Project: Personal Tutoring Service (PTS)

CSE 5325 – Fall 2023

Project Management

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1. Introduction and Executive Summary

In today's fast-paced world, the demand for personalized learning experiences is on the rise, and individuals are constantly seeking opportunities to enhance their skills and knowledge. To address this growing need, our team is embarking on a transformative project known as the Personal Tutoring Service (PTS). PTS is set to revolutionize the way individuals access tutoring services and offer their expertise as tutors. This innovative platform will consist of both a user-friendly website and a feature-rich Android application, and it is scheduled to be up and running by December 5, 2023. The central idea of PTS is to create a versatile and secure platform that connects learners and tutors, empowering individuals to access quality education easily. By providing a seamless and secure environment for both tutors and learners, the company aims to capitalize on the growing demand for personalized learning and earn revenue through a 20% commission on tutoring sessions and external advertising partnerships.

PTS offers a convenient solution for learners of all ages, allowing them to access tutoring services with ease. Users can effortlessly set up their profiles, providing essential information such as name, contact details, and preferences. A robust authentication system ensures secure access, safeguarding both clients and tutors. PTS covers a broad spectrum of tutoring categories, including programming languages, mathematics, languages (French), music (Piano), and sports (Tennis). Additional categories can be added on-demand without the need for programming. Qualified tutors can offer their services, specifying their specialization, pricing, and location preferences. Users can easily find and hire tutors, negotiating agreements on session frequency, pricing, and location. A powerful search feature enables users to find tutors based on price, distance, or ratings. Clients can provide reviews, ensuring transparency and accountability. The platform ensures secure payments, allowing tutors to receive their earnings promptly while the company retains a fair commission. Integrated communication tools such as email, calls, and text messages facilitate seamless interactions between tutors, learners, and the app owner.

The major risk associated with PTS is the potential for unethical behavior, such as tutors and clients bypassing the app to avoid the 20% commission. To mitigate this risk, we will implement a vigilant monitoring system that tracks user interactions and enforces compliance with platform policies. Any violators will face consequences, including potential termination of their relationship with the platform. Additionally, background checks for tutors and clear user guidelines will be implemented.

The budget for the PTS project includes expenses related to software development, server maintenance, marketing, and staff salaries. Competitive bids for hardware and software purchases will be sought to ensure cost-efficiency and optimal resource allocation.

While there are existing competitors in the online tutoring space, PTS differentiates itself through its comprehensive offerings. Notable competitors like Tutor.com and Khan Academy specialize in certain subjects or are primarily focused on pre-recorded lessons. In contrast, PTS provides a versatile platform that connects learners with live tutors, offers a diverse range of subjects, and supports in-person or remote tutoring arrangements. While there are existing tutoring platforms in the market, PTS stands out by offering a holistic solution with a focus on security, diversity of categories, and ethical practices. Unlike some competitors that lack comprehensive functionalities or security measures, PTS provides a one-stop-shop for all tutoring needs while prioritizing user safety and data protection.

2. Objectives

2.1 BUSINESS OBJECTIVES

The following is the list of business objectives:

Objective 1: Registration: Allow individuals to create their profiles on the platform by providing basic information such as name, phone number, email, and address.

Objective 2: User Authentication: Ensure that users, both tutors and clients, can securely access the platform. Users are not required to log in until they decide to hire or offer tutoring services.

Objective 3: Tutoring Categories: Organize the tutoring services into various categories, including Programming languages, Math, French, Piano, and Tennis. Enable the addition of new categories without the need for technical expertise.

Objective 4: Become a Tutor: Enable individuals with expertise in a specific subject to offer their services as tutors. They should be able to specify their area of specialization, set their tutoring prices, define their location, and indicate their willingness to travel within a certain distance.

Objective 5: Find a Tutor: Allow clients to search and find suitable tutors based on criteria such as price, distance, and tutor ratings. Make it easy for clients to select a tutor and establish tutoring agreements.

Objective 6: Review and Rating: Enable clients to provide feedback on their tutoring experiences by giving tutors a rating on a scale of 1 to 5 stars. Optionally, clients can leave comments to share their experiences with others.

Objective 7: Payment Processing: Facilitate the process of making payments to tutors or receiving payments as a tutor. The app owner should deduct a 20% commission from each transaction as revenue.

Objective 8: App Monitoring: Implement a system for the app owner to monitor interactions between clients and tutors to prevent illegal or unethical activities, such as bypassing the app's payment system.

Objective 9: Communication: Provide communication channels, including email, phone calls, and text messaging, for tutors, clients, and the app owner to connect and discuss tutoring arrangements.

2.2 SYSTEM OBJECTIVES

The following is the list of system objectives:

Objective 1: Develop a responsive web-based platform using modern web technologies (HTML5, CSS3, JavaScript) for cross-browser compatibility. For the Android mobile application, use Java or Kotlin, adhering to Android design guidelines to provide access to the tutoring service, ensuring a seamless user experience across different devices.

Objective 2: Implement Google Search API integration, utilizing RESTful API calls to fetch and display search results within the application to enable users to search for various tutoring services and related information. This includes providing a Frequently Asked Questions (FAQ) section on tutoring subjects.

Objective 3: Implement a user registration system where individuals can set up their profiles with personal information. Employ secure user authentication, using industry-standard encryption protocols (e.g., HTTPS) for data transmission. Store user data securely in a relational database with hashing and salting for password storage.

Objective 4: The system should support a range of tutoring categories, initially including Programming languages, Math, French, Piano, and Tennis. Create a dynamic database schema that allows for the addition of new tutoring categories without altering the underlying database structure. Use SQL or NoSQL databases for efficient data management.

Objective 5: Develop a user-friendly interface for tutors to create and update their profiles. Implement image upload and validation for tutor identification.

Objective 6: Enable users who have received tutoring to provide reviews and ratings for tutors, ranging from 1 to 5 stars, along with optional comments. Ensure that only individuals who have received tutoring can review tutors. Store reviews and ratings in a relational database, associating them with the respective tutors. Implement data aggregation techniques to calculate average ratings and generate meaningful insights.

Objective 7: Facilitate payments between clients and tutors, with the platform deducting a 20% fee as profit for the app owner. Track and manage income, including the 20% charge from tutors and revenue from external advertisements. Integrate payment gateways (e.g., Stripe, PayPal) for secure and convenient transactions.

Objective 8: Administer a system for monitoring clients and tutors to prevent illegal and unethical activities. Develop an admin dashboard with real-time analytics using technologies like React or Angular for front-end and Node.js for back-end. Implement AI-based anomaly detection for identifying suspicious activities.

Objective 9: Incorporate a mapping system for locating users, helping clients and tutors find each other more easily. Integrate Google Maps API for geolocation services, enabling users to locate nearby tutors and clients accurately.

3 Project Feasibility, Risks and Metrics

Project feasibility and metrics are summarized below:

3.1 Project Feasibility Concerns

Market Readiness: Like other systems, the PTS market may already have existing platforms. However, the unique selling point (USP) of offering a wide range of tutoring categories and a user-friendly interface can be a significant advantage. Ensuring an attractive and user-oriented UI is crucial, especially since user experience plays a vital role in the success of educational platforms.

Technical Issues: User data and payment information must be secure to prevent unauthorized access and protect sensitive information. Robust authentication and data encryption measures are essential. As the user base grows, the platform should be able to handle increased traffic and data without performance issues. Scalability considerations need to be in place. Since tutors and clients enter information manually, there's a potential for inaccurate data. Implementing data validation and verification processes can mitigate this issue.

Resources: Having a skilled and dedicated development team is crucial to meet the tight 3-month timeline. Adequate staffing and expertise in app development, database management, and UI/UX design are essential. Ensuring data redundancy and disaster recovery plans for the data centers are critical to maintain uninterrupted service. Implementing systems for monitoring and managing clients and tutors to prevent unethical behavior is resource intensive.

Cost: Competitive bids for hardware and software procurement should be obtained to manage costs effectively. Adequate budgeting for development, quality assurance, and testing phases is necessary. Additionally, ongoing maintenance and updates will have associated costs. The cost of advertising, both internal and external, should also be considered. The 20% profit margin for the app owner must be carefully managed to ensure profitability.

Time to Market: The 3-month timeline is ambitious. Effective project management, regular communication with the client, and a transparent development process will be crucial to meet the deadline. Consider adopting an Agile development methodology to adapt to changing requirements and ensure progress is on track. Thorough testing is essential to ensure the platform's reliability and security. Rushed testing could result in critical issues post-launch.

User Acquisition: While the initial user base may consist of existing clients, strategies for acquiring new users should be developed to sustain growth beyond the beta testing phase. Attracting both tutors and students to the platform may require a significant marketing effort, including advertising, promotions, and partnerships.

3.2 PROJECT RISKS

Data Security and Privacy Risks: The personal information of tutors and clients, including contact details and payment information, could be vulnerable to data breaches or unauthorized access. Implement robust data encryption protocols for sensitive information. Regularly audit and update security measures to protect against cyber threats. Limit access to sensitive data to authorized personnel only. Comply with data protection regulations, such as GDPR, and conduct regular security audits.

Server and Data Center Vulnerabilities: Physical damage to servers or data centers, power outages, or natural disasters affecting service availability. Set up backup power solutions (e.g., generators and UPS) to ensure uninterrupted server operation. Choose data centers with high physical security and disaster recovery plans. Implement load balancing to distribute traffic across multiple servers for redundancy. Ensure physical security with access controls, surveillance, and biometric authentication.

Resource Availability Risks: A shortage of human resources, including developers and support staff, could hinder project progress and support. Maintain a backup team or on-call support for emergencies or increased workloads. Cross-train team members to ensure redundancy and flexibility in resource allocation. Consider outsourcing certain tasks or support functions if needed.

Software Compatibility and Bug Risks: Incompatibility issues with different web browsers or Android versions, as well as unexpected software bugs, could impact user experience. Perform thorough testing and quality assurance on various platforms and devices. Regularly update the application to fix bugs and improve compatibility. Have a dedicated team for ongoing maintenance and support.

Financial Risks: Financial issues related to processing payments, tracking profits, and handling disputes may arise. Implement a secure payment gateway with fraud detection capabilities. Keep accurate records of all financial transactions. Establish clear policies for dispute resolution and communication. Regularly audit financial transactions for accuracy and security.

User Accountability Risks: Users may attempt to bypass the platform's fee structure or engage in unethical behaviour. Monitor user interactions and transactions to detect suspicious or non-compliant behaviour. Enforce platform policies and take appropriate actions, including banning users if necessary. Educate users on the benefits of using the platform transparently.

Advertisement Management Risks: Managing internal and external advertisements may lead to complications or conflicts with users or advertisers. Establish clear guidelines for advertisement content and placement. Monitor advertisements for compliance with policies. Provide a mechanism for users to report inappropriate ads.

3.3 PROJECT METRICS

Productivity: Productivity measures the efficiency of the team in delivering the project. Measure the company's overall capabilities and resource utilization. It can be calculated as the ratio of input hours to output features or components.

Productivity = Units of Input (Human Hours) / Units of Output (Features or Components)

Quality: Quality is a critical metric for the success of the project. It measures how well the delivered product meets or exceeds client expectations. Evaluate the quality of the website and mobile app. It can be assessed using a predefined quality checklist provided by the client.

Quality = Adherence to Quality Checklist

Customer Reach: Customer reach measures the extent to which the system becomes known to potential users. It's essential for the success of the platform, as more users mean a higher chance of transactions occurring. Determine how many people are aware of and using the tutoring service. Start tracking customer reach after completing a significant portion of the system (e.g., 70% completion). Aim to increase customer reach over time.

Customer Reach = Impressions (advertisements) / Frequency

Earned Value: Earned Value (EV) helps in tracking the progress of the project by comparing the value of completed work with the allocated budget.

Earned Value (EV) = % of Completed Work / Budget at Completion (BAC)

Gross Profit Margin: Gross Profit Margin measures how much profit the project generates for the business. It's calculated by deducting total costs from total profits, taking into account the 20% charge from tutors and external advertisement income. Calculate the gross profit margin as a percentage.

Gross Profit Margin = (Total Profit - Total Costs) / 100

Actual Cost: Actual Cost represents the actual expenses incurred during the project. It helps in tracking and managing project expenses. Determine the total costs per time period.

Actual Cost (AC) = Total Costs per Time Period × Time Period

Cost Performance: Cost Performance Index (CPI) assesses the cost efficiency by comparing the value of the work actually performed (earned value) with the actual costs incurred. Forecast cost performance to estimate future budget requirements.

Cost Performance Index (CPI) = Earned Value / Actual Costs

Employee Satisfaction: Employee satisfaction is an important metric for team morale and productivity. It can be measured through surveys and feedback from team members.

Employee Satisfaction Score = (Total Survey Point Score / Total Questions) × 100

4 Project Scope and Process Model

Project scope includes the following:

1. User Registration and Login
2. Tutoring Categories
3. Search Functionality with Filters
4. Review and Rating System
5. Payments
6. Profit Management
7. System Monitoring and Reporting
8. Secure Communication through Encrypted Mediums
9. Location Services
10. Advertisement
11. Privacy and Data Security
12. Schedule Management
13. Notifications and Reminders
14. Support and Help Center

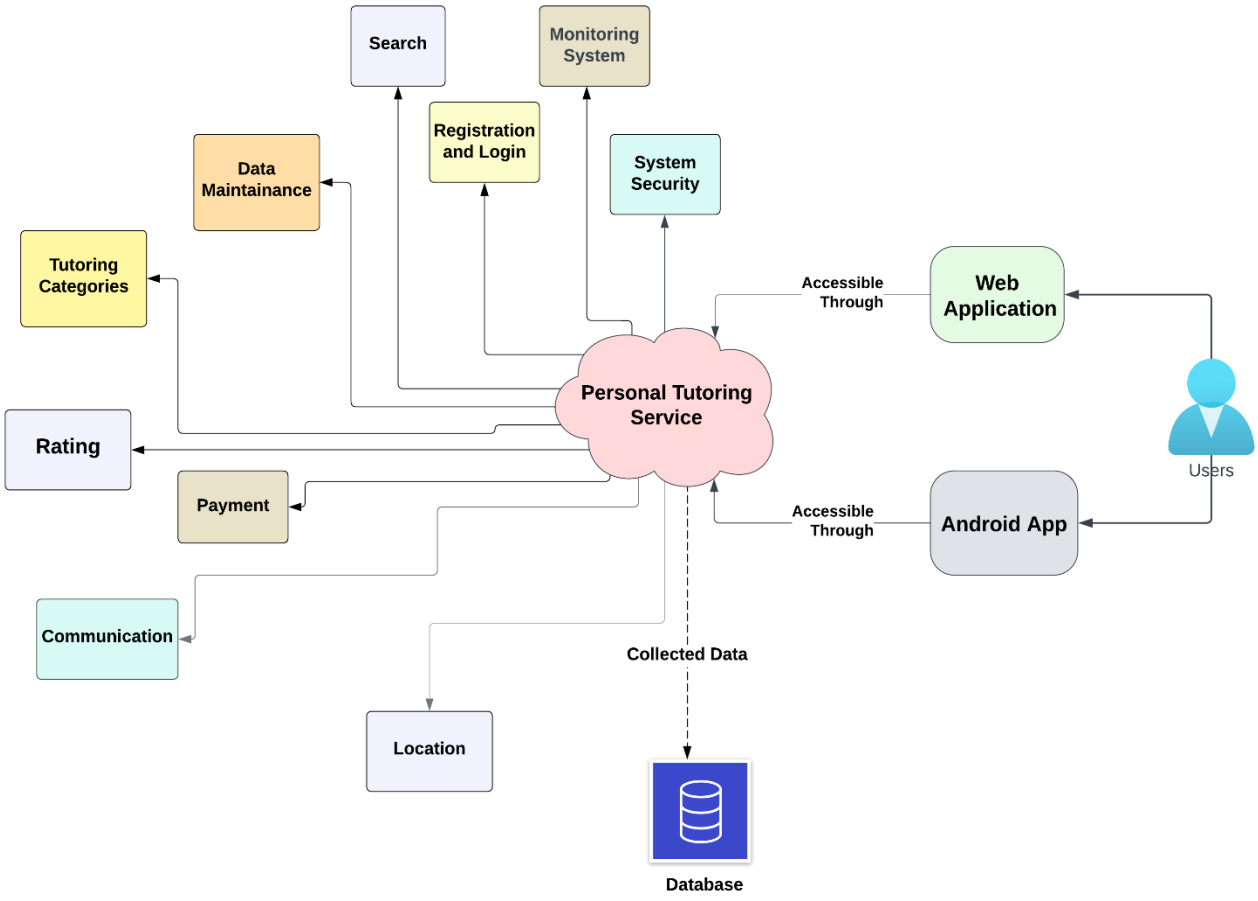
The following is a list of items out of scope:

1. Post project maintenance of the system
2. Financial and Tax Reporting Details
3. Tutoring Categories Expansion
4. Post-Launch App Marketing
5. Sample collection for tutoring services
6. Automatic update of personal information
7. Developing an iOS application for iPhone users
8. Real bank account setup for profit collection
9. Real credit card validation
10. Providing in-house support to tutors and clients

4.1 Project Process Model

For the Personal Tutoring Service (PTS) project, the chosen project model will be the Waterfall model. The Waterfall model is selected for several reasons: The project has well-defined and stable requirements from the start. The client has outlined the minimum required functionality clearly such as registration, login, tutoring categories, hiring tutors, payments, and communication, and additional functionality can be added incrementally without affecting the core requirements. The technology stack and tools required for building a tutoring service platform are likely to be well-established and stable. There is no immediate need for frequent technology updates or iterations. The project operates in a regulated environment where user data, security, and compliance are crucial. The Waterfall model allows for thorough planning and implementation of security measures from the beginning. The client's involvement is crucial at various stages of the project, such as defining tutoring categories, setting up payment structures, and monitoring the platform for ethical and legal issues. Waterfall's clear phases and client validation points ensure that the client's input is integrated into the project effectively. The project involves financial transactions, including payments to tutors and the app owner's profit. The Waterfall model provides a structured approach to implement financial systems and ensures accuracy and security. Integrating internal and external advertisements is a significant aspect of the project. The Waterfall model allows for dedicated phases to design and implement advertisement systems. User experience is critical for a tutoring service platform. The Waterfall model allows for thorough design and testing of the user interface to ensure a seamless experience for both tutors and students. The project requires continuous monitoring to prevent illegal and unethical issues, which can be effectively addressed in the testing and validation phase of the Waterfall model. The project has a relatively short timeframe of three months. While the Waterfall model is often associated with longer development cycles, it can be adapted to meet this deadline by setting clear milestones and adhering to a well-defined schedule. By following the Waterfall model, the PTS project aims to deliver a stable, secure, and feature-rich tutoring service platform within the specified timeframe, meeting the client's requirements while allowing for additional functionality to be incorporated in future iterations. The structured approach of the Waterfall model aligns with the project's characteristics and objectives.

4.2 PROJECT CONTEXT



5. Assumptions and Constraints

5.1 ASSUMPTIONS

The following is a list of assumptions:

- Assume that all users of the PTS platform are over the age of 18. For users under 18, the involvement of an adult guardian is required.
- Ignore any legal issues related to the tutoring services provided on the platform, and assume that all tutors have passed background checks or meet the necessary legal requirements to offer their services.
- Ignore detailed financial and tax reporting requirements for the platform unless the project decides to make a profit publicly.
- There is no need to set up a real bank account to collect money as the App owner for the 20% profit share. Keeping track of this income within the system is sufficient.
- Implement basic credit card validation rules, such as ensuring that credit card numbers are 16 digits long, the card expiration date follows the format "mmyy" and the security code is 3 digits. However, there is no need to perform real-time credit card validation or processing.
- The system should allow the addition of new tutoring categories without the need for programming, providing flexibility to adapt to changing needs.
- Assume that post-project maintenance issues are not within the scope of this project, and the focus is on the initial development and deployment.
- Ignoring any employee vacation cost during the project and health insurance costs.
- Assuming all the software and hardware will work above par and there will be no technical interruptions.
- Assuming that the website will be responsive so that it can be accessed from any digital device not only from personal computers or laptops.

5.2 CONSTRAINTS

The following is a list of constraints:

- The PTS project faces a constraint of having developers with limited experience in Android programming. This constraint may require additional time for learning and adapting to the Android platform.
- The client mentions budget concerns, indicating that there might be limited financial resources available for the project. This constraint could restrict the acquisition of necessary tools or services.
- The PTS project is operating on a tight project schedule, with a duration of just 3 months. This aggressive timeline may lead to increased pressure on the development team and could potentially impact the quality of the final product.
- Ensuring the safety of users, especially when arranging in-person tutoring sessions, is a critical concern. Proper safety measures and monitoring are essential to prevent incidents.
- The project needs to consider all the technical requirements, such as hosting servers, databases, and app infrastructure, which could impact the project timeline and budget.
- Managing external advertisements necessitates a system for approving and controlling ad content to maintain the app's reputation and user experience.
- As the user base grows, the app needs to be scalable to handle increased traffic, tutor listings, and user interactions.
- Allowing users to be a tutor for one category while receiving tutoring in another category can introduce complexity in user management and matching algorithms.

6. Project Tasks, Schedule and Cost

Let’s outline the project tasks, schedule outline, and estimated costs.

- Our project is scheduled to commence on September 5, 2023.
- The project's completion date is set for December 5, 2023, or earlier.
- As the project manager, I will lead a dedicated team of 5 developers who will work full-time to ensure timely project delivery.
- Throughout the project, we will have a total of 3 meetings with clients and superiors to provide progress updates. Outside of these meetings, my team will report exclusively to me and take instructions only from me. All 5 developers and I will maintain a 40-hour workweek and receive compensation accordingly.
- I hold full responsibility for this project and serve as the spokesperson for my team. Any design changes requested by the client should be communicated during the meetings and submitted in written form for consistency and documentation purposes.

Resource	**Cost per Unit**	**Units Needed**	**Total Cost**
Manager	$10k/month (3 months)	1	$30k
Developers	$5k/month (3 months)	5	$75k
Hardware	$1.5k	4	$6k
Database and Servers	$3k	3	$9k
Health Insurance	$2k	6	$12k
Building and Utility cost	-	-	$30k
Other Costs (Tech, etc.)	-	-	$18k
			$180k

- Total estimated cost for client = total cost + 100% profit margin

  = $180k + $180k

  =$360k

Task and subtasks with schedule:

Number	Task Description	Start Date	End Date
1	Team meeting with client to understand goals and requirements gathering. Preparing Project Development Documentation and training.	09/05/2023	09/05/2023
2	Analysis of functionality development. Hardware buying and installation.	09/06/2023	09/08/2023
3	Project designing starts. Choosing APIs, platform, and servers. Project meeting with the client to finalize design.	09/09/2023	09/14/2023
4	Implementation of web application. Front-end development and Android application designing.	09/15/2023	09/28/2023
5	Code repository setup and optimization. Implementation of Android application.	09/29/2023	10/05/2023
6	Implementation of functionalities like tutor registration, tutoring categories, and basic search functionality. Meeting with client for a live demo at 50% implementation.	10/06/2023	10/20/2023
7	Implementation of tutor authentication, being a tutor, and hire a tutor functionality. Enforcing changes based on client feedback.	10/21/2023	11/03/2023
8	Implementation of review and payment functionalities. Profit management setup.	11/04/2023	11/17/2023
9	App Monitoring setup for preventing illegal and unethical issues. Implementation of communication features.	11/18/2023	11/29/2023
10	Location feature implementation. Internal and external advertisement setup.	11/30/2023	12/03/2023
11	Project Deployment. Employee and client satisfaction meeting (in-between).	12/04/2023	12/05/2023

7. Conclusion and Recommendations

In conclusion, the Personal Tutoring Service (PTS) project is set to be operational by December 5, 2023, with a primary focus on delivering a high-quality platform within the stipulated timeline. We are committed to ensuring the security and integrity of the platform, given the sensitive information and financial transactions involved in connecting tutors and students.

The PTS platform is designed to streamline the process of finding and offering tutoring services across various categories. It offers a user-friendly interface for both tutors and students, allowing them to connect, schedule tutoring sessions, and facilitate payments seamlessly. Our development team has worked diligently to meet the minimum required functionality, and we remain open to incorporating additional features and improvements.

For the front-end development of the website and Android application, we will employ modern technologies such as ReactJS and Bootstrap to ensure an attractive and intuitive user experience. Additionally, we will utilize Android Studio for the Android app's development. The backend will rely on robust technologies like MySQL and PHP, ensuring data reliability and scalability.

To enhance the security and trustworthiness of the PTS platform, we will implement blockchain technology for database security. This approach will help protect user data and prevent unauthorized access, ensuring data integrity. According to statistical data, once new information undergoes validation and becomes part of the blockchain, attempting to compromise a single node becomes futile unless the attacker commands a majority share of 51% of the total nodes.

PTS is not merely a tutoring platform; it is a valuable tool for both tutors and students to connect and exchange knowledge. It offers a unique opportunity for tutors to showcase their expertise and for students to find the right tutor to meet their educational needs.

However, we have a couple of recommendations to further improve the system. To capture a broader market share, we recommend developing an iOS application in addition to the Android version. iOS has a significant user base in the United States, and not having an iOS app could limit potential users. Implement AI algorithms to provide personalized tutor recommendations based on user preferences and past interactions. PTS should actively seek user feedback and engage in regular updates and improvements to meet evolving needs and expectations. Continue to invest in robust security measures to protect user data and privacy. Regular security audits, vulnerability assessments, and data encryption should be part of the ongoing maintenance strategy to ensure the utmost security. Regular maintenance and updates are essential for long-term success. While external advertisements can generate extra income, it's important to ensure they are relevant and non-intrusive to the user experience. Careful consideration of ad placements and content should be a priority. Implement data analytics to provide insights to tutors and clients about their progress and areas of improvement. This can help tutors tailor their teaching methods, and clients can track their learning progress more effectively. Expanding language and location support can make the platform more accessible to a global audience. Implement advanced search filters, such as tutor qualifications, availability, or teaching style, to improve the matching process.

In summary, the PTS platform aims to revolutionize the tutoring industry by providing a user-friendly, secure, and efficient way for tutors and students to connect and learn. Our commitment to quality, security, and user satisfaction remains unwavering, and we look forward to delivering a successful project by December 5, 2023, while considering these recommendations for further enhancement.

Appendices

- https://www.sparxitsolutions.com/blog/tutor-booking-app-development-guide/ - Complete guide to develop Personal Tutoring app
- https://www.sciencedirect.com/science/article/pii/S2667295221000386 - A survey on blockchain systems
- https://www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-in-the-united-states/ - Subscriber share held by smartphone operating systems in the United States
- https://www.mmu.ac.uk/about-us/professional-services/uta/personal-tutoring/pt-design#ai-42847-6 - Design a Personal Tutoring System
- https://business.adobe.com/blog/basics/metrics - Learn Metrics for Project Management
- https://lucid.app/ - Create context diagram
- https://goabacus.com/ - Research about hardware cost