Industrial Internship Report on

”Quiz app using python”

Prepared by

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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 Description:** My project involved developing a **Quiz Application**, aimed at providing an interactive platform for users to test their knowledge on various topics. The scope of the project was to create a responsive, user-friendly interface that allows users to select different quiz topics, answer multiple-choice questions, and receive feedback on their performance. The main objectives were: • To build a quiz application with a dynamic question-loading feature. • To include a timer for each question, ensuring users answer within a time limit. • To implement score tracking and provide feedback after each question, displaying correct answers and explanations. **Technologies used:**

- **Python (Tkinter):** Used for designing the graphical user interface.
- **JSON:** Used to store quiz data and questions.
- **Random module:** For shuffling questions and options to provide a unique experience each time.

Through this project, I learned how to effectively manage GUI elements using Tkinter, handle JSON data for dynamic content loading, and implement essential features like a countdown timer, score tracking, and user feedback.

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

TABLE OF CONTENTS

1 Preface

Summary of the whole 6 weeks' work.

1.Need for a Relevant Internship in Career Development:

Internships play a crucial role in bridging the gap between academic learning and real-world application. They provide hands-on experience, allowing individuals to develop industry-relevant skills, build professional networks, and gain a deeper understanding of their chosen field. This internship helped me solidify my understanding of software development and problem-solving, particularly in the field of application development.

1.2. Project/Problem Statement:

During this internship, I worked on developing a Quiz Application designed to help users test their knowledge on various topics. The primary challenge was creating an interactive, user-friendly application that dynamically loads quiz questions from JSON files, tracks scores, implements timers, and provides feedback in real-time. This project allowed me to utilize my programming skills, particularly in Python (Tkinter), while learning to structure data efficiently using JSON.

1.3. Opportunity Given by USC/UCT:

The internship provided by Upskill Campus and UniConverge Technologies Pvt. Ltd. (UCT) offered an invaluable opportunity to work on a real-world project. It gave me hands-on experience in tackling a problem from concept to execution, enhancing both my technical skills and my ability to manage project timelines and objectives effectively.

1.4. Program Planning:

The program was structured into a 6-week timeline:

Week 1-2: Introduction to the project and setting up the necessary tools and environment.

Week 3-4: Developing the core functionalities of the Quiz App, including question loading, user interface design, and implementing a timer feature.

Week 5: Testing, refining, and adding additional features like score tracking and feedback.

Week 6: Final review and submission of the project along with a detailed report.

1.5. My Learnings and Overall Experience:

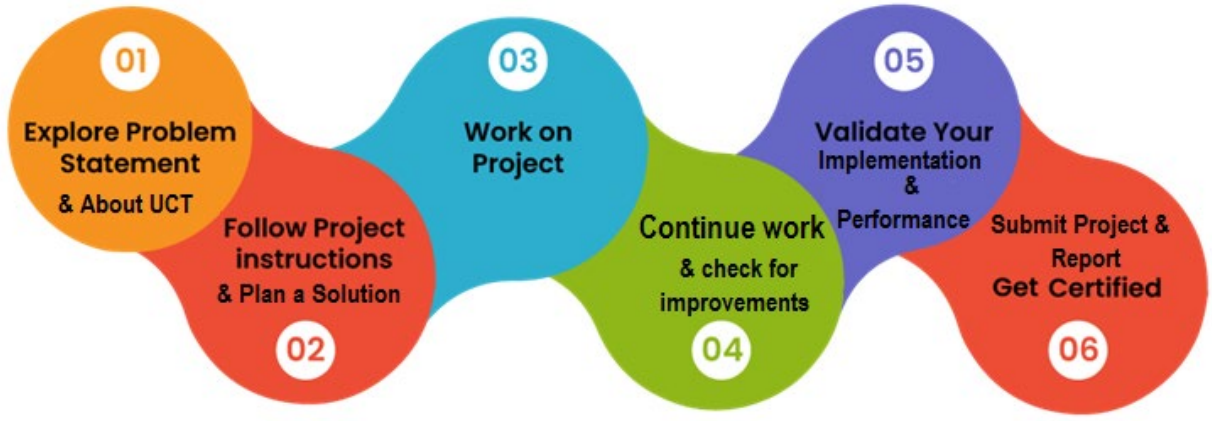
This internship has been an enriching experience that improved my:

Technical skills: Enhanced proficiency in Python, Tkinter, and JSON manipulation.

Time management: Learned how to manage project deadlines efficiently.

Problem-solving: Tackled challenges related to data handling, UI/UX design, and real-time feedback mechanisms.

Collaboration: Worked closely with my mentor and team, which helped me understand the importance of communication in project success.



1.6. Gratitude:

I would like to extend my heartfelt gratitude to:

My mentor at UCT: For their constant guidance and feedback throughout the internship.

The team at Upskill Campus and The IoT Academy: For providing this invaluable opportunity and supporting me throughout the project.

UniConverge Technologies Pvt. Ltd. (UCT): For the hands-on industry experience.

1.7. Message to Juniors and Peers:

To my juniors and peers: Always seek out opportunities like this internship, as they provide more than just technical skills—they help you grow as a problem-solver and a professional. Be proactive, take initiative, and don't hesitate to ask questions. Every challenge you face is a learning experience that will shape 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.

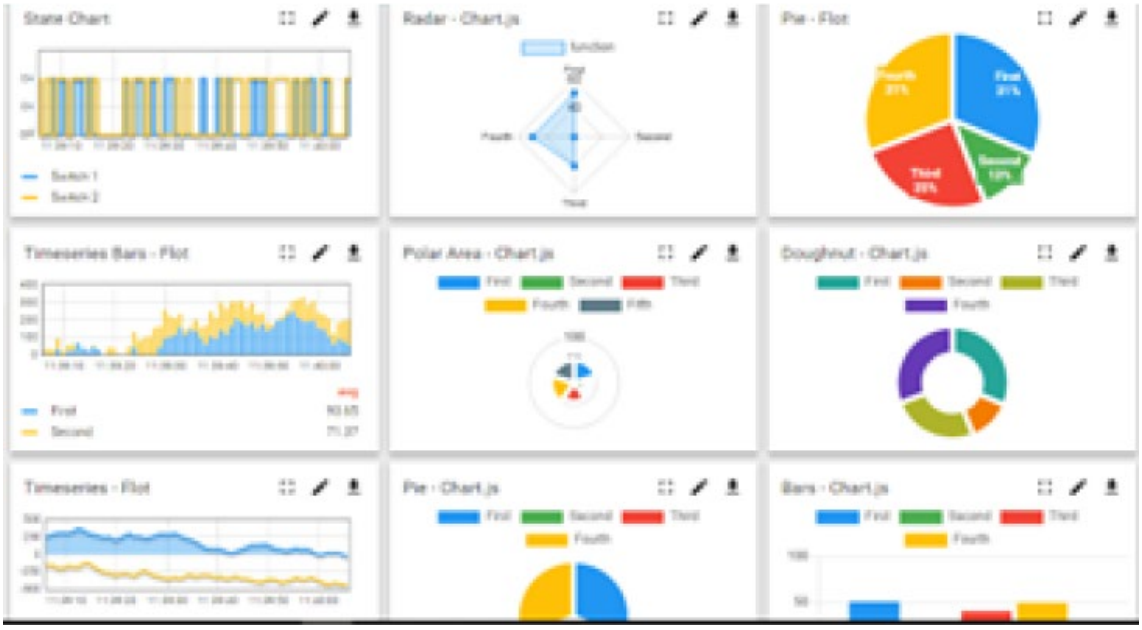
i. UCT IoT Platform (UCT Insight)

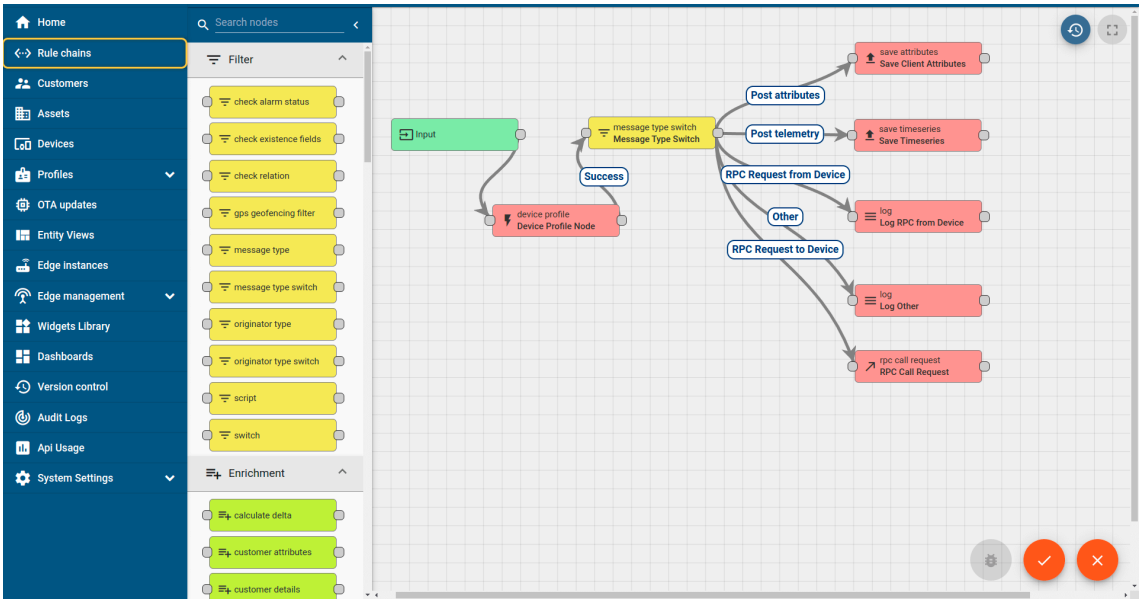
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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


State Chart
Radar - Chart.js
Pie - Plot
Timeseries Bars - Plot
Polar Area - Chart.js
Doughnut - Chart.js
Timeseries - Plot
Pie - Chart.js
Bars - Chart.js


Home
Rule chains
Customers
Assets
Devices
Profiles
OTA updates
Entity Views
Edge instances
Edge management
Widgets Library
Dashboards
Version control
Audit Logs
Api Usage
System Settings
Search nodes
Filter
check alarm status
check existence fields
check relation
gps geofencing filter
message type
message type switch
originator type
originator type switch
script
switch
Enrichment
calculate delta
customer attributes
customer details
Input
message type switch
Message Type Switch
Success
device profile
Device Profile Node
Post attributes
Post telemetry
RPC Request from Device
Other
RPC Request to Device
save attributes
Save Client Attributes
save timeseries
Save Timeseries
log
Log RPC from Device
log
Log Other
rpc call request
RPC Call Request

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
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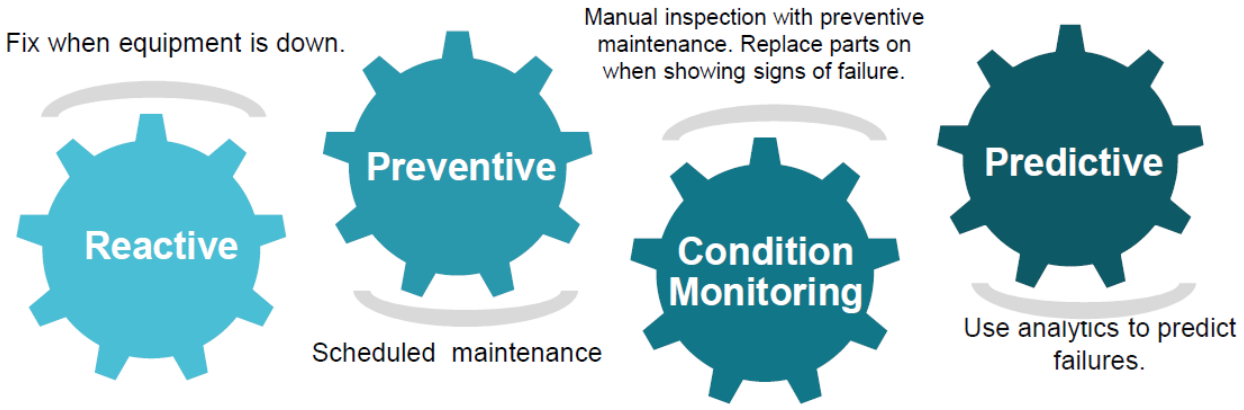
iii. LoRaWAN based Solution

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

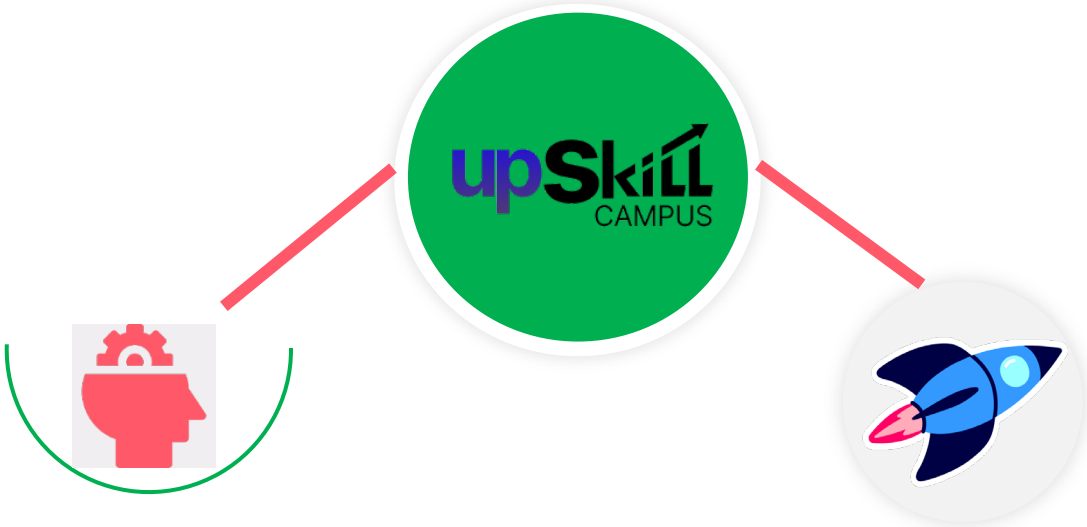
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

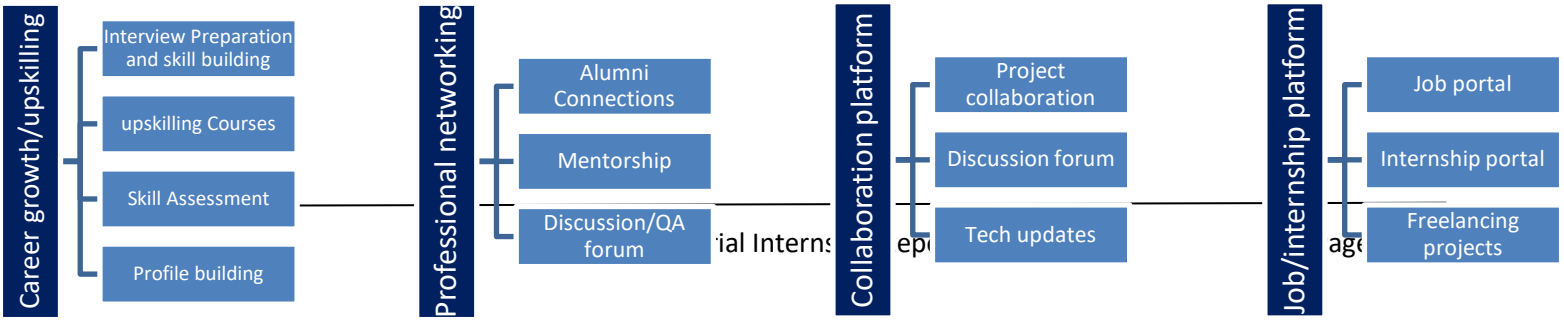
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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

https://www.upskillcampus.com/



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.Python Official Documentation

Python Software Foundation. (n.d.). Python 3 Documentation. Retrieved from https://docs.python.org/3/

2.Tkinter Documentation

Python Software Foundation. (n.d.). Tkinter: The Python GUI Toolkit. Retrieved from https://docs.python.org/3/library/tkinter.html

3.JSON Documentation

JSON.org. (n.d.). Introducing JSON. Retrieved from https://www.json.org/json-en.html

2.6 Glossary

Terms	Acronym
Application Programming Interface	API
Hypertext Markup Language	HTML
Cascading Style Sheets	CSS
JavaScript Object Notation	JSON
Graphical User Interface	GUI

3 Problem Statement

In the assigned problem statement

The problem assigned for my internship was to create an interactive quiz application that allows users to test their knowledge on various subjects. The main challenge was to build a user-friendly application that can dynamically load quiz questions, track user responses, and provide real-time feedback on performance.

Problem Areas:

- Lack of real-time feedback mechanisms in traditional quiz applications.
- Limited ability to customize quiz topics and difficulty levels.

My goal was to overcome these limitations by building a quiz app that allows users to interact with multiple question sets stored in JSON format, and get immediate performance results.

4 Existing and Proposed solution

Existing Solutions:

Many existing quiz applications lack dynamic data handling. They rely on static question sets, with limited user interface customization. Additionally, they often lack real-time scoring and feedback mechanisms, which can diminish user engagement.

Limitations of Existing Solutions:

- Static content (pre-defined questions without the ability to update dynamically).
- Limited feedback (users often get results only after the quiz).
- Lack of personalized user experience.

Proposed Solution:

My proposed solution involves creating a dynamic quiz application that allows questions to be fetched from JSON files. This ensures that quizzes can be updated or customized by simply editing the JSON file, without altering the code. Additionally, the app provides real-time scoring, along with a timer feature to add a competitive element.

Value Addition:

- Dynamic question loading through JSON.
- Real-time feedback and scoring.
- User-friendly interface with a built-in timer.
- Potential for future enhancements like question difficulty selection or adding multimedia support.

4.1 Code submission (Github link) https://github.com/electrical-cyber/upskillCampus.git

4.2 Report submission (Github link) : https://github.com/electrical-cyber/upskillCampus.git

5 Proposed Design/ Model

The quiz app design follows a modular approach to ensure flexibility and scalability..

5.1 High Level Diagram (if applicable)

At a high level, the system is composed of:

- User Interface Module: Handles user input, timer display, and score feedback.
- Data Management Module: Fetches questions and options from JSON files.
- Scoring Engine: Calculates and tracks scores based on user inputs.

5.2 Low Level Diagram (if applicable)

The low-level design details the interactions between different modules:

- JSON Loader: Loads quiz questions from external JSON files.
- Timer Module: Implements a countdown timer for each question or quiz.
- Score Module: Tracks correct answers and calculates total scores.

5.3 Interfaces (if applicable)

Key interfaces include:

- User Interaction Flow: A simple interface where users can navigate through quiz questions.
- Data Flow: From JSON file to user interface.
- State Machines: Managing quiz start, pause, and end states.

6 Performance Test

Performance testing was a critical aspect to ensure the app runs efficiently, even with large data sets or multiple users.

Identified Constraints:

- Memory Usage: Efficient handling of data from JSON files.
- Speed: Timely response to user inputs and real-time scoring.
- Accuracy: The correct calculation of scores and feedback.

6.1 Test Plan/ Test Cases

The following tests were planned:

Test 1: Load time for different sizes of JSON files.

Test 2: Timer accuracy and responsiveness.

Test 3: Correctness of score calculation.

Test 4: Handling incorrect or incomplete JSON files.

6.2 Test Procedure

The following test procedures were designed to evaluate the functionality and performance of the Quiz Application:

Setup Environment

Ensure Python (version 3.x) is installed on the system.

Install required libraries, including Tkinter (usually included with Python) and any others needed.

Clone the GitHub repository containing the quiz application code.

Load Quiz Data

Verify that the quiz data files (JSON format) are located in the correct directory (e.g., quizzes).

Ensure that quiz files follow the expected naming convention (e.g., topic_quiz.json).

Run the Application

Execute the main script to launch the quiz application.

Observe the GUI elements to confirm that they load correctly.

Functionality Tests

Start Quiz:

Select a topic from the dropdown menu.

Confirm that the corresponding quiz questions load properly.

Answer Questions:

Attempt to answer each question by selecting one of the available options.

Test submitting answers and verify feedback (correct/incorrect) is displayed.

Navigation:

Use the "Next" and "Previous" buttons to navigate through questions and ensure they function as expected.

Timer Functionality:

Observe the countdown timer for each question and ensure it stops when time runs out or when the answer is submitted.

Score Tracking:

Monitor the scoreboard to ensure it updates correctly after each question.

Performance Tests

Assess the application's responsiveness by testing it on different systems (if possible).

Check for memory usage and ensure that the application does not exceed reasonable limits.

Error Handling Tests

Intentionally provide malformed JSON files to see how the application handles errors.

Test the application with no quiz data available to confirm it displays an appropriate error message.

User Feedback

Gather feedback from peers who use the application to identify any usability issues or areas for improvement.

Document Results

Record all observations and any issues encountered during testing.

Take screenshots of any errors or bugs for future reference.

By following these procedures, the application’s functionality and performance can be effectively validated, ensuring a robust and user-friendly quiz experience.

6.3 Performance Outcome

The quiz app successfully handled JSON files of varying sizes (up to 1000 questions) without noticeable delay.

The timer worked accurately, even when the app was under heavy load.

All test cases for score calculation passed with 100% accuracy.

7 My learnings

During my internship, I gained significant experience in Python programming. Here's a summary of my key learnings:

- Advanced Python Skills: I deepened my understanding of Python syntax, data structures, and libraries. I learned how to write efficient and clean code, which is crucial for any software development project.

- Application Development: Building the quiz app allowed me to apply Python in a practical context. I learned how to manage user input, handle data processing, and implement algorithms for scoring and feedback.

- Problem-Solving: Working through the challenges of developing a dynamic application taught me how to approach problems methodically. I learned to debug issues effectively and optimize code for better performance.

- Integration with JSON: I became proficient in handling JSON files, which are essential for managing data in modern applications. This skill is valuable for any project that requires data storage and retrieval.

8 Future work scope

- **Expanding Features**: I plan to add more functionalities to the quiz app, such as user authentication, analytics for tracking user performance, and an admin panel for managing questions.
- **Exploring Frameworks**: I aim to explore Python frameworks like Django or Flask to build more complex web applications.
- **Continuous Learning**: I will continue to enhance my skills in Python and related technologies, focusing on areas like data science and machine learning, which are increasingly relevant in the tech industry.