**A10**

**Title: Adaptive Quiz Engine**

In an era where personalized and engaging digital learning is increasingly vital, traditional quizzes often fail to adapt to individual learner needs or scale effectively in real-time classroom settings. To address these challenges, we propose a Gamified Quiz Generator with Adaptive Difficulty and Role-Based Access, an AI-powered eLearning platform designed to enhance student engagement, teacher productivity, and learning outcomes. The system integrates Java-based backend services with a React frontend, offering seamless user experiences across three roles: Student, Teacher, and Admin.

Leveraging large language models (LLMs) such as Google Gemini Pro, the platform automatically generates multi-level MCQs from diverse resources (e.g., PDFs, YouTube videos, or text), ensuring comprehensive coverage across cognitive levels. Adaptive difficulty algorithms adjust question complexity in real time based on student performance, promoting effective learning through challenge calibration. Teachers can create classes, assign resources, and monitor performance dashboards at both class and individual levels. Students may either self-learn or join guided classrooms, accessing personalized feedback, performance analytics, and targeted improvement suggestions generated by AI.

The system emphasizes scalability, reliability, and ease of deployment, using freely available cloud platforms and open-source technologies. By automating quiz creation, scoring, and feedback, the platform reduces manual effort while maintaining academic integrity and quality. This project demonstrates how intelligent systems can transform education by making assessments dynamic, scalable, and truly learner-centric.

**Key Words:**

Gamification, Adaptive Learning, eLearning Platform, Large Language Models, Google Gemini Pro, React, Spring Boot, Java Backend, Educational Analytics, Performance Feedback, Real-time Quiz Generator, Role-based Access Control, Personalized Learning.  
**Team Members:**

Gnaneshwar Reddy Yenna (22241A1264)

Ponnamanda Eswar (22241A1244)

Madupathi Nithin Kumar (22241A1233)

**Project Guide:**

1. Pavithra

Professor

IT Department - GRIET