



Problem Statements

1. Let's Judge (App Development)

Background Information

Online judge applications are online platforms that allow developers to test and benchmark their code in a simulated environment.

A mobile-based online judge provides an ideal platform for programming students to hone their skills and practice coding challenges. It also provides a convenient way to evaluate coding challenges without the need for a physical programming environment. This is especially useful for students who may not have access to a desktop or laptop computer, as they can access the online judge through their mobile device. Additionally, a mobile-based online judge can provide a more accessible platform for coding competitions, such as hackathons, as the online judge can be used from any location. This can be beneficial for those who are looking to get feedback on their code or participate in coding challenges from the comfort of their home.

Application Requirements

- The Online Judge application must provide a secure, simulated environment in which developers can test their code.
- It should support a variety of programming languages and provide a range of debugging and testing tools.

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- It should also provide feedback on the performance of code, including execution time and memory usage.
- It should be user-friendly and easy to use, with a clear and intuitive interface.

Tips

- <https://judge0.com/>



2. Committee / Club Management Portal (Web Development)

Background Information

For any college, it is crucial that the numerous student committees (technical, cultural, and social) coordinate. Conducting an event within a committee or club, however, is not simple. It requires obtaining approvals from a variety of departments and authorities and obtaining permission for venues. It must also be ensured that there is no clash in timings and locations with other events and lectures.

For example, if CSI S.P.I.T is conducting an event, we would need the approval of the Student Council, the Dean of Student Affairs as well as our Faculty Mentor. This all should be possible from a single platform.

Application Requirements

- Various committees should be able to create events and seek approval from the required faculties and departments.
- There should be a system for students to participate in college events and keep track of the event schedule through the platform.
- Committees should be able to view the availability of rooms and venues on the campus to ensure there are no clashes.



3. NGO Student Management (Web Development)

Background Information

Yasham Foundation is an NGO that deals with the education of underprivileged students. They partner with coaching institutes from across the country to offer JEE, NEET, and UPSC coaching as well as regular classes to underprivileged children. However, there is no system in place for easy management and assignment of these students to institutes.

Furthermore, Yasham is entirely run by the efforts and goodwill of its volunteers who are also students from colleges across India. However, there is no system to manage this network of volunteers, and the process of onboarding these volunteers, and handing out certificates and letters of recommendation is currently completely manual.

Application Requirements

- There should be a system for management and easy adding of students to the database. Note that partner schools often share a list of students in Excel format.
- The portal should be able to manage volunteers, view and track their achievements/hours, and easily hand out certificates and LORs.



4. AI Assistant StudyPat

Background Information

A study assistant for students that would help them in increasing their productivity by using AI-powered tools. One of the tools could be posture detection and correction. Students tend to have a bad posture after long durations of studying. An AI study assistant is a software application designed to help students improve their productivity and efficiency while studying. It uses artificial intelligence tools and algorithms to provide personalized support and guidance to students

The end goal of this problem statement is to improve the productivity of the student using (but not exclusively limited to) AI-based solutions.

Application Requirements

- The model should be integrated with a web or mobile application.
- The system should be personalized to the student over time.
- Study material recommendation: The AI study assistant can analyze a student's learning style, preferences, and previous performance to suggest personalized study materials, increasing the effectiveness of the study process.
- Adaptive Learning: An AI system that can analyze a student's learning pace, strengths, and weaknesses, and adapt to their individual needs, providing personalized content and exercises.

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- Time Management: An AI tool that can help students plan their time more effectively by identifying the most important tasks, prioritizing them, and allocating time more efficiently.
- Writing Assistance: An AI tool that can help students improve their writing by offering suggestions for grammar, spelling, and tone.
- Posture Detection and Correction: An AI tool that can detect and correct a student's posture in real-time, helping them maintain a healthy posture while studying.
- **Note:** The requirements for this PS are not mandatory and are only suggestions.



5. Network Security Prediction System (AI-ML)

Background Information

As technology is growing, hackers are getting smarter as well, and cybersecurity has become one of the major issues. Your task is to design a model which predicts how safe a system is and suggest improvements to increase security, to ensure the data of users is safe.

Application Requirements

- The application should accept a dataset of the given network and predict the security rates from various perspectives for a given network.
- The model should be integrated with a web/mobile application.
- The model should be configurable to various security threats and arrange the weights according to the user's requirement and then provide a security score.
- Threat Detection: The ability to detect and analyze known and unknown threats, such as malware, phishing attacks, and network intrusions.
- Vulnerability Assessment: The ability to scan and assess the system for potential vulnerabilities and weaknesses, such as outdated software, misconfigured settings, and unpatched software.
- Risk Assessment: The ability to analyze and quantify the potential impact of a security breach, such as data loss, downtime, and reputational damage.



- Recommendations: The ability to provide recommendations for improving the security of the system, including best practices, security controls, and remediation steps.
- Integration with Security Tools: The ability to integrate with existing security tools and technologies, such as firewalls, antivirus software, and intrusion detection systems.
- User-Friendly Interface: A user-friendly interface that allows for easy navigation, visualization, and reporting of security information.
- **Note:** The requirements for this PS are not mandatory and are only suggestions.

References:

NIST Cybersecurity Framework: <https://www.nist.gov/cyberframework>

OWASP Top 10 Project: <https://owasp.org/Top10/>

SANS Institute: <https://www.sans.org/>

Datasets:

Kaggle : : : :
<https://www.kaggle.com/datasets?sortBy=relevance&group=public&search=cybersecurity&page=1&pageSize=20>

NIST National Vulnerability Database: <https://nvd.nist.gov/>

Common Crawl: <https://commoncrawl.org/>

GitHub Datasets

<https://github.com/shramos/Awesome-Cybersecurity-Datasets#webapps>



6. AR/VR for Education

Background Information

A picture speaks a thousand words, but in our modern era why restrict ourselves to just that? Students learn much faster when it's interactive and fun.

Devise a solution that helps students learn concepts such as projectile motion and other concepts, in an interactive and fun manner.

Ensure usage of AR/VR in some manner.

Application Requirements

- The models must be incorporated into a web or mobile application.
- The solution should be accessible to students with different abilities and disabilities, providing alternative methods of interaction and navigation.



7. Decentralized Tweeting System

Background Information

Social Media platforms in general have access to a lot of our personal information that is stored on centralized servers that are prone to security threats. There is also less transparency and control given to the user as the controller of the application can suspend his or her account at will. Build a decentralized platform that allows users to share their opinions and feelings online while considering the above.

Application Requirements

- The application user should be able to upload any form of content, text, images, videos, other forms of media, etc.
- Take into consideration various factors like hate speech, sensitive content, etc.
- The application should be decentralized in nature.
- Various users should be able to view other users' uploaded content.



8. Pay-per-view Blockchain solution

Background Information

The problem of content distribution and access control has been a challenge for many industries, including entertainment, education, and media. The traditional methods for delivering and accessing content, such as television and movie subscriptions, online streaming services, and e-learning platforms, are often centralized and reliant on intermediaries, such as payment processors and content delivery networks. This centralization can lead to several challenges, including inefficiency, lack of transparency, high costs, and intermediary dependence.

By leveraging the benefits of blockchain technology, such as security, transparency, and immutability, a pay-per-view blockchain solution can address these challenges and provide a secure, efficient, and transparent platform for delivering and accessing content and services.

Build an OTT platform where service providers give viewers an option to decide on a pay-per-use basis for digital content. This payment can be via micropayments in Ethereum-based tokens.



Application Requirements

- The application should be decentralized in nature.
- The application should have a working payment system through some form of cryptocurrency.
- Content Provider: The content provider creates and uploads content, such as a video, article, or music, to the blockchain platform.
- User: The user requests access to the content by paying a fee using cryptocurrency or other payment methods supported by the platform.
- Decentralized Storage: The content is stored on a decentralized storage network, such as InterPlanetary File System (IPFS), to ensure that it is secure, immutable, and accessible to the user.
- Audit: The platform provides a transparent audit trail of all transactions and access to the content, ensuring that the payment and access records are secure and tamper-proof.
- **Note:** The requirements for this PS are not mandatory and are only suggestions.



9. Securing Business Certifications and Licenses (Web Development)

Background Information

The current process of securing certifications and licenses for businesses is often a lengthy and cumbersome process involving multiple steps and organizations. This can result in delays and confusion for businesses, resulting in lost time and money. A system to streamline this process would provide businesses with the ability to quickly and easily access the necessary documents, eliminating the need to manually search for them and contact different organizations. The platform would act as a SaaS platform that would enable multiple entities to automate their document verification processes.

Application Requirements

- The system should allow businesses to enter their basic information such as business name, address, type, size, and any other relevant information.
- The system should then provide the list of necessary documents for the business to download, review, and sign.

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- Once the documents are signed, the system should be able to transmit them to the relevant government agencies or organizations to secure the certifications and licenses.
- The system should also provide the ability to track the progress of the applications and inform the business when the certifications and licenses have been approved.



10. Eco-Quest (App Development)

Background Information

The current problem scenario is that many people struggle to adopt sustainable habits and reduce their impact on the environment. Despite increasing awareness of the importance of sustainability, many people find it difficult to make changes in their daily lives that support this goal. This can be due to a lack of information, a lack of motivation, or simply because it can be challenging to know where to start. To address this issue, there is a need for new and innovative solutions that can make reducing waste and promoting sustainability more accessible, engaging, and achievable for everyone.

Application Requirements

- Tracking and recording: The app must be able to track and record the user's daily actions related to reducing waste and promoting sustainability.
- Gamification: The app must incorporate elements of gamification, such as challenges, rewards, and progress tracking, to make the experience of reducing waste and promoting sustainability engaging and fun.



- Sustainable habits: The app must provide information and resources to help users adopt sustainable habits, such as reducing plastic usage or using eco-friendly products.
- User accounts: The app must allow users to create an account and track their progress over time.
- Easy-to-use interface: The app must have a user-friendly interface that is intuitive and easy to use.
- Notifications and reminders: The app must provide notifications and reminders to help users stay on track and make sustainable choices.
- Social features: The app should include social features, such as the ability to share progress and compete with friends, to encourage community involvement and support.