OpenAI Workshop Student Project

Objective: Web-based application for interactive exam generation and document-based learning.

Features and Functionalities:

1. Question Generation

- Generate 5 questions based on a topic provided by the user.
- Support the addition of difficulty levels: Basic, Intermediate, and Advanced.

2. Answer Submission and Evaluation

- Students submit their answers to the generated questions.
- Display results on a new page, including the correct answers and detailed explanations.

3. Prompt Engineering

- Optimize queries for generating questions.
- Include functionality to refresh questions based on a temperature value (controlled via a slider).

4. Context Management

- Maintain conversation context while generating and evaluating questions.

5. Multiple Choice Questions (MCQs)

- Generate structured outputs in JSON schema.
- Display MCQs with the ability to show correct answers and explanations.

6. Retrieval-Augmented Generation (RAG)

- Use courseware documents uploaded by users to generate contextually relevant questions.
- Implement file upload functionality and embedding generation for question preparation.

7. Fine-Tuning

- Train and fine-tune a model using the dataset of questions for a specific module.

Technology Stack

- Backend: Python, FastAPI
- Frontend: ReactJS
- Database: MySQL
- Vector Database: pgvector (PostgreSQL extension)
    - **Option1**: PostgreSQL (with pgvector) https://supabase.com/pricing
    - **Option2**: Amazon Relational Database Service (Amazon RDS) for PostgreSQL support the pgvector extension to store embeddings.
    - **Option3**: Amazon OpenSearch Service
- AI Integration: OpenAI API

Technical Requirements:

Frontend (UI)

- Topic selection.
- Temperature slider control.
- File upload and embedding initiation.
- Answer submission and result display.

Backend

- Integration with OpenAI API for question generation and fine-tuning.
- Embedding creation using courseware documents.
- Maintenance of conversation context.

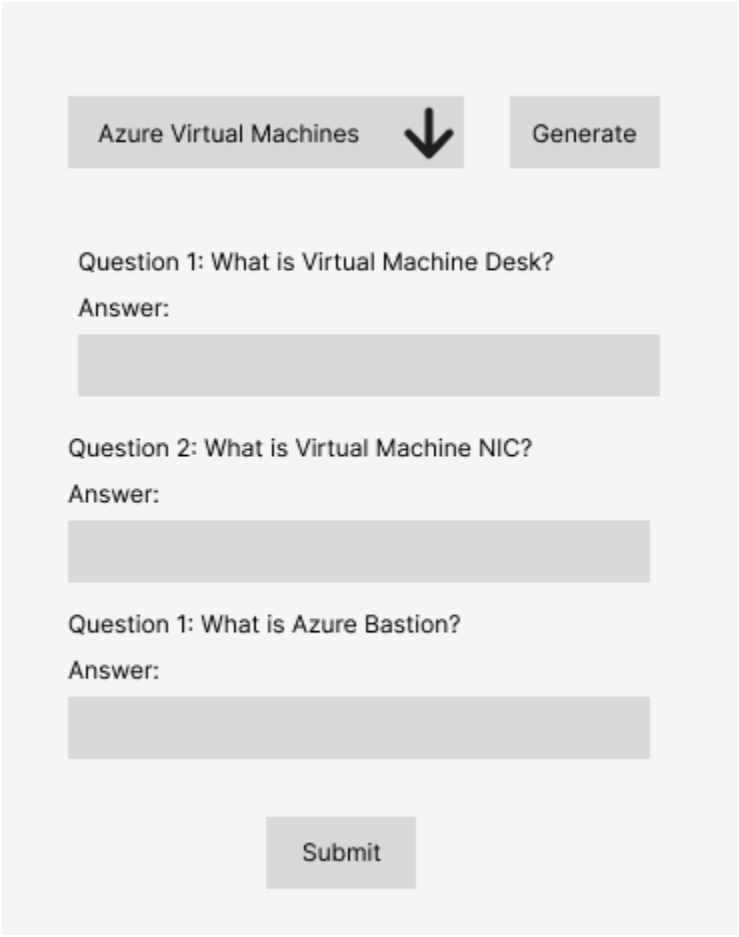
Data Storage

- Store user-uploaded files and embeddings securely.
- Save submitted answers and evaluation results for review.

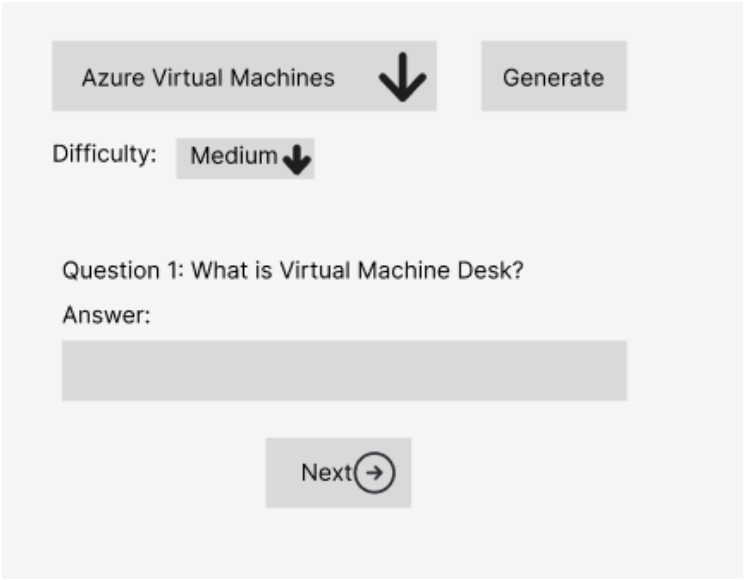
Deployment

- Cloud-hosted with scalable infrastructure.
- Secure access for students and instructors.

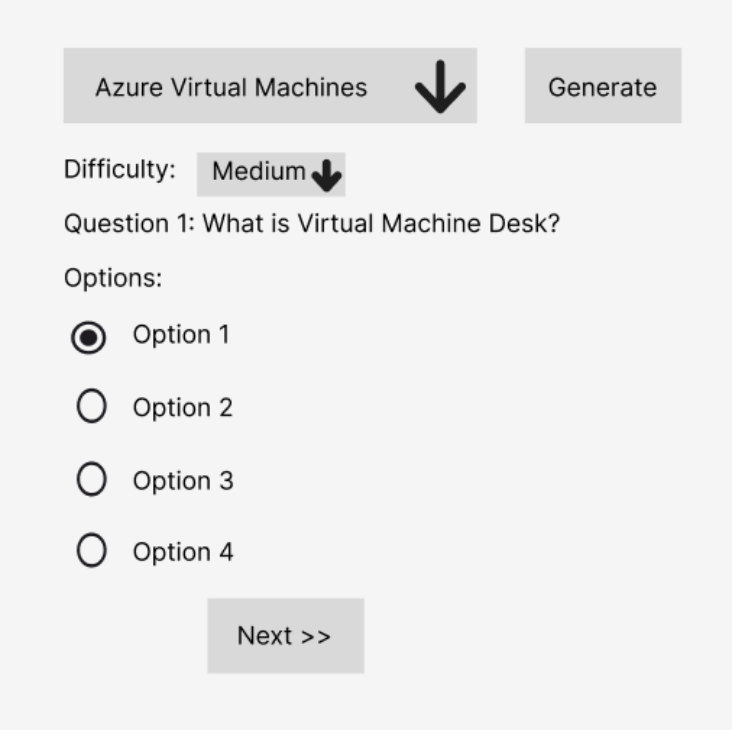
Exercise 1:



Exercise 2:



Exercise 3:



File Upload:

Deliverables:

1. A boilerplate starter application.
2. Documentation including:
    - Installation and deployment guide.
    - API references.
    - User manual for students and instructors.
3. Presentation demonstrating the application's features.

4. Dataset prepared for fine-tuning

Notes:

- Students should have basic knowledge of python.