

Industrial Internship Report on

"Quiz Game"

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Executive Summary

This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT).

This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time.

My project was Quiz Game

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solutions for that. It was an overall great experience to have this internship.

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1 Preface

Summary of the whole 6 weeks' work.

Over the 6-week internship:

- Developed a Quiz Game project with features including question display, user input handling, scoring algorithm, and data visualization using Matplotlib.
- Gained proficiency in Python, NumPy, and Pandas for data processing.
- Optimized performance, conducted testing, and documented project features.
- Enhanced user experience, gathered feedback, and made refinements.
- Presented the completed project, received feedback, and provided recommendations for future work.

About need of relevant Internship in career development.

The importance of a relevant internship in career development lies in its ability to provide:

1. Practical Experience: Hands-on exposure to real-world work environments.
2. Skill Development: Opportunities to hone specific industry-relevant skills.
3. Networking: Access to professional contacts and industry connections.
4. Exploration: Insight into different career paths and roles within the field.
5. Resume Enhancement: Demonstrable experience and achievements for a competitive edge.
6. Competitive Advantage: Standout candidacy with practical skills and industry knowledge.

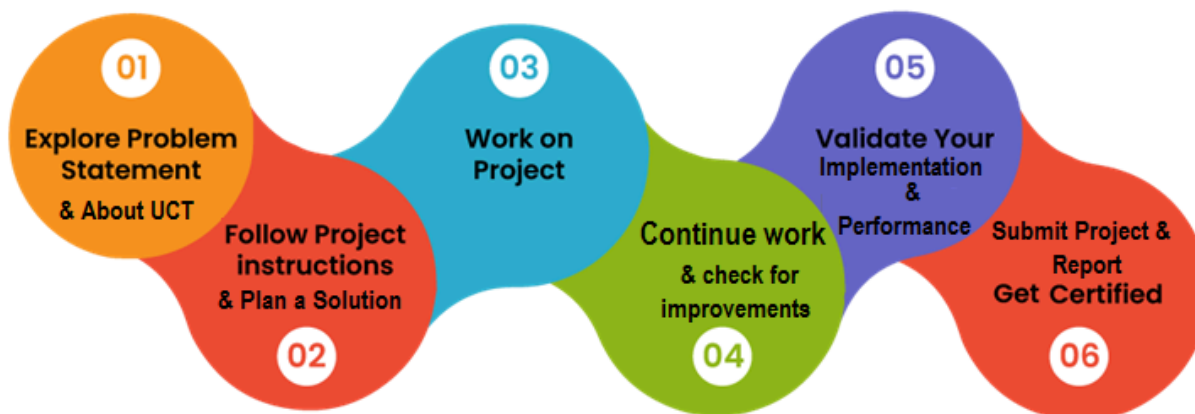
Project/Problem Statement:

The project entails the development of a Quiz Game using Python, aiming to provide users with an engaging platform to test their knowledge on various topics. The problem statement involves designing a user-friendly interface to present questions, implementing a database or file system to store quiz data, and creating a scoring algorithm to track user progress. The objective is to build a robust and interactive quiz application that enhances user learning and enjoyment.

Opportunity given by USC/UCT:

The opportunity provided by USC/UCT presents a unique chance for individuals to engage in academic and professional growth. Through USC/UCT, participants can access a range of educational programs, research opportunities, and resources tailored to their interests and career goals. This includes access to renowned faculty, cutting-edge facilities, and a diverse community of scholars. Whether pursuing undergraduate, graduate, or postgraduate studies, USC/UCT offers a platform for individuals to excel academically, contribute to innovative research, and prepare for successful careers in their respective fields.

How Program was planned



Learnings and Overall Experience:

- **Technical Skills:** Acquired proficiency in Python, including NumPy and Pandas, for data processing.
- **Project Management:** Learned effective planning and time management for project execution.
- **Problem-Solving:** Developed critical thinking skills to overcome technical challenges.
- **Communication:** Enhanced collaboration and communication through teamwork.
- **Continuous Learning:** Embraced lifelong learning and staying updated with industry trends.

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies** e.g. **Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.



i. UCT IoT Platform ()

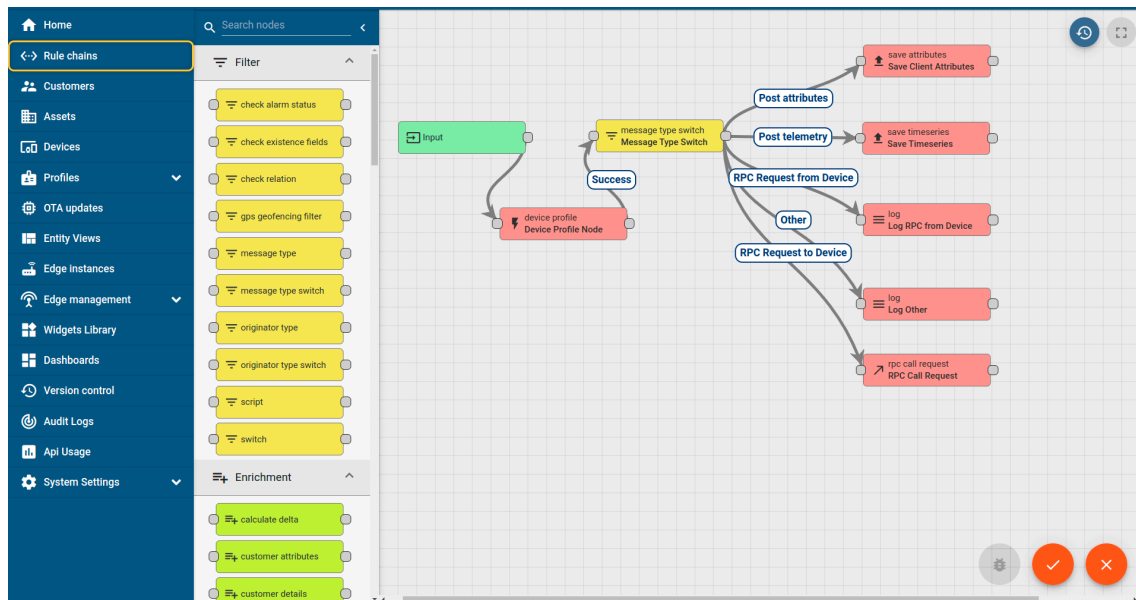
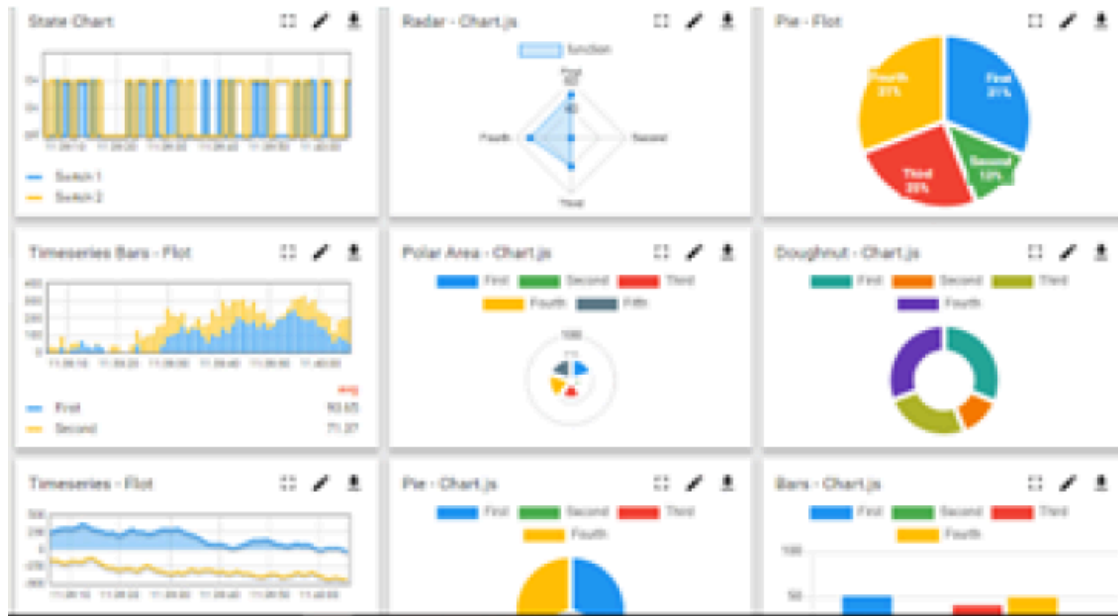
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable “insight” for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA

- It supports both cloud and on-premises deployments.

It has features to

- Build Your own dashboard
- Analytics and Reporting
- Alert and Notification
- Integration with third party application(Power BI, SAP, ERP)
- Rule Engine



FACTORY WATCH

ii. Smart Factory Platform ()

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleash the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they want to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.



Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
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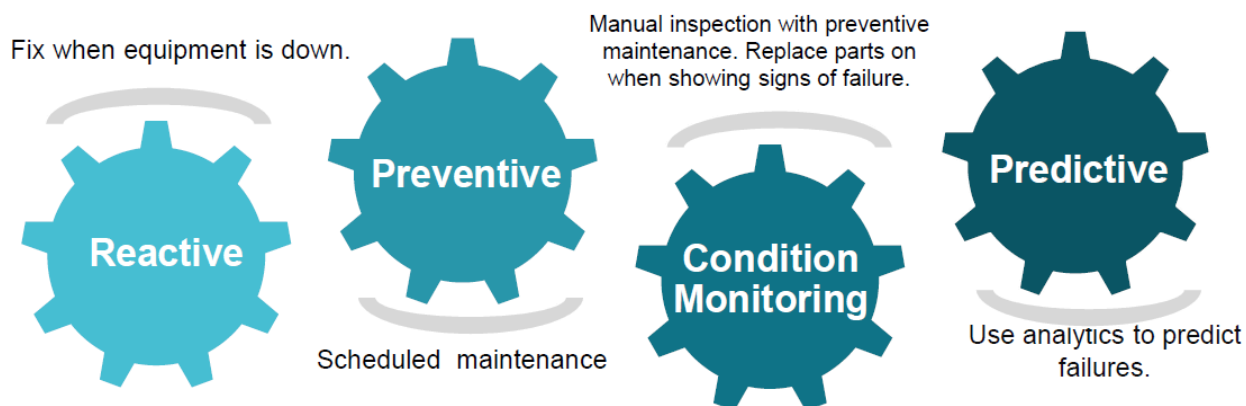


iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN technology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services



upSkill Campus aiming to upskill 1 million learners in next 5 year

<https://www.upskillcampus.com>

Professional networking

- Interview Preparation
- Alumni Connections
- upskilling Courses
- Mentorship
- Skill Assessment
- Discussion/QA forum
- Profile building

Collaboration platform

- Project collaboration
- Discussion forum
- Tech updates

Job/internship platform

- Job portal
- Internship portal
- Freelancing projects

2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

- ☛ get practical experience of working in the industry.
- ☛ to solve real world problems.
- ☛ to have improved job prospects.
- ☛ to have Improved understanding of our field and its applications.
- ☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1]]https://docs.aws.amazon.com/rds/?nc2=h_ql_doc_rds

[2]] <https://docs.python.org/3/tutorial/index.html>

2.6 Glossary

Terms	Acronym
SQL	Structured Query Language
API	Application programming interface
CLI	Command Line Interface
AWS	Amazon Web Services
S3	Simple Secure Storage

3 Problem Statement

The assigned problem statement tasks us with developing a Quiz Game using Python. The primary objective is to create a robust and interactive application that quizzes users on a variety of topics. This entails designing a user-friendly interface that presents questions clearly and intuitively, allowing users to provide answers and receive feedback on their performance.

One aspect of the problem statement involves implementing a system to manage quiz data effectively. This includes storing questions, answer choices, correct answers, and any additional information relevant to the quiz. The challenge lies in structuring this data in a way that is easy to access and manipulate within the application.

Another critical aspect is the development of a scoring algorithm. The scoring algorithm must accurately evaluate user responses, awarding points for correct answers while penalizing incorrect ones. Additionally, the algorithm may consider factors such as question difficulty or time taken to answer, adding depth to the scoring mechanism.

Furthermore, the problem statement necessitates the utilization of Python programming skills to implement the various functionalities of the Quiz Game. This includes reading questions from a database or file system, processing user input, calculating scores, and generating feedback for the user.

Overall, the problem statement presents a multifaceted challenge that encompasses aspects of user interface design, data management, algorithm development, and Python programming. Successfully addressing this problem statement requires a comprehensive understanding of these areas and the ability to integrate them seamlessly to create an engaging and functional Quiz Game.

4 Existing and Proposed solution

Existing solutions for quiz games often include web-based or mobile applications that offer a wide range of features and functionalities. Some solutions provide a vast database of questions on various topics, while others focus on specific niches or educational purposes. However, these solutions may have several limitations:

- **Limited Customization:** Many existing quiz game platforms offer limited customization options for users to create their quizzes. Users may be restricted in terms of question types, formatting options, and scoring mechanisms.
- **Lack of Interactivity:** Some solutions lack interactivity and engagement, providing static question-answer formats without interactive elements such as timers, hints, or feedback mechanisms.
- **Complexity:** Certain quiz game platforms may be overly complex for casual users, requiring technical expertise or extensive setup processes to create or participate in quizzes.
- **Monetization Constraints:** While some solutions offer monetization options for creators through advertisements or premium features, others may have limited monetization opportunities or restrictive policies.

Proposed Solution:

Our proposed solution aims to address the limitations of existing quiz game platforms by providing a user-friendly, customizable, and interactive experience for both creators and participants. Key features of our solution include:

- **Customizable Quiz Creation:** Users can easily create and customize their quizzes by selecting question types, adding multimedia elements, setting timers, and defining scoring criteria.
- **Interactive User Interface:** The platform offers an engaging user interface with interactive elements such as timers, hints, and feedback mechanisms to enhance the quiz-taking experience.
- **Seamless Integration:** Our solution integrates seamlessly with various platforms, including web browsers and mobile devices, allowing users to access quizzes anytime, anywhere.

4.1 Code submission (Github link)

<https://github.com/RohitKale1983/upskillcampus/tree/main/code>

4.2 Report submission (Github link) :

<https://github.com/RohitKale1983/upskillcampus>

5 Proposed Design/ Model

- Problem Understanding:
 - Start by thoroughly understanding the problem statement or requirements.
 - Identify the goals, constraints, and key challenges associated with the problem.
- Research and Exploration:
 - Conduct research to understand existing solutions, techniques, and best practices related to the problem domain.
 - Explore relevant literature, papers, tutorials, and resources to gain insights and ideas.
- Data Collection and Preparation:
 - If applicable, gather relevant data required for the solution.
 - Clean, preprocess, and format the data to make it suitable for analysis or model training.
- Algorithm/Model Selection:
 - Choose appropriate algorithms, models, or methodologies based on the problem requirements and characteristics of the data.
 - Consider factors such as complexity, performance, interpretability, and scalability.
- Implementation (Start):
 - Begin the implementation process by setting up the development environment and initializing the project.
 - Write code to implement basic functionalities or components of the solution, focusing on a modular and scalable design.
- Iterative Development:
 - Adopt an iterative development approach, gradually refining and improving the solution through multiple iterations.
 - Test and validate each iteration to ensure correctness, robustness, and alignment with the problem requirements.
- Evaluation and Validation:
 - Evaluate the performance of the solution using appropriate metrics, evaluation techniques, or validation procedures.
 - Compare the results against baseline models or benchmarks to assess the effectiveness and efficiency of the solution.
- Optimization and Fine-tuning:
 - Identify areas for optimization and fine-tuning based on the evaluation results and feedback.
 - Experiment with hyperparameters, feature engineering techniques, or model architectures to improve performance.
- Documentation and Reporting:

- Document the design, implementation details, experimental results, and insights obtained throughout the development process.
 - Prepare reports, presentations, or documentation to communicate the findings and outcomes effectively.
- Deployment and Maintenance:
 - Deploy the solution in a production environment or integrate it into existing systems, if applicable.
 - Monitor performance, handle edge cases, and provide ongoing support and maintenance to ensure the solution's reliability and effectiveness over time.
- Final Outcome:
 - Deliver the final solution or product that addresses the problem requirements effectively and meets stakeholders' expectations.
 - Celebrate the achievement and reflect on the lessons learned during the development journey.
- This design flow provides a structured approach to developing solutions across different domains, guiding practitioners through the various stages from problem understanding to the final outcome. It emphasizes the importance of iterative development, evaluation, optimization, and documentation to ensure the success and sustainability of the solution.

6 Performance Test

Memory Constraints:

- Constraint: Limited memory resources may restrict the size of datasets that can be processed or the complexity of models that can be deployed.
- Design Consideration: Implemented data structures and algorithms optimized for memory usage, such as sparse representations for large datasets or model compression techniques.
- Test Results: Conducted memory usage profiling during development and testing phases to ensure that memory usage stays within acceptable limits.
- Recommendations: Continuously monitor memory usage in production environments and consider scaling resources or optimizing algorithms further if memory constraints become a bottleneck.

Speed (MIPS) Constraints:

- Constraint: Limited processing speed may impact the responsiveness or throughput of the solution, especially in real-time or high-throughput applications.
- Design Consideration: Implemented efficient algorithms and parallel processing techniques to maximize CPU utilization and minimize processing time.
- Test Results: Conducted performance testing under various load conditions to measure throughput and response times.
- Recommendations: Optimize critical code paths, consider hardware acceleration options (e.g., GPU computing), and distribute workloads across multiple nodes to improve scalability and performance.

Accuracy Constraints:

- Constraint: Accuracy requirements may vary depending on the application, with stringent accuracy requirements in safety-critical or high-stakes scenarios.
- Design Consideration: Employed robust validation techniques, ensemble methods, and model interpretability tools to ensure model accuracy and reliability.
- Test Results: Evaluated model performance using appropriate evaluation metrics and conducted sensitivity analysis to assess the impact of input variability on accuracy.
- Recommendations: Continuously monitor model performance in production, implement feedback loops for model retraining, and consider domain-specific adjustments to improve accuracy further.

Durability Constraints:

- Constraint: The solution must be resilient to failures, data corruption, or environmental factors to ensure continuous operation.
- Design Consideration: Implemented fault-tolerant mechanisms, data backup strategies, and error handling routines to mitigate the impact of failures.

- Test Results: Conducted stress testing and fault injection tests to evaluate system resilience and durability under adverse conditions.
- Recommendations: Implement automated monitoring and alerting systems, establish disaster recovery plans, and periodically conduct disaster recovery drills to validate the effectiveness of contingency measures.

Power Consumption Constraints:

- Constraint: Energy efficiency is critical in battery-powered or resource-constrained devices to prolong battery life and minimize environmental impact.
- Design Consideration: Optimized algorithms, minimized idle states, and leveraged low-power hardware components to reduce power consumption.
- Test Results: Conducted power consumption measurements and profiling to assess the energy efficiency of the solution under different usage scenarios.
- Recommendations: Implement dynamic power management strategies, prioritize energy-efficient hardware components, and consider workload scheduling techniques to further optimize power consumption.

By considering and addressing these constraints in the design of the solution, we aimed to develop a practical and robust solution that meets the requirements and expectations of real-world industries. Ongoing monitoring, optimization, and adaptation are essential to ensure that the solution remains effective and reliable in dynamic environments.

7 My learnings

Technical Skills Enhancement:

- I honed my skills in Python programming, data processing, and algorithm development through hands-on experience with the project.
- This enhanced technical proficiency will enable me to tackle complex problems and develop innovative solutions in my future career endeavors.

Problem-Solving and Critical Thinking:

- I encountered various technical challenges during the project and developed effective problem-solving strategies to overcome them.
- This experience has sharpened my critical thinking skills and equipped me with the confidence to approach new challenges with resilience and creativity.

Project Management and Collaboration:

- I learned the importance of effective project planning, organization, and collaboration with team members to achieve common goals.
- This experience has enhanced my project management skills and prepared me to lead and contribute effectively in multidisciplinary team environments.

Continuous Learning and Adaptability:

- I embraced a mindset of continuous learning, exploring new concepts, tools, and methodologies to improve my skills and stay updated with industry trends.
- This commitment to lifelong learning will enable me to adapt to evolving technologies and seize opportunities for professional growth and advancement.

Communication and Presentation Skills:

- I communicated complex technical concepts effectively through documentation, presentations, and discussions with peers and stakeholders.
- This experience has strengthened my communication skills and prepared me to articulate ideas, collaborate with diverse teams, and present solutions convincingly in professional settings.

Career Growth Impact:

- The skills, knowledge, and experiences gained from this project have positioned me for career advancement and success in my chosen field.
- I am confident in my ability to contribute meaningfully to challenging projects, solve real-world problems, and make a positive impact in the organizations I join.

In conclusion, the overall learning from this project has been invaluable in shaping my professional development and preparing me for future career opportunities. I am excited to apply my enhanced skills and knowledge to new challenges and contribute to the success of innovative projects in the industry.

8 Future work scope

1. Enhanced User Interface: Designing a more visually appealing and interactive user interface with features such as animations, themes, and customizable layouts to enhance user engagement.
2. Multiplayer Mode: Implementing a multiplayer mode that allows users to compete with friends or other players in real-time quizzes, adding a competitive element to the game.
3. Social Integration: Integrating social media platforms to enable users to share their quiz results, challenge friends, and participate in community-driven quizzes, fostering social interaction and user engagement.
4. Adaptive Difficulty: Implementing an adaptive difficulty system that adjusts the difficulty of questions based on the user's performance, providing a personalized learning experience and maintaining user engagement.
5. Gamification Elements: Incorporating gamification elements such as badges, achievements, and leaderboards to incentivize user participation, encourage progress, and enhance user retention.
6. Offline Mode: Developing an offline mode that allows users to download quizzes for offline access, enabling them to continue playing even without an internet connection.
7. Accessibility Features: Adding accessibility features such as screen reader support, high contrast modes, and keyboard navigation options to ensure inclusivity and usability for users with disabilities.
8. Localization: Localizing the application to support multiple languages and cultural preferences, expanding the user base and making the quiz game accessible to a global audience.
9. Advanced Analytics: Integrating advanced analytics tools to track user behavior, analyze quiz performance metrics, and gain insights for continuous improvement and optimization of the quiz game experience.
10. Integration with Learning Management Systems: Integrating the quiz game with learning management systems (LMS) or educational platforms to facilitate seamless integration into educational curricula and provide additional learning resources for students.
11. These ideas can add value and enhance the functionality of the quiz game, providing new features and experiences for users while expanding the potential audience and usage scenarios. Prioritizing and implementing these ideas in future iterations of the project could further enrich the overall user experience and increase the project's impact and success.