

Context

You are building a simplified version of a real-world engineering system used to analyze subsurface well-log data. The goal of this assignment is to evaluate your ability to design, implement, and reason about a full-stack data application involving file ingestion, data modeling, visualization, and AI-assisted analysis.

You are provided with a LAS(Log ASCII Standard) file, which contains depth-indexed well-log measurements.

Prior domain knowledge in geology or oil & gas is not required. This assignment focuses on software engineering fundamentals.

Problem Statement

Design and implement a web-based system that ingests a LAS file, stores it appropriately, visualizes selected well-log curves, and performs AI-assisted interpretation over a specified depth range.

Requirements:

1. Architecture

- The application must have a proper frontend and backend communicating via well designed APIs
- Sensitive credentials should not be exposed on the client side

2. File Ingestion & Storage

- Accept LAS file uploads through the application
- Store the original file in Amazon S3
- Parse the LAS file and design a storage strategy that supports the rest of the application's needs
- Choose an appropriate database and justify your choice

3. Visualization

- Javascript based web UI to visualize selected well-log curves against depth
- Users should be able to choose which curves to view and specify depth ranges
- Support basic interactivity (zoom, pan, or similar)

4. AI-Assisted Interpretation

- Allow the user to specify a depth range and curves of interest
- Perform AI based interpretation on the selected data and display results within the application
- Your approach is entirely up to you, including the technique you use, how you design it, and what insights you choose to extract

5. Chatbot Interface (Bonus)

- A conversational interface to ask data-driven questions about the uploaded well data

6. Deployment (Optional)

- Deploy using any cloud platform and provide URL
- If deployment is not done, the project should still be runnable locally with clear instructions.

Deliverables:

- Provide a private github repository link with read access to following accounts: **shilu143, mahesh-248, manish-44, Grudev100, crhodes-dev**
- The repository should have clear instructions on how to run code locally.
- Demo video showcasing the implemented functionality.
- Optional, provide deployment link.

Deadline:

February 15, 2026, 11:59 PM IST