firebase backend services, including authentication, real-time database management, and cloud storage. This integration enhances the reliability, scalability, and performance of the platform, ensuring a seamless user experience.

Future Work:

While CipherWeb has achieved significant milestones, there are several areas for future improvement and expansion:

1. Enhanced Algorithm Support: Continuously expand the selection of cryptographic algorithms offered by CipherWeb to include additional algorithms and encryption techniques based on user feedback and emerging cryptographic standards.

2. Advanced Security Features: Implement advanced security features such as multi-factor authentication, end-to-end encryption, and secure key management to further enhance the security posture of CipherWeb and protect user data from evolving threats.

3. Improved User Experience: Continuously refine the user interface and user experience of CipherWeb based on user feedback and usability testing. Incorporate user-friendly features, tutorials, and interactive guides to empower users to utilize cryptographic functionalities effectively.

4. Integration with External Systems: Explore opportunities for integrating CipherWeb with external systems and platforms, such as messaging applications, email clients, and collaboration tools, to expand its utility and reach a broader user base.

5. Research and Education: Serve as a platform for research and education in the field of cryptography by providing resources, tutorials, and educational content on cryptographic algorithms, techniques, and best practices.

In summary, CipherWeb represents a significant step forward in the development of cryptographic tools and platforms, offering users a secure, intuitive, and versatile solution for protecting their digital privacy and security. Through ongoing innovation and collaboration, CipherWeb will continue to evolve and adapt to meet the changing needs and challenges of the digital landscape.

Chapter 7
References

1. Ferguson, N.Schneier, **B.**&Kohno,T.(2010).Cryptography Engineering: Design Principles and Practical Applications. Wiley.

2. Katz,**J.** & Lindell,Y.(2014).Introduction to Modern Cryptography .CRC Press.

3. Stallings W.(2017).Cryptography and Network Security: Principles and Practice. Pearson.

4. Tailwind CSS Documentation. Retrieved from: https://tailwindcss.com/docs

5. Firebase Documentation Retrieved from: https://firebase.google.com/docs

6. Node.js Documentation. Retrieved from: https://nodejs.org/en/docs/

7. Google Cloud Platform Documentation. Retrieved from: https://cloud.google.com/docs

8. Cryptography Stack Exchange. Retrieved from: https://crypto.stackexchange.com/

9. GitHub Repository for CipherWeb. Available at: [https://github.com/KalamPinjar/CipherWeb]