2025 | Wisdom AI

Learning platform based on AI and Blockchain

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1 | Introduction

1.1| Purpose

The purpose of this web app as a learning platform is to combine old world and new world of web. Old world is the database and Java backend to provide stable content. The new world part is to add AI provided by a python based backend to personalize the learning plans and a Go based Blockchain to provide internal tokens and save the personal profiles.

In an ideal scenario the user can login with his existing wallet to create a user profile. When he starts, he receives a starting amount of tokens, with that he can buy learning plans, courses and also certificates. He also is able to create his own learning plan or, if he provide information, he let the AI do the creation of a personalized plan.

1.2| Scope

The scope of Wisdom AI is to merge traditional and modern web technologies into a decentralized AI-driven learning platform. It allows users to use tokens to access educational content, leverage AI for personalized learning, and secure their achievements on the blockchain.

1.3| Audience

Wisdom AI is designed for learners, educators, crypto users, corporations, and developers who want to engage in AI-powered, blockchain-secured learning experiences.

2 | Architecture

2.1| Overview

The architecture will be brought in the following parts:

- Blockchain
- AI
- Backend
- Frontend

2.2| Blockchain

2.2.1| Overview

As a Blockchain this One delivers a personal wallet to each user, either the user has already a wallet or just use a Web2-way with Login-Credentials. This Blockchain shall save not only the wallet and tokens, but also several progresses.

2.2.2| Usage

The Blockchain behind shall deliver some own cryptocurrency to be able to go deeper into the Learning Plans.

2.2.3| Smart Contracts

To make the Blockchain more useful, several smart contracts will be implemented:

- Token Interchange: A contract that allows users to exchange tokens with each other, enabling a dynamic economy within the platform.
- Initial Token Allocation: Each new user will receive an initial amount of 1,000 tokens upon registration to engage with learning plans and courses.
- Profile & Learning Progress Storage: A smart contract that records user progress, including completed courses, achievements, and personalized AI-driven learning adjustments.

- Certification Contract: Once a course is completed, a smart contract will generate a blockchain-based certificate linked to the user's wallet.

2.3| AI

The AI component of the Wisdom Learning Platform is developed using Python. It leverages machine learning models to analyze user learning behavior and provide personalized recommendations. The AI system continuously tracks user engagement, progress, and performance metrics.

To ensure a seamless learning experience, the AI records progress data in the PostgreSQL database. This includes information such as completed lessons, quiz scores, time spent on each module, and suggested next steps based on individual progress. The backend services in Java interact with the database to retrieve this data and present it dynamically to the users through the platform's frontend.

Furthermore, the AI adapts learning plans based on user performance, optimizing content recommendations and study schedules. It also identifies potential gaps in knowledge and suggests supplementary resources to enhance understanding. By utilizing Python-based AI models, the system ensures a data-driven, adaptive learning experience tailored to each user.

2.4| Learning Structure

The Wisdom Learning Platform organizes learning content into structured plans, ensuring a comprehensive and engaging educational experience. Below is the structured breakdown of the learning plans:

2.4.1| JavaScript Learning Plan

- Microcourses: Short, skill-based lessons ranging from 5 to 30 minutes.
- Full Courses: Comprehensive learning paths covering in-depth JavaScript concepts over several hours.
- Live Sessions: Webinars, workshops, and Q&A sessions with instructors.
- Quizzes & Assessments: Tests for certification and self-evaluation.
- AI-Assisted Mentoring: Personalized learning recommendations using AI.

2.5| Backend

The backend of the Wisdom Learning Platform ensures seamless user interaction, progress tracking, and blockchain integration. It consists of multiple components:

2.5.1| Backend Structure

User Management

- Store user profiles, roles (learner, creator, reviewer, admin).
- Track token balances and learning history.

Learning Plans

- Tables: `learning_plans`, `courses`, `modules`, `lessons`.
- Relations: A `learning_plan` has multiple `courses`, each `course` has `modules`, and each `module` contains `lessons`.
- Features:
  - Prerequisites & Progress Tracking.
  - AI Recommendations based on completed courses.

Blockchain Integration

- Smart contracts validate course ownership and learning progress.
- PostgreSQL stores off-chain metadata like completion timestamps.
- Users buy courses with blockchain tokens.

Payments & Transactions

- PostgreSQL tracks purchases, linked to blockchain transactions.
- Java service listens for on-chain payments and grants course access.

REST & GraphQL API

- REST for traditional API consumers (mobile/web apps).
- GraphQL for dynamic queries (e.g., fetch specific lessons).

2.6| Frontend

The frontend of the Wisdom Learning Platform provides users with an intuitive and interactive interface to navigate through their learning plans, track progress, and engage with the educational content. The frontend communicates seamlessly with the backend to deliver real-time updates and course recommendations.

2.6.1| Learning Plan Navigation

- Users can browse available learning plans categorized by topics and skill levels.
- Personalized recommendations based on AI analytics enhance the discovery of relevant courses.
- Visual indicators display progress within each learning plan, highlighting completed and pending lessons.

2.6.2| Course Interaction

- Each course consists of structured modules, lessons, quizzes, and live sessions.
- Users can bookmark courses, revisit past lessons, and participate in discussions.
- AI-generated hints and explanations assist users in understanding complex topics.

2.6.3| Progress Tracking and Blockchain Integration

- Each user's progress is securely recorded in the blockchain, ensuring transparency and immutability.
- Smart contracts validate course completions and store learning achievements on-chain.
- Users receive blockchain-backed certificates as proof of learning completion.
- Tokenized incentives reward users upon completing specific milestones or assessments.

2.6.4| User Interface

- A responsive and accessible design optimizes the user experience across devices.
- Interactive dashboards provide insights into learning history, token balance, and recommended courses.
- Integrated wallet support enables seamless transactions using blockchain tokens.

3 | Learning Concept

The Wisdom Learning Platform is designed as an innovative blockchain-based educational ecosystem, enabling users to engage in personalized learning experiences while leveraging tokenized incentives. This chapter provides an in-depth explanation of the platform's structure, functionality, and how users can effectively utilize it to maximize their learning potential.

3.1| Overview of the Learning Platform

The Wisdom Learning Platform integrates blockchain technology, AI-driven recommendations, and structured learning paths to provide an adaptive learning experience. Users can purchase tokens, enroll in courses, track progress, and earn rewards for their achievements. The key components of the platform include:

- A tokenized economy that facilitates transactions within the platform.
- AI-driven recommendations for personalized learning paths.
- Blockchain-backed certifications and progress tracking.
- A structured system for courses, learning plans, and assessments.
- A badge and reward system to enhance motivation and engagement.

3.2| User Journey and Token Utilization

Users interact with the Wisdom Learning Platform by acquiring tokens and utilizing them to access educational resources. The process is structured as follows:

3.2.1| Acquiring Tokens

Users can purchase tokens using fiat currency or cryptocurrencies. These tokens serve as the primary currency within the platform, enabling transactions for course enrollments, assessments, and additional features.

3.2.2| Enrolling in Learning Plans and Courses

Tokens are used to purchase access to learning plans, which consist of multiple courses. A learning plan is structured to guide users from basic to advanced concepts, ensuring a comprehensive understanding of the subject matter.

- Microcourses: Short, skill-based lessons focused on specific topics.
- Full Courses: Comprehensive modules covering broader subjects.
- Live Sessions: Interactive webinars and workshops.
- Quizzes & Assessments: Evaluations that test user knowledge and grant certifications.

3.3| AI Functionality and Personalized Learning

The AI component of the Wisdom Learning Platform plays a crucial role in enhancing the learning experience. It analyzes user interactions, learning patterns, and assessment results to provide:

- Personalized course recommendations based on learning history.
- Adaptive learning paths that adjust to user progress.
- Automated hints and explanations for challenging topics.
- AI-generated quizzes to reinforce understanding.

The AI continuously refines recommendations, ensuring that users receive content that matches their skill level and learning goals.

3.4| Assessments and Certifications

Assessments are an integral part of the platform, validating user knowledge and ensuring comprehension. The assessment system includes:

- Quizzes: Short tests to check understanding of specific concepts.
- Final Exams: Comprehensive assessments for full-course completion.
- Practical Evaluations: Project-based assignments demonstrating applied skills.
- Blockchain Certifications: Secure, verifiable certificates stored on the blockchain.

Users who successfully pass assessments earn certifications, which can be used to showcase expertise in professional environments.

3.5| Badges and Rewards System

To enhance motivation, the platform employs a badge and rewards system. Users earn badges for various achievements, including:

- Completing a course or learning plan.
- Achieving high scores in assessments.
- Participating in live sessions and discussions.
- Contributing to the community by reviewing and rating courses.

Badges serve as a recognition of progress and expertise, encouraging continuous learning and engagement.

3.6| Blockchain Integration and Progress Tracking

All user progress, certifications, and transactions are securely recorded on the blockchain. This ensures transparency, immutability, and verifiability. The blockchain integration supports:

- Securely storing completed courses and earned certifications.
- Preventing fraud and ensuring the authenticity of learning records.
- Enabling peer-to-peer verification of achievements.
- Allowing organizations and employers to validate credentials instantly.

3.7| Conclusion

The Wisdom Learning Platform offers a dynamic and structured approach to online education by leveraging blockchain and AI technologies. Users can seamlessly acquire knowledge, track their progress, earn certifications, and participate in an engaging learning experience. The integration of tokens, personalized recommendations, and rewards ensures that learning remains motivating, accessible, and verifiable in a decentralized ecosystem.

4 | Design

The design of the Wisdom Learning Platform is centered around providing an intuitive and engaging user experience (UX) and a visually appealing user interface (UI). The platform is designed to be accessible, interactive, and adaptable to different user needs, ensuring a seamless learning journey.

4.1| User Experience (UX) Design

User experience is a core component of the Wisdom Learning Platform. The UX design follows key principles that enhance engagement, usability, and accessibility.

4.1.1| User-Centric Navigation

The platform employs a clear and structured navigation system to guide users efficiently through the learning process:

- Dashboard: A personalized interface displaying active learning plans, upcoming live sessions, and progress tracking.
- Course Catalog: An easy-to-browse section with filters for selecting courses by topic, difficulty level, and instructor.
- Learning Pathway: A step-by-step guide through lessons, assessments, and certifications.
- User Profile: Displays achievements, badges, and blockchain-backed certifications.

4.1.2| Adaptive Learning System

The AI-driven adaptive learning system enhances the UX by dynamically adjusting course recommendations based on user progress and performance. The system includes:

- Personalized course suggestions based on learning history.
- Skill-gap analysis to recommend supplementary courses.

- AI-generated quizzes to reinforce weak areas.

4.1.3| Engagement and Gamification

To maintain user motivation, the platform integrates various gamification elements:

- Badges: Earned through course completions, high quiz scores, and community participation.
- Leaderboard: Encourages competition and engagement within the platform.
- Streaks: Users are rewarded for continuous learning activity.

4.1.4| Accessibility and Inclusivity

The platform is designed to be inclusive, ensuring usability for all individuals, including those with disabilities:

- Support for screen readers and text-to-speech.
- Adjustable text size and contrast settings.
- Keyboard and voice navigation options.
- Multilingual support for global accessibility.

4.2| User Interface (UI) Design

The UI of the Wisdom Learning Platform is designed with a modern, clean, and professional aesthetic. It emphasizes clarity, simplicity, and responsiveness to enhance the learning experience.

4.2.1| Visual Design Principles

The UI follows several key design principles:

- Minimalistic Layout: Reduces cognitive load and enhances readability.
- Consistent Color Scheme: A well-balanced color palette that aligns with the brand identity.
- Typography: A clean and legible font choice optimized for digital reading.
- Iconography: Intuitive icons that enhance navigation and usability.

4.2.2| Responsive and Mobile-Friendly Design

Given the growing number of mobile learners, the platform is designed to be fully responsive:

- Optimized for desktops, tablets, and smartphones.
- Adaptive layouts that adjust to different screen sizes.
- Touch-friendly UI elements for mobile interactions.

4.2.3| Interactive Components

The platform incorporates interactive UI elements to improve the learning experience:

- Dynamic Progress Bars: Show learning progress and completed milestones.
- Collapsible Sections: Reduce clutter while allowing users to expand content as needed.
- Interactive Quizzes: Provide real-time feedback and explanations.
- Live Chat and Discussion Forums: Facilitate peer learning and collaboration.

4.2.4| Dark Mode and Customization Options

To enhance user comfort, the platform includes customization options:

- Dark mode for reduced eye strain in low-light conditions.
- Theme customization for a personalized experience.
- Adjustable font sizes and UI scaling for accessibility.

4.3| Integration with Blockchain and AI

The integration of blockchain and AI enhances the overall design of the platform:

- Blockchain-Backed UI Elements: Secure, verifiable certification displayed within the user profile.
- AI-Generated Course Recommendations: Displayed dynamically within the dashboard.
- Secure Wallet Integration: Allows users to manage and utilize tokens seamlessly.

4.4| Conclusion

The design of the Wisdom Learning Platform combines an intuitive UX with a visually appealing UI to create an engaging and accessible learning environment. By incorporating adaptive learning, gamification, accessibility features, and blockchain integration, the platform ensures a seamless and effective educational experience for all users.

5 | Technical Concept of Wisdom

5.1| Introduction

A Web3-based Learning Platform leverages blockchain technology to create a decentralized, transparent, and secure environment for learners and educators. This platform enables courses, structured learning plans, assessments, and NFT-based badges that authenticate achievements.

5.2| Core Components

The platform consists of the following core components:

5.2.1| User Roles

- Learners: Register, enroll in courses, complete assessments, and earn badges.
- Instructors: Create courses, assign learning plans, and evaluate learner performance.
- Administrators: Oversee the platform, approve content, and manage governance.

5.2.2| Courses & Learning Plans

Courses should be structured as modular learning units, including:

- Course Metadata: Title, description, difficulty level, estimated duration.
- Learning Modules: Video lectures, text-based materials, and interactive content.
- Assessments: Quizzes, coding challenges, project submissions.
- Smart Contracts for Course Enrollment: A blockchain-based contract to handle registration and access control.

5.3| Web3 Integration

5.3.1| Smart Contracts

Smart contracts should manage:

- Enrollment: Learners must sign a transaction to enroll.
- Completion Validation: A smart contract verifies progress and finalizes course completion.
- Badge & Certification Issuance: NFTs representing skills, stored on-chain.
- Assessment Automation: Decentralized evaluations where answers are logged immutably.

5.3.2| NFT-Based Badges & Certificates

- Non-Fungible Tokens (NFTs) serve as verifiable proof of completion.
- Each NFT represents a skill or achievement and is stored in the learner's blockchain wallet.
- Badges can have metadata linking to the course, instructor, and timestamp of issuance.

5.3.3| Payment & Token Rewards

- WSD Token Integration: Learners pay for premium courses with WSD tokens.
- Incentives: Learners and instructors receive WSD rewards for engagement and contributions.
- Decentralized Funding: Users can stake tokens to support specific courses or creators.

5.4| User Experience & Interaction

5.4.1| Web Application (React Frontend)

- User Dashboard: Personalized progress tracking, enrolled courses, and earned badges.
- Course Library: Searchable and filterable list of available courses.
- Learning Module Player: Interactive content delivery with quizzes and project-based challenges.

5.4.2| Decentralized Identity (DID)

- Users sign in with a crypto wallet (e.g., MetaMask, WalletConnect).
- Profiles store learning history, completed courses, and certifications.

5.5| Backend & Blockchain Infrastructure

- Backend (Java & PostgreSQL): Handles course storage, user data (off-chain), and API requests.
- Blockchain (Wisdom Chain):
  - Stores NFT credentials, course smart contracts, and payment transactions.
  - Enables transparent verification of learning history.

5.6| Assessment & Evaluation System

5.6.1| Automated & Peer-Based Assessments

- Automated Grading: Multiple-choice quizzes, coding assignments auto-graded via smart contracts.
- Peer Review: Learners evaluate each other's submissions, with voting mechanisms to ensure fairness.

5.6.2| On-Chain Records

All assessments are logged as immutable records, preventing tampering or data loss.

5.7| Governance & Decentralization

- DAO for Platform Management: Community-driven governance via token-based voting.
- Instructor Verification: Decentralized reputation system where instructors earn credibility based on student reviews and completions.

5.8| Security & Privacy

- Zero-Knowledge Proofs (ZKP) for private credential verification.
- End-to-End Encryption for personal data stored off-chain.

- Multi-Signature Authentication for course certification issuance.

5.9| Summary & Next Steps

This Web3-based learning platform introduces decentralization, NFT-based credentials, token incentives, and secure learning records. The next steps include:

1. Developing smart contract prototypes for enrollment and badges.
2. Integrating a decentralized identity system.
3. Building the first MVP with key functionalities.

6 | Functional Concept of Wisdom

This chapter outlines the core functionalities of the Wisdom AI Learning Platform, detailing how the platform operates and how its various learning elements interconnect to create a seamless educational experience.

6.1 | Learning Platform

The Wisdom AI Learning Platform is a blockchain-integrated, AI-powered educational system designed to provide a structured and adaptive learning experience. It enables users to enroll in courses, follow guided learning plans, complete assessments, and track their progress transparently through blockchain verification. The platform ensures:

- Personalized learning experiences with AI recommendations.
- Transparent progress tracking through blockchain-based verification.
- Secure and tokenized transactions for purchasing educational content.
- A user-centric interface with accessibility and engagement features.

The platform caters to both learners and educators, offering a decentralized ecosystem where users can engage in self-paced learning while earning verifiable certifications.

6.2 | Learning Elements

The Wisdom AI Learning Platform structures its content into distinct learning elements to provide a clear and comprehensive educational experience. Each element serves a specific function in guiding users through their learning journey.

6.2.1 | Lesson

A lesson is the smallest unit of learning in the Wisdom platform. It is designed to be a focused and digestible piece of educational content that typically includes:

- Text-based explanations, video lectures, or interactive media.

- AI-generated hints and supplementary material.
- Practice exercises and instant feedback mechanisms.
- A lesson completion tracker to update the user's progress.

Lessons are sequentially organized within courses to build a structured learning path.

6.2.2| Course

A course is a collection of lessons centered around a specific subject or skill. It provides learners with an in-depth exploration of a topic and includes:

- A structured series of lessons designed for progressive learning.
- Interactive components such as quizzes, assignments, and discussions.
- AI-powered recommendations for related content.
- Certificates issued upon successful completion of the course.

Courses are categorized based on difficulty levels (beginner, intermediate, advanced) and can be purchased using platform tokens.

6.2.3| Assessment

Assessments are tools used to measure learner understanding and progress. They help in validating acquired knowledge and include:

- Multiple-choice quizzes and problem-solving exercises.
- AI-adaptive testing that adjusts difficulty based on user performance.
- Practical project-based evaluations for skill application.
- Blockchain-secured records of test scores and completion status.

Assessments contribute to learning milestones and may be required to earn certifications or badges.

6.2.4| Learning Plan

A learning plan is a curated pathway that organizes courses and assessments into a structured roadmap, guiding users through their educational journey. Key features of a learning plan include:

- AI-driven personalized learning pathways tailored to user goals.
- A clear progression from foundational to advanced topics.
- Integrated quizzes and assessments to reinforce learning.
- Progress tracking with visual indicators and blockchain verification.

Learning plans are designed to help users systematically acquire new skills and knowledge, ensuring a structured and rewarding learning experience.

6.3| User Administration

User administration in the Wisdom AI Learning Platform provides learners with tools to manage their educational journey efficiently. Users can create and customize their learning paths, track achievements, and receive recognition through badges and level progression.

6.3.1| Personalized Learning Management

Users have the ability to:

- Create and organize custom learning lists, including lessons, courses, and assessments.
- Develop their own learning plans by combining courses, lessons, and assessments according to their personal goals.
- Set learning milestones and track progress through an interactive dashboard.
- Modify learning plans dynamically based on AI recommendations and performance analysis.

6.3.2| Achievements and Level Progression

Users are rewarded for their learning activities through a structured achievement system:

- Levels: Users gain levels by completing assessments, lessons, courses, or full learning plans.
- Badges: Special achievements are awarded for milestones such as mastering a subject, completing a learning track, or achieving high assessment scores.

- Token Rewards: Users can earn platform tokens as incentives for consistent learning and high performance.
- Blockchain Verification: Achievements are stored securely on the blockchain for transparency and authenticity.

6.3.3| User Progress Tracking and Insights

Users have access to real-time progress analytics, including:

- A visual progress tracker that updates upon lesson and course completions.
- AI-driven insights into learning strengths and improvement areas.
- Comparison charts to view progress relative to peer learners.
- History logs showing completed courses, assessments, and awarded badges.

6.3.4| Social and Community Features

The Wisdom AI Learning Platform encourages peer engagement and knowledge sharing through:

- Discussion Forums: Users can ask questions, share insights, and collaborate on learning topics.
- Peer Learning Groups: Users can join or create study groups to learn together.
- Mentorship Opportunities: Experienced users can mentor beginners and receive recognition for their contributions.

User administration empowers learners to take control of their education, set learning goals, and achieve tangible progress, all while benefiting from an AI-powered and blockchain-backed ecosystem.

7 | Sales Point

The Wisdom AI Learning Platform operates on a token-based economy where users can purchase Wisdom Tokens with fiat money to access educational content, participate in mentorship programs, and support other learners. Additionally, users can earn tokens through achievements, course completions, and mentorship contributions.

7.1 | Token Economy and Exchange Rate

Upon registration, each user receives an initial balance of 100 Wisdom Tokens as a starting incentive. Users can then purchase additional tokens using fiat currency to continue learning and accessing premium content.

The current exchange rate is set as follows:

- 1 Wisdom Token = 0.10 EUR / 0.11 USD
- 10 Wisdom Tokens = 1.00 EUR / 1.10 USD
- 100 Wisdom Tokens = 10.00 EUR / 11.00 USD
- 500 Wisdom Tokens = 50.00 EUR / 55.00 USD
- 1000 Wisdom Tokens = 100.00 EUR / 110.00 USD

Payments can be made via credit card, PayPal, or cryptocurrency transactions, ensuring a seamless and secure transaction experience.

7.2 | Pricing for Platform Features

The following pricing model applies to various learning elements within the platform:

7.2.1 | Lesson Access

- Standard Lesson: 5 Wisdom Tokens
- Advanced Lesson: 10 Wisdom Tokens
- AI-Guided Lesson: 15 Wisdom Tokens (Includes personalized recommendations)

7.2.2| Course Enrollment

- Basic Course (4–6 lessons): 50 Wisdom Tokens
- Intermediate Course (7–12 lessons): 100 Wisdom Tokens
- Advanced Course (13+ lessons): 150 Wisdom Tokens
- Certification Course: 200 Wisdom Tokens (Includes blockchain-backed certificate)

7.2.3| Learning Plan Subscription

Users can purchase structured learning plans that consist of multiple courses and assessments.

- Basic Learning Plan (3 Courses + Assessments): 250 Wisdom Tokens
- Comprehensive Learning Plan (5+ Courses + AI Support): 400 Wisdom Tokens
- Professional Track (8+ Courses + Certification): 600 Wisdom Tokens

7.2.4| Mentorship and Community Support

- One-on-One Mentorship Session: 100 Wisdom Tokens per session
- Group Mentorship Participation: 50 Wisdom Tokens per session
- Discussion Forum Priority Access: 20 Wisdom Tokens per month

7.3| Token Rewards and Incentives

Users can also earn Wisdom Tokens through various achievements on the platform. These incentives encourage continued learning and community engagement.

7.3.1| Course Completion Rewards

- Completing a Basic Course: +10 Wisdom Tokens
- Completing an Intermediate Course: +20 Wisdom Tokens
- Completing an Advanced Course: +30 Wisdom Tokens
- Earning a Certificate: +50 Wisdom Tokens

7.3.2| Learning Plan Completion

- Completing a Basic Learning Plan: +50 Wisdom Tokens
- Completing a Comprehensive Learning Plan: +100 Wisdom Tokens
- Completing a Professional Track: +200 Wisdom Tokens

7.3.3| Mentorship and Community Engagement Rewards

- Mentoring another user: +20 Wisdom Tokens per session
- Providing an AI-Assisted Answer in Discussions: +5 Wisdom Tokens per upvote
- Publishing a high-rated course: +100 Wisdom Tokens
- Receiving an Excellence Badge for Contributions: +50 Wisdom Tokens

7.4| Sustainability of the Token Economy

The Wisdom AI Learning Platform ensures token circulation through a balanced ecosystem where tokens are earned and spent in a sustainable manner. Users can reinvest earned tokens into additional courses, mentorships, or premium platform features. Additionally, blockchain technology guarantees transparent and secure transactions, making every learning achievement verifiable.

This approach encourages active participation, rewards commitment to education, and ensures that the Wisdom Token remains valuable within the ecosystem.

8 | Badges and Token Rewards

The Wisdom AI Learning Platform incorporates a badge and token reward system to motivate users, acknowledge achievements, and promote continuous engagement. By completing courses, assessments, and mentorship activities, users can earn badges of different levels and receive Wisdom Tokens as rewards.

8.1 | Badge System

Badges represent milestones achieved by users on the platform. To provide a sense of progression, badges are classified into four sublevels: Bronze, Silver, Gold, and Platinum. Higher-level badges come with increased token rewards.

8.1.1 | Types of Badges

The following badge categories exist within the Wisdom AI Learning Platform:

Learning Mastery Badges

These badges are awarded based on the number of completed courses, lessons, and learning plans.

- Course Finisher (Awarded for completing a course)
  - Bronze: 1 Course Completed (+10 Tokens)
  - Silver: 5 Courses Completed (+50 Tokens)
  - Gold: 10 Courses Completed (+100 Tokens)
  - Platinum: 20 Courses Completed (+200 Tokens)
- Learning Plan Conqueror (Awarded for completing learning plans)
  - Bronze: 1 Learning Plan Completed (+50 Tokens)
  - Silver: 3 Learning Plans Completed (+150 Tokens)
  - Gold: 5 Learning Plans Completed (+300 Tokens)
  - Platinum: 10 Learning Plans Completed (+500 Tokens)

Assessment Performance Badges

Users who perform well on quizzes and assessments receive these badges.

- Assessment Achiever (Awarded for passing assessments with high scores)
  - Bronze: Passed 3 Assessments (+20 Tokens)
  - Silver: Passed 10 Assessments (+80 Tokens)
  - Gold: Passed 20 Assessments (+150 Tokens)
  - Platinum: Passed 50 Assessments (+300 Tokens)
- Perfect Scorer (Awarded for achieving full marks on assessments)
  - Bronze: 1 Perfect Score (+15 Tokens)
  - Silver: 5 Perfect Scores (+75 Tokens)
  - Gold: 10 Perfect Scores (+150 Tokens)
  - Platinum: 25 Perfect Scores (+300 Tokens)

Mentorship and Community Badges

Users who contribute to the platform by mentoring others or engaging in discussions can earn these badges.

- Mentor Badge (Awarded for mentoring users)
  - Bronze: 1 Mentorship Session Completed (+20 Tokens)
  - Silver: 5 Mentorship Sessions Completed (+100 Tokens)
  - Gold: 10 Mentorship Sessions Completed (+200 Tokens)
  - Platinum: 25 Mentorship Sessions Completed (+500 Tokens)
- Community Contributor (Awarded for actively participating in discussions)
  - Bronze: 10 Contributions (+10 Tokens)
  - Silver: 50 Contributions (+50 Tokens)
  - Gold: 100 Contributions (+150 Tokens)
  - Platinum: 500 Contributions (+500 Tokens)

8.2| Token Rewards System

Users are rewarded with Wisdom Tokens for their achievements. These tokens can be used to enroll in new courses, access premium content, or participate in mentorship programs.

8.2.1| Token Distribution for Achievements

The following table provides an overview of how Wisdom Tokens are awarded based on achievements:

Achievement	Bronze	Silver	Gold	Platinum
Course Completion	+10 Tokens	+50 Tokens	+100 Tokens	+200 Tokens
Learning Plan Completion	+50 Tokens	+150 Tokens	+300 Tokens	+500 Tokens
Assessment Pass	+20 Tokens	+80 Tokens	+150 Tokens	+300 Tokens
Perfect Assessment Score	+15 Tokens	+75 Tokens	+150 Tokens	+300 Tokens
Mentorship Sessions	+20 Tokens	+100 Tokens	+200 Tokens	+500 Tokens
Community Contributions	+10 Tokens	+50 Tokens	+150 Tokens	+500 Tokens

8.2.2| Redeeming Wisdom Tokens

Wisdom Tokens can be used for the following:

- Unlocking new courses and learning plans.
- Enrolling in AI-guided personalized learning sessions.
- Accessing mentorship opportunities.
- Receiving discounts on premium certifications.
- Donating tokens to support other learners.

8.3| Sustainability of the Reward System

The Wisdom AI Learning Platform ensures a sustainable token economy by balancing earnings and spending. Users can reinvest earned tokens into learning, making continuous progress without relying solely on purchasing new tokens. The integration of blockchain technology guarantees fair distribution, security, and transparency of all transactions.

By combining achievement-based rewards with a structured badge system, the platform fosters motivation, engagement, and a thriving learning community.

9 | User Profile Data and Smart Contract Integration

The Wisdom AI Learning Platform requires structured and secure user profiles to manage learning progress, achievements, and token balances efficiently. This chapter outlines the necessary data to be stored in a user profile and how this information can be securely managed using a smart contract in Solidity.

9.1 | User Profile Data Structure

Each user profile must store essential information to enable personalized learning, progress tracking, and blockchain verification. The following data points are necessary:

9.1.1 | Personal Information

- User ID: A unique identifier for each user.
- Username: The display name of the user.
- Email Address: Used for notifications and security.
- Wallet Address: The public blockchain address for token transactions.
- Account Creation Date: The date the user registered.

9.1.2 | Learning Progress Data

- Completed Lessons: List of lessons completed by the user.
- Completed Courses: Courses the user has successfully finished.
- Learning Plans Progress: Tracking of enrolled learning plans and progress.
- Assessment Scores: Records of test scores and achievements.
- Earned Certifications: Blockchain-verified certificates.

9.1.3| Achievements and Rewards

- Badges Earned: Collection of awarded badges and their levels.
- Wisdom Token Balance: Amount of tokens owned by the user.
- Token Transactions: Log of token earnings and spending.
- Mentorship Contributions: Tracking of mentorship sessions and rewards.

10 | Implementation

10.1| Smart Contract Implementation in Solidity

To ensure transparency and immutability, key user profile data can be stored and managed using a Solidity smart contract. Below is a basic implementation:

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract UserProfile {
struct User {
        string username;
    string email;
    address wallet;
    uint256 registrationDate;
    uint256 wisdomTokens;
    string[] completedCourses;
    string[] completedLessons;
    string[] completedLearningPlans;
    string[] ongoingCourses;
    string[] ongoingLessons;
    string[] ongoingLearningPlans;
}
mapping(address => User) public users;

event UserRegistered(address indexed wallet, string username);
event CourseCompleted(address indexed wallet, string courseName);
event TokensAwarded(address indexed wallet, uint256 amount);

function registerUser(string memory _username, string memory _email) public {
    require(users[msg.sender].wallet == address(0), "User already exists");
    users[msg.sender] = User(_username, _email, msg.sender, block.timestamp, 100, new string[](0), new string );
    emit UserRegistered(msg.sender, _username);
}

function completeCourse(string memory _courseName) public {
    require(users[msg.sender].wallet != address(0), "User not registered");

    // Remove from ongoingCourses
    for (uint i = 0; i < users[msg.sender].ongoingCourses.length; i++) {
        if (keccak256(abi.encodePacked(users[msg.sender].ongoingCourses[i])) == keccak256(abi.encodePacked(_courseName))) {
            users[msg.sender].ongoingCourses[i] = users[msg.sender].ongoingCourses[users[msg.sender].ongoingCourses.length -
                1];
            users[msg.sender].ongoingCourses.pop();
            break;
        }
    }

    // Add to completedCourses
    users[msg.sender].completedCourses.push(_courseName);
    users[msg.sender].wisdomTokens += 10; // Reward for completion
    emit CourseCompleted(msg.sender, _courseName);
}

function completeLearningPlan(string memory _planName) public {
    require(users[msg.sender].wallet != address(0), "User not registered");
```

```
    // Remove from ongoingLearningPlans
    for (uint i = 0; i < users[msg.sender].ongoingLearningPlans.length; i++) {
        if (keccak256(abi.encodePacked(users[msg.sender].ongoingLearningPlans[i])) == keccak256(abi.encodePacked(_planName)))
             {
            users[msg.sender].ongoingLearningPlans[i] = users[msg.sender].ongoingLearningPlans[users[msg.sender].
                 ongoingLearningPlans.length - 1];
            users[msg.sender].ongoingLearningPlans.pop();
            break;
        }
    }

    // Add to completedLearningPlans
    users[msg.sender].completedLearningPlans.push(_planName);
    users[msg.sender].wisdomTokens += 50; // Reward for completing a learning plan
}

function awardTokens(address _user, uint256 _amount) public {
    require(users[_user].wallet != address(0), "User not registered");
    users[_user].wisdomTokens += _amount;
    emit TokensAwarded(_user, _amount);
}

function enrollInCourse(string memory _courseName) public {
    require(users[msg.sender].wallet != address(0), "User not registered");
    users[msg.sender].ongoingCourses.push(_courseName);
}

function enrollInLearningPlan(string memory _planName) public {
    require(users[msg.sender].wallet != address(0), "User not registered");
    users[msg.sender].ongoingLearningPlans.push(_planName);
}

function startLesson(string memory _lessonName) public {
    require(users[msg.sender].wallet != address(0), "User not registered");
    users[msg.sender].ongoingLessons.push(_lessonName);
}
}
```

10.2| Smart Contract Implementation

This chapter outlines the necessary smart contracts for the Wisdom Learning Platform, including user profile management, token transactions, learning progress tracking, and reward systems.

10.2.1| Overview of Smart Contracts

To ensure a decentralized and transparent learning ecosystem, multiple smart contracts are implemented to handle different aspects of the platform. The following table summarizes the key smart contracts:

Smart Contract	Function
`UserProfile.sol`	Stores user details (username, email, wallet).
`WisdomToken.sol`	Implements ERC-20 token for purchases and rewards.
`BadgeSystem.sol`	Manages badges and achievements.
`LearningProgress.sol`	Tracks completed courses and lessons.
`CourseAccess.sol`	Handles enrollments and paid access verification.
`Mentorship.sol`	Logs mentorship sessions and rewards mentors.
`TransactionLog.sol`	Tracks all purchases and token transactions.

Table 10.1: Smart Contracts for the Wisdom Learning Platform

10.2.2| User Profile Management

The user profile contract stores basic user information on-chain while large data remains off-chain.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract UserProfile {
struct User {
string username;
string email;
address wallet;
}

mapping(address => User) public users;

event UserRegistered(address indexed wallet, string username);

function registerUser(string memory _username, string memory _email) public {
    require(users[msg.sender].wallet == address(0), "User already registered");
    users[msg.sender] = User(_username, _email, msg.sender);
    emit UserRegistered(msg.sender, _username);
}

}
```

10.2.3| Wisdom Token Implementation

The Wisdom Token is implemented using the ERC-20 standard for transactions within the platform.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

import "@openzeppelin/contracts/token/ERC20/ERC20.sol";

contract WisdomToken is ERC20 {
constructor() ERC20("WisdomToken", "WSD") {
_mint(msg.sender, 1000000 * 10**18);
}
}
```

10.2.4| Badge System

The badge system tracks user achievements and provides token rewards for milestones.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract BadgeSystem {
enum BadgeLevel { Bronze, Silver, Gold, Platinum }

struct Badge {
    string name;
    BadgeLevel level;
    uint256 rewardTokens;
}

mapping(address => Badge[]) public userBadges;
mapping(string => Badge) public availableBadges;

function earnBadge(address _user, string memory _badgeName) public {
    require(bytes(availableBadges[_badgeName].name).length > 0, "Badge does not exist");
    userBadges[_user].push(availableBadges[_badgeName]);
}

}
```

10.3| Learning Progress Tracking

This contract tracks completed courses, lessons, and learning plans.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract LearningProgress {
struct Completion {
string itemType;
string itemName;
uint256 completedAt;
}

mapping(address => Completion[]) public userCompletions;

function completeItem(address _user, string memory _itemType, string memory _itemName) public {
    userCompletions[_user].push(Completion(_itemType, _itemName, block.timestamp));
}

}
```

10.3.1| Course Access Control

This contract manages course enrollments and access verification.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;
```

```
contract CourseAccess {
mapping(address => string[]) public enrolledCourses;

function enroll(address _user, string memory _courseName) public {
    enrolledCourses[_user].push(_courseName);
}

}
```

10.3.2| Mentorship System

The mentorship system tracks sessions and issues token rewards.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract Mentorship {
struct MentorshipSession {
address mentor;
address mentee;
uint256 timestamp;
uint256 rewardTokens;
}

mapping(address => MentorshipSession[]) public mentorSessions;

function logSession(address _mentor, address _mentee, uint256 _rewardTokens) public {
    mentorSessions[_mentor].push(MentorshipSession(_mentor, _mentee, block.timestamp, _rewardTokens));
}

}
```

10.3.3| Transaction Log

All purchases and reward transactions are stored in the blockchain for transparency.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract TransactionLog {
struct Transaction {
address user;
string transactionType;
string itemName;
uint256 amount;
uint256 timestamp;
}

mapping(address => Transaction[]) public userTransactions;

function logTransaction(address _user, string memory _transactionType, string memory _itemName, uint256 _amount) public {
    userTransactions[_user].push(Transaction(_user, _transactionType, _itemName, _amount, block.timestamp));
}

}
```

These smart contracts ensure a transparent, decentralized, and tokenized learning ecosystem, fully integrated with blockchain technology.

10.4| Integration with the Learning Platform

To integrate this smart contract with the Wisdom AI Learning Platform:

- Users register their profiles through the platform, triggering a blockchain transaction.
- Course completions and badge achievements update the smart contract automatically.
- Token transactions are recorded transparently on-chain.
- The front-end UI connects via Web3 to interact with the smart contract.

This approach ensures data security, user autonomy, and a transparent reward system within the Wisdom ecosystem.

10.5| PostgreSQL Database Schema

The Wisdom Learning Platform requires a structured database to manage lessons, courses, and learning plans. As user progress is stored in smart contracts, the database focuses on managing static and transactional data related to the learning content and token economy.

10.5.1| Lessons Table

Each lesson represents a unit of learning that can be part of multiple courses.

```
CREATE TABLE lessons (
id SERIAL PRIMARY KEY,
title VARCHAR(255) NOT NULL,
description TEXT,
content TEXT,  -- Markdown/HTML or reference to external storage
video_url VARCHAR(500),
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

10.5.2| Courses Table

Courses group multiple lessons into structured content.

```
CREATE TABLE courses (
id SERIAL PRIMARY KEY,
title VARCHAR(255) NOT NULL,
description TEXT,
price DECIMAL(10,2) DEFAULT 0.00,  -- Price in Fiat or Tokens
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

10.5.3| Course Lessons Table

Defines a many-to-many relationship between courses and lessons.

```
CREATE TABLE course_lessons (
course_id INT REFERENCES courses(id) ON DELETE CASCADE,
lesson_id INT REFERENCES lessons(id) ON DELETE CASCADE,
order_index INT NOT NULL,  -- Defines the sequence of lessons in the course
PRIMARY KEY (course_id, lesson_id)
);
```

10.5.4| Learning Plans Table

Learning plans provide structured pathways consisting of multiple courses.

```
CREATE TABLE learning_plans (
id SERIAL PRIMARY KEY,
title VARCHAR(255) NOT NULL,
description TEXT,
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

10.5.5| Learning Plan Courses Table

Defines a many-to-many relationship between learning plans and courses.

```
CREATE TABLE learning_plan_courses (
learning_plan_id INT REFERENCES learning_plans(id) ON DELETE CASCADE,
course_id INT REFERENCES courses(id) ON DELETE CASCADE,
order_index INT NOT NULL,  -- Defines sequence in the learning plan
PRIMARY KEY (learning_plan_id, course_id)
);
```

10.5.6| Transactions Table

Tracks token transactions for course purchases and rewards.

```
CREATE TABLE transactions (
id SERIAL PRIMARY KEY,
user_id UUID REFERENCES users(id) ON DELETE CASCADE,
course_id INT REFERENCES courses(id) ON DELETE CASCADE,
amount DECIMAL(10,2) NOT NULL,
transaction_type VARCHAR(50) CHECK (transaction_type IN ('purchase', 'reward')),
```

```
transaction_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

This database schema supports efficient content management and integrates seamlessly with the blockchain-based user progress tracking system.