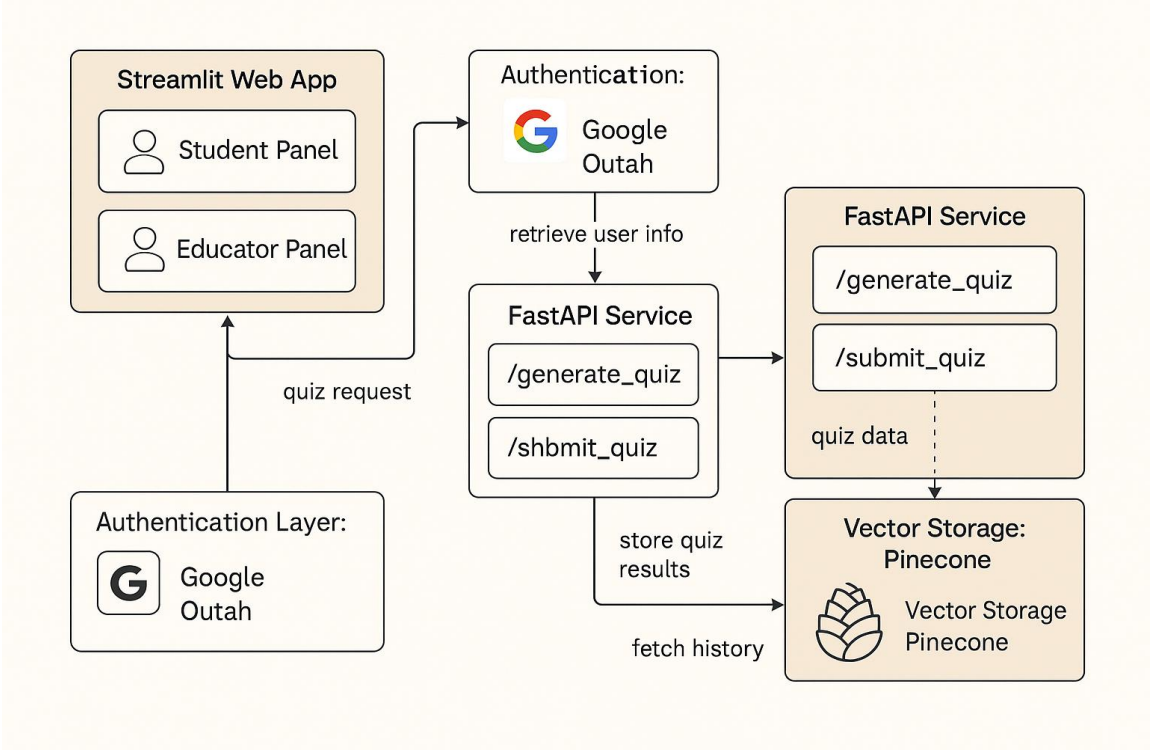
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI– Personalized AI-Powered Learning Platform
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



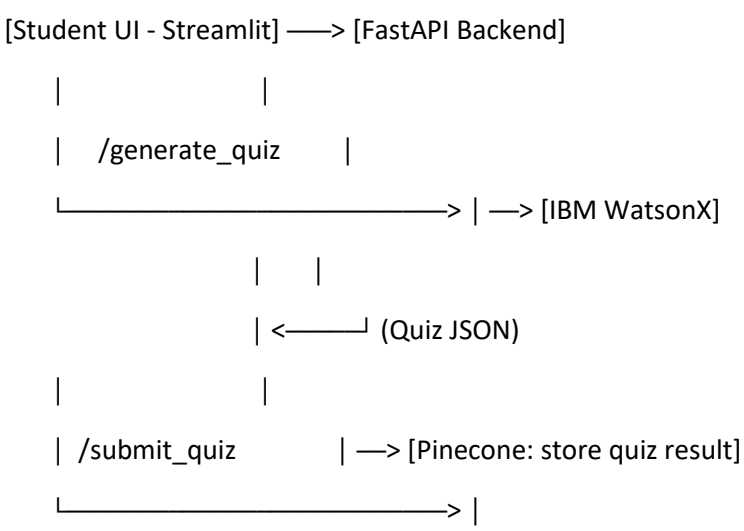


Table-1 : Components & Technologies:-

S.No	Component	Description	Technology
1.	User Interface	Web UI for students and educators	Streamlit (Python-based Web UI)
2.	Application Logic-1	Quiz generation from text prompt	FastAPI + WatsonX API Integration (Granite Model)

3.	Application Logic-2	Answer evaluation and scoring logic	Python (FastAPI backend)
4.	Application Logic-3	Educator analytics dashboard	Streamlit + Pinecone vector search
5.	Database	Quiz input/output data and feedback	JSON documents, vector data
6.	Cloud Database	Storage of student quiz history	Pinecone Vector DB (Cloud)
7.	File Storage	Temporary quiz content or UI states	Local storage / Session state in Streamlit
8.	External API-1	Authentication & Google Classroom sync	Google OAuth 2.0, Google Classroom API
9.	External API-2	Model Inference	IBM WatsonX AI API
10.	Machine Learning Model	Quiz generation model	IBM Granite Instruct (LLM)
11.	Infrastructure (Server / Cloud)	Hosting UI + Backend services	Localhost / Uvicorn for FastAPI / Streamlit Server

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Web & API framework used	Streamlit, FastAPI, Pinecone SDK, Authlib
2.	Security Implementations	User authentication via Google, secure token usage	Google OAuth, HTTPS, Bearer Token, CORS policy
3.	Scalable Architecture	Modular architecture (separate UI, backend, DB services)	3-tier Architecture: Streamlit ↔ FastAPI ↔ WatsonX/Pinecone
4.	Availability	Local server testing; easily deployable to cloud	Uvicorn, Docker-ready, compatible with IBM Cloud
5.	Performance	API caching, fast response time (<5s quiz), vector indexing for search	Pinecone indexing, stateless backend, async APIs