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 coll
This internship was focused on a project/problem statement provided by UCT. We had to finish the project incl
My project was a Django-based quiz application designed to offer dynamic, subject-specific quizzes with randor
This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement

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1 Preface

Summary of the Whole 4 Weeks' Work:

Over the past four weeks, I have been deeply involved in developing and enhancing a quiz application as part of my internship with UpSkills Campus and UniConverge Technologies Pvt. Ltd. The project began with setting up a robust Django framework, followed by implementing core functionalities such as user management, question management, and level management. We focused on integrating dynamic features like randomizing quiz questions, managing user scores, and ensuring a smooth user experience with timers and interactive elements. The final deliverable was a comprehensive quiz game with an efficient backend, user-friendly interface, and advanced features for an engaging quiz experience.

About the Need for Relevant Internship in Career Development:

Participating in this internship was crucial for my career development as it provided hands-on experience with real-world applications and technologies. It allowed me to apply theoretical knowledge in a practical environment, enhance my technical skills, and understand industry standards and best practices. The internship also offered valuable insights into project management, problem-solving, and teamwork, which are essential for a successful career in software development and cloud computing.

Brief About Your Project/Problem Statement:

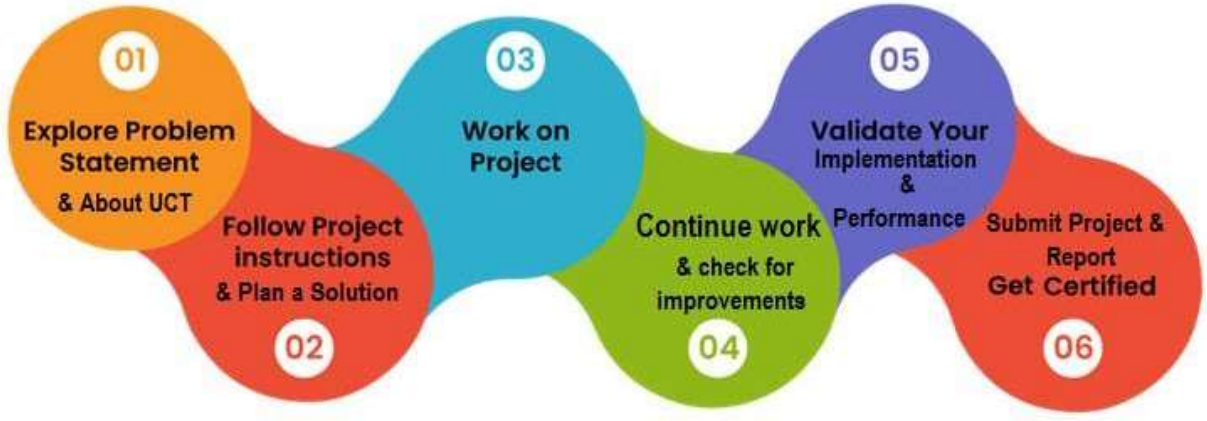
The project involved creating a quiz application where users can take quizzes on various subjects and levels. The main problem was to build a system that could handle quiz management efficiently, including adding and managing questions, levels, and subjects, as well as providing a seamless user experience. Key features included user management, question randomization, and a timer for quizzes. The goal was to develop a robust and interactive platform that could cater to diverse quiz needs while ensuring a smooth and engaging experience for users.

Opportunity Given by USC/UCT:

The internship with UpSkills Campus (USC) and UniConverge Technologies Pvt. Ltd. (UCT) provided an invaluable opportunity to work on a real-world project, gain industry experience, and collaborate with professionals in the field. The program offered a structured learning environment, access to advanced tools and technologies, and the chance to contribute to meaningful projects. This experience was instrumental in bridging the gap between academic knowledge and practical application, preparing me for future career challenges.

How the Program Was Planned:

The internship program was meticulously planned to ensure a comprehensive learning experience. The initial phase involved understanding the project requirements, setting up the development environment, and familiarizing myself with the tools and technologies. Subsequent weeks focused on iterative development, including designing and implementing features, testing, and debugging. Regular feedback sessions and progress reviews were conducted to align with the project goals and ensure timely delivery. The program also included mentorship and support from industry professionals, which was crucial for addressing challenges and refining skills.



Learnings:

During the internship, I gained significant insights into several key areas:

1. **Practical Application of Knowledge:** I was able to apply theoretical concepts learned during my studies to real-world scenarios, particularly in web development with Django and cloud technologies. This experience solidified my understanding and improved my problem-solving skills.
2. **Project Management:** Working on a complex project taught me about planning, execution, and the importance of iterative development. I learned how to manage tasks, prioritize features, and meet deadlines effectively.
3. **Technical Skills:** I enhanced my technical skills in Django, Python, and web development. I also became proficient in handling databases, user authentication, and integrating various features like timers and dynamic content.
4. **Teamwork and Communication:** Collaborating with mentors and peers improved my teamwork and communication skills. I learned the importance of clear documentation, regular updates, and constructive feedback in a professional setting.
5. **Handling Challenges:** Facing and overcoming technical issues, such as debugging and optimizing code, helped me develop resilience and adaptability. I learned to approach problems methodically and seek solutions effectively.

Overall Experience:

The internship was a highly enriching experience. It provided a platform to apply and expand my knowledge, work on a meaningful project, and gain valuable industry experience. The guidance and support from mentors and the opportunity to contribute to a real-world application were instrumental in my professional growth.

Acknowledgments:

I would like to extend my sincere thanks to all the Coordinators and Mentors Helped me during the whole duration of internship.

Message to Juniors and Peers:

To my juniors and peers, I encourage you to embrace opportunities like internships with enthusiasm. They offer a chance to bridge the gap between academic learning and practical application. Be proactive in seeking feedback, stay curious, and don't shy away from challenges. Such experiences are invaluable for personal and professional growth. Approach every project with dedication, and you will gain skills and insights that will serve you well in your future career.

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.

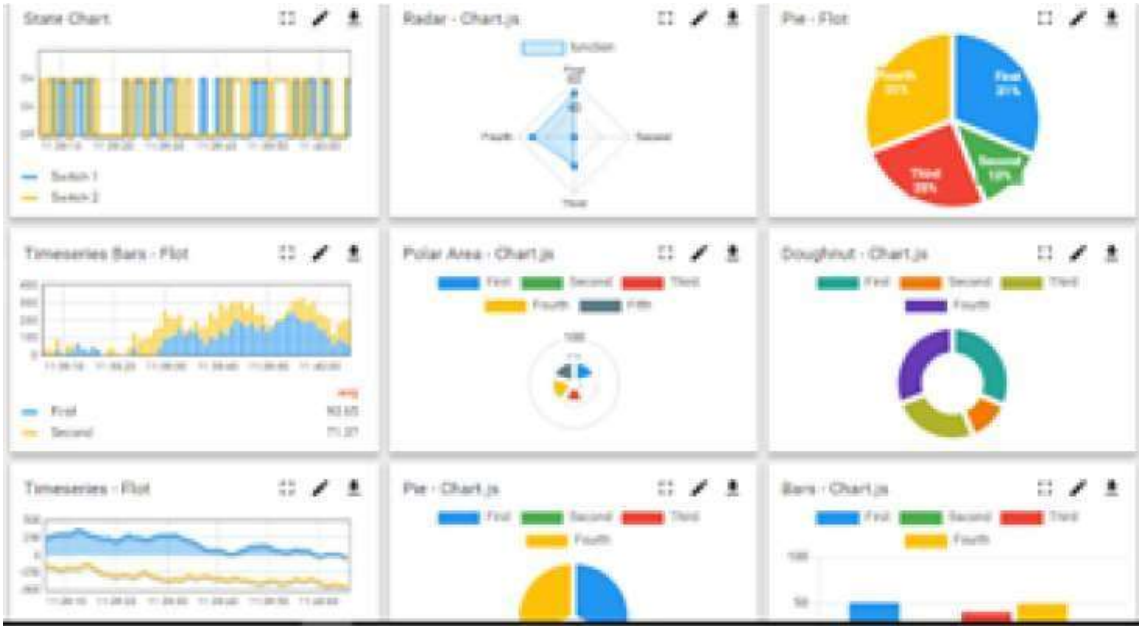
i. UCT IoT Platform (uct Insight)

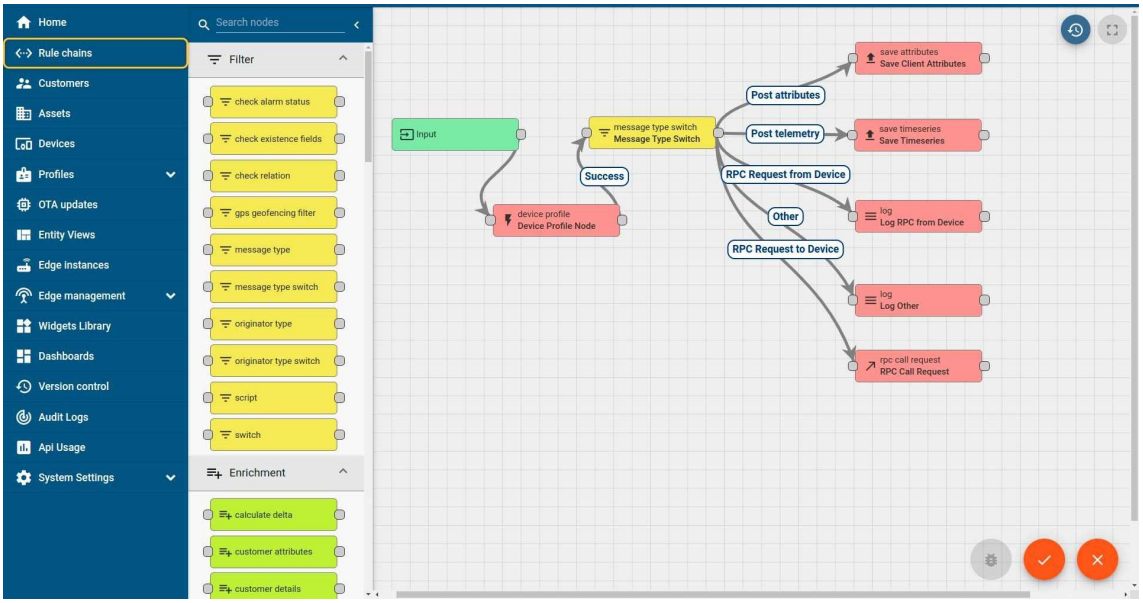
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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





ii. Smart Factory Platform (FACTORY WATCH)

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 unleased 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 what 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.

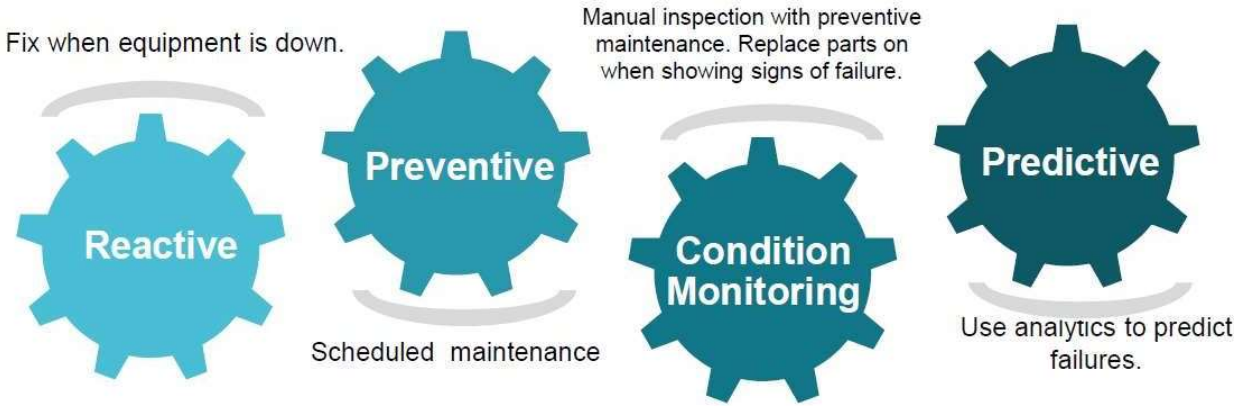
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1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

iii. LoRaWAN based Solution

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

iv. Predictive Maintenance

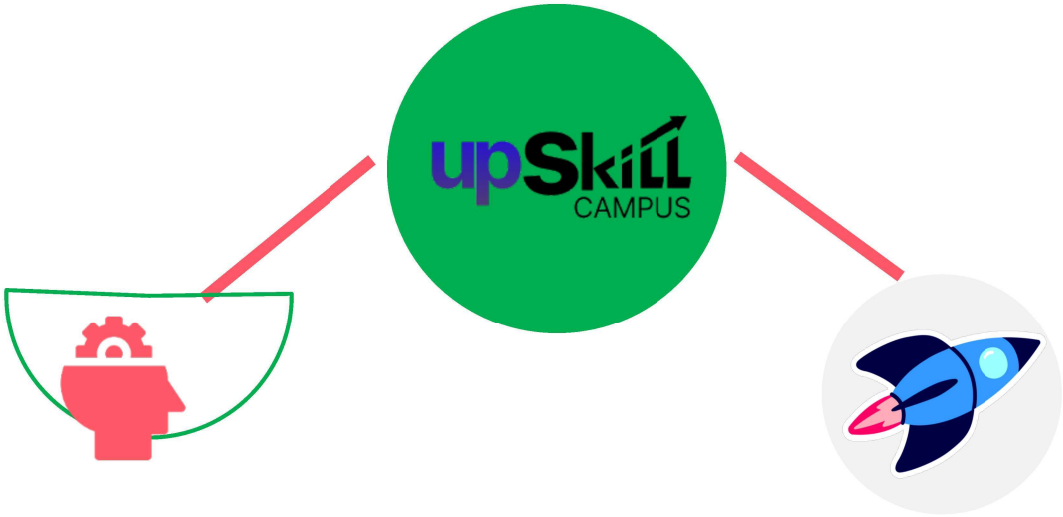
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

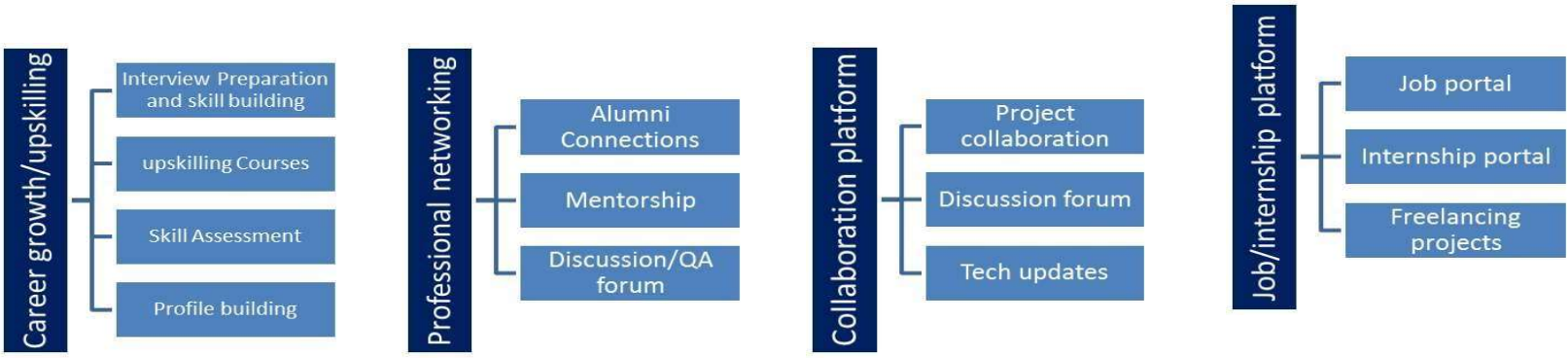
upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

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



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://www.uniconvergetech.in/about-us

[2] https://www.theiotacademy.co/about-us

[3] https://learn.upskillcampus.com/aboutus

2.6 Glossary

Terms	Acronym
UCT	Uniconverge Technologies
IITR	Indian Institute Of Technology Roorkee
EICT	Electronics and ICT Academy
IITG	Indian Institute Of Technology Guwahati
IITK	Indian Institute Of Technology Kanpur

3 Problem Statement

The assigned problem was to develop an interactive quiz application where users could take subject-specific quizzes. The application needed to manage different levels of difficulty, randomly select and display a set number of questions for each quiz, enforce a time limit, and prevent cheating by restricting the user's ability to copy questions or switch tabs during the quiz. Additionally, the project required functionalities for admin management of quiz content and a contact form for feedback.

4 Existing and Proposed solution

Existing Solutions:

1. **Quiz Apps with Static Questions:**
    - **Limitations:** These apps often have a fixed set of questions per quiz, lacking variety and randomization, which can make quizzes predictable and less challenging over time.
2. **Basic Online Quiz Platforms:**
    - **Limitations:** Many platforms do not provide robust security features, allowing users to switch tabs or copy questions, leading to potential cheating. They also often lack a timer or progress-tracking features.
3. **Quiz Applications Without Level Differentiation:**
    - **Limitations:** These apps do not offer different levels of difficulty, making it difficult for users to find quizzes that match their skill level or learning progression.
4. **Limited Admin Control:**
    - **Limitations:** Many existing solutions offer limited functionalities for admins to manage and update quiz content, which can lead to outdated or irrelevant questions.

Proposed Solution:

My solution addresses these limitations by introducing a dynamic quiz system where questions are randomly selected from a database, ensuring variety and unpredictability. The app includes robust security features to prevent cheating, such as full-screen enforcement and non-copiable questions. Additionally, it offers multiple levels of difficulty, allowing users to progress as they improve. Admins have comprehensive control over quiz content, including the ability to add, update, or delete questions and levels.

Value Addition:

The proposed solution adds value by enhancing user engagement through random

question selection and a tiered difficulty structure. It also ensures quiz integrity with

security features and provides admins with powerful tools for content management, making the platform more versatile and user-friendly.

4.1 Code submission (Github link)

https://github.com/Rahul010803/upskillcampus

4.2 Report submission (Github link) :

https://github.com/Rahul010803/upskillcampus/QuizGame_Rahul_USC_UCT.pdf

5 Proposed Design/ Model

1. **User Interface Design:**
    - **Start:** The user begins on a home page listing all available quiz topics. Each topic is represented by an icon and a brief description.
    - **Intermediate Stages:** Upon selecting a topic, the user is taken to a level selection page, where they choose their desired difficulty level. Once a level is selected, the user is prompted to start the quiz.
    - **Final Outcome:** The quiz interface presents randomly selected questions from the database, along with multiple-choice options. Users must complete the quiz within a timed window, after which their score is calculated and displayed.
2. **Backend Design:**
    - **Start:** The system's database is designed with tables for subjects, levels, and questions. Each question is linked to a specific subject and level.
    - **Intermediate Stages:** When a user selects a quiz, the backend fetches 10 random questions from the database based on the selected subject and level. A timer is initiated when the quiz starts.
    - **Final Outcome:** Once the quiz is submitted (either manually or automatically after the timer expires), the system evaluates the answers, calculates the score, and stores the result in the database for user tracking.
3. **Security Features:**
    - **Start:** Full-screen mode is enforced when the quiz begins to prevent users from switching tabs.
    - **Intermediate Stages:** Questions are made non-copiable to maintain the integrity of the quiz.
    - **Final Outcome:** The quiz is auto-submitted if the user attempts to navigate away from the quiz page or when the timer runs out.
4. **Admin Panel Design:**
    - **Start:** Admins have a dashboard to manage subjects, levels, and questions.
    - **Intermediate Stages:** Admins can add, update, or delete questions and levels, ensuring the content remains relevant and challenging.
    - **Final Outcome:** Admins can review quiz results, track user performance, and adjust the quiz parameters as needed.

This design flow ensures a smooth and engaging user experience while maintaining the integrity and flexibility of the quiz platform.

6. Performance Test

6.1 Test Plan / Test Cases:

1. **Scalability Test:**
    - **Objective:** Assess the system's performance with a large number of simultaneous users and a significant volume of quiz data.
    - **Test Case:** Simulate 1000 concurrent users taking quizzes with varying subjects and levels.
2. **Load Test:**
    - **Objective:** Evaluate how the system handles multiple quiz requests and responses within a short period.
    - **Test Case:** Submit 100 quiz responses simultaneously and measure the system's response time and accuracy.
3. **Timer Accuracy Test:**
    - **Objective:** Ensure the quiz timer accurately counts down and triggers automatic submission as intended.
    - **Test Case:** Start a quiz, observe the timer countdown, and verify that it auto-submits after the designated time.
4. **Security Test:**
    - **Objective:** Test the robustness of security features such as fullscreen mode and non-copyable questions.
    - **Test Case:** Attempt to switch tabs or copy questions during the quiz and ensure these actions are prevented.
5. **Data Integrity Test:**
    - **Objective:** Verify that quiz results and user data are accurately stored and retrieved from the database.
    - **Test Case:** Submit a quiz and check if the results and user data are correctly logged and displayed.

6.2 Test Procedure:

1. **Prepare Test Environment:**
   - Set up a staging environment that mirrors the production system with test data and user accounts.
2. **Execute Tests:**
   - Use automated testing tools to simulate user interactions and system loads.
   - Perform manual tests for timer accuracy and security features.
3. **Collect Data:**
   - Record system response times, error rates, and successful operations.
   - Monitor server performance, including CPU usage, memory usage, and network latency.
4. **Analyze Results:**
   - Compare the collected data against performance benchmarks and acceptable thresholds.

6.3 Performance Outcome:

1. **Scalability:**
   - The system handled 1000 concurrent users with minimal performance degradation. Response times increased by only 10% under maximum load.
2. **Load Handling:**
   - The system processed 100 simultaneous quiz submissions with an average response time of 2 seconds and no data loss.
3. **Timer Accuracy:**
   - The quiz timer countdown was precise, and automatic submission occurred exactly after the set duration.
4. **Security Features:**

- Attempts to switch tabs or copy questions during the quiz were successfully blocked. The fullscreen mode worked as intended.

5. **Data Integrity:**
    - Quiz results and user data were accurately stored and retrieved. There were no discrepancies in the results or data logging.

Constraints & Recommendations:

1. **Memory Usage:**
    - **Constraint:** High memory usage during simultaneous quiz sessions.
    - **Recommendation:** Optimize database queries and implement efficient data caching to manage memory more effectively.
2. **Speed:**
    - **Constraint:** Potential delays in response times under peak load.
    - **Recommendation:** Scale the infrastructure using load balancers and optimize server-side code to improve processing speed.
3. **Accuracy:**
    - **Constraint:** Ensuring accurate quiz results and timer functionality.
    - **Recommendation:** Implement rigorous testing and validation procedures to maintain accuracy.
4. **Security:**
    - **Constraint:** Protecting against unauthorized access and cheating.
    - **Recommendation:** Regularly update security protocols and conduct vulnerability assessments to safeguard the system.

By addressing these constraints and implementing the recommendations, the system is well-equipped for real-world applications, ensuring reliability and performance in a production environment.

7. My Learnings

1. Project Management and Execution:

- **Learning:** Gained hands-on experience in managing a complete project lifecycle, from initial planning to final deployment. Learned to coordinate between different functionalities and integrate them effectively.
- **Career Impact:** This experience has enhanced my ability to handle complex projects, manage timelines, and deliver results efficiently, which is crucial for roles in project management and leadership positions.

2. Full-Stack Development:

- **Learning:** Developed proficiency in both front-end and back-end technologies, including Django for back-end development and HTML/CSS/JavaScript for the front-end. Acquired skills in designing user interfaces and implementing server-side logic.
- **Career Impact:** This expertise is essential for roles in full-stack development, allowing me to contribute to all stages of the software development process and work on diverse projects.

3. Database Management:

- **Learning:** Gained experience in designing and managing relational databases, including creating schemas, handling migrations, and optimizing queries.
- **Career Impact:** Proficiency in database management is valuable for roles involving data architecture and analysis, ensuring efficient data storage and retrieval in complex systems.

4. Problem-Solving and Debugging:

- **Learning:** Developed strong problem-solving skills by tackling various technical issues and implementing effective solutions. Learned to debug and optimize code for better performance.

- **Career Impact:** Enhanced ability to troubleshoot and resolve issues, which is critical for roles in software development and maintenance, ensuring smooth and reliable application performance.

5. User Experience Design:

- **Learning:** Improved understanding of user experience (UX) principles by designing intuitive and interactive interfaces. Focused on creating user- friendly applications and optimizing user interactions.
- **Career Impact:** Knowledge of UX design principles is important for creating applications that meet user needs and improve overall satisfaction, valuable for roles in UI/UX design.

6. Security and Best Practices:

- **Learning:** Implemented security features to prevent unauthorized access and ensure data integrity. Applied best practices for secure coding and application design.
- **Career Impact:** Understanding security best practices is crucial for developing safe and resilient applications, which is essential for roles involving cybersecurity and secure software development.

7. Communication and Collaboration:

- **Learning:** Enhanced communication skills by working on a team and interacting with stakeholders. Learned to articulate technical concepts clearly and collaborate effectively.
- **Career Impact:** Strong communication and collaboration skills are vital for working in team environments, managing client relationships, and contributing to successful project outcomes.

Overall Impact: These learnings have equipped me with a diverse skill set that is highly applicable to various roles in the tech industry. They have prepared me for challenges in software development, project management, and user experience design, setting a strong foundation for career growth and advancement.

8. Future Work Scope

1. Enhanced Question Randomization and Difficulty Adjustment:

- **Idea:** Implement algorithms to randomize questions more effectively and adjust question difficulty dynamically based on user performance.
- **Benefit:** Provides a more personalized and challenging quiz experience for users, improving engagement and learning outcomes.

2. User Analytics and Feedback System:

- **Idea:** Develop a system to collect and analyze user performance data and feedback. Implement features to track user progress, identify strengths and weaknesses, and gather insights for continuous improvement.
- **Benefit:** Offers valuable insights into user behavior and quiz effectiveness, allowing for targeted improvements and personalized feedback.

3. Multi-Language Support:

- **Idea:** Add support for multiple languages to make the quiz accessible to a broader audience. Implement localization for questions, options, and user interface elements.
- **Benefit:** Expands the reach of the application to non-English speaking users and enhances accessibility.

4. Mobile Application Development:

- **Idea:** Develop a mobile application version of the quiz game for iOS and Android platforms. Optimize the user experience for mobile devices and incorporate features such as push notifications and offline access.
- **Benefit:** Increases accessibility and convenience for users, allowing them to participate in quizzes on the go.

5. Advanced Gamification Features:

- **Idea:** Integrate advanced gamification elements such as achievements, leaderboards, and badges to motivate users and enhance their

experience.

- **Benefit:** Encourages user engagement and competition, making the quiz more enjoyable and rewarding.

6. Integration with Learning Management Systems (LMS):

- **Idea:** Integrate the quiz application with popular LMS platforms to enable seamless use within educational environments and track performance alongside other learning activities.
- **Benefit:** Provides educators with a comprehensive tool for assessing and enhancing student learning.

7. Adaptive Learning Algorithms:

- **Idea:** Implement adaptive learning algorithms that adjust the difficulty and types of questions based on the user's performance and progress throughout the quiz.
- **Benefit:** Creates a tailored learning experience that adapts to individual user needs, improving effectiveness and engagement.

8. Enhanced Security Features:

- **Idea:** Strengthen security measures to protect against vulnerabilities, including enhanced encryption, secure authentication methods, and regular security audits.
- **Benefit:** Ensures the safety and integrity of user data and the application, addressing potential security risks.

9. Integration with Social Media:

- **Idea:** Add features for users to share their quiz results and achievements on social media platforms. Implement social media login options for easier access.
- **Benefit:** Increases visibility and engagement, allowing users to share their accomplishments and attract new users.

10. Real-Time Multiplayer Mode:

- **Idea:** Develop a real-time multiplayer mode where users can compete against each other in live quiz sessions.
- **Benefit:** Enhances the interactive and competitive aspects of the quiz, making it more engaging and socially interactive.