# Sample Task: Building a Student Performance Analysis Engine

## Problem Statement:

In the world of high-stakes tests, success isn't just about knowledge – it's about strategy.

We're building an intelligent performance analysis tool to empower students to analyze their strengths, pinpoint weaknesses, and implement data-backed strategies to boost their accuracy and achieve their potential.

## Your Mission:

You have the opportunity to craft the core analytical engine behind this revolutionary tool. Your primary mission is to develop strategies designed to directly improve student accuracy.

## Understanding Your Students: The Power of Data

We meticulously collect a wealth of data points to understand each student's test-taking journey:

### Question-Level Data:

* Topic, Concept, and Difficulty Level:
  + This helps us pinpoint specific knowledge gaps.
  + Example: John consistently struggles with questions related to "exponential decay" within the broader topic of "Algebra II." This suggests a need for John to revisit that specific concept.
* Ideal vs. Actual Time Spent:
  + This helps identify students who rush through the test or spend too much time on a single question.
  + Example: Sarah consistently takes much longer than the ideal time on "data interpretation" questions. This might indicate a lack of familiarity with the question format or difficulty interpreting graphs.
* Question Type:
  + We analyze performance across different question formats like single correct, multiple choice, numerical input, etc.
  + Example: David scores well on single correct questions but struggles with multiple-choice options. This suggests David might have difficulty narrowing down answer choices effectively.
* Time Attempted Within Section:
  + Can be used for determining if the student strategically leaves harder questions for later, or if there's knowledge-based avoidance towards the end of the section.

### Section-Wise Data:

* Number of Attempts, Correct Answers, Skipped Questions:
  + This helps identify sections where students are struggling or not attempting questions at all.
  + Example: Mary consistently skips a high percentage of questions in the "Chemistry" section. This suggests a knowledge gap or lack of confidence in that subject.
* Time Allocation Per Section:
  + This helps assess students' time management skills.
  + Example: John spends a disproportionate amount of time on the first section, leaving insufficient time for later sections. This indicates a need for John to develop better time management strategies.

### Hourly Data:

* Accuracy Trends Across the Test Duration:
  + This helps identify potential fatigue-related dips in performance.
  + Example: Emily's accuracy steadily declines throughout the test. This suggests fatigue might be impacting her focus and concentration. Strategies to improve stamina can be recommended.

### Subject-Wise Data:

* Performance Breakdown:
  + This helps identify subjects where students need extra support.
  + Example: David consistently scores lower in "Physics" compared to other subjects. This indicates a need for targeted practice and revision materials in Physics.

### Test Timeline Data:

* Frequency of Tests and Preparation Gaps:
  + This helps assess the impact of preparation time on performance.
  + Example: Sarah's scores consistently drop when there's a short preparation gap between tests. This suggests Sarah might benefit from spaced repetition techniques to retain information longer.

Remember: These are just a few examples. The actual data will be much richer, allowing for a comprehensive analysis of student strengths and weaknesses.

## Your Challenge: Deliverables

Now that you understand the data at your disposal, it's time to showcase your skills! Here's what we need from you:

### Deliverable 1: Pseudo-Code - The Analytical Blueprint

* + Develop well-structured pseudocode whose primary target should be to suggest ways for students improve their accuracy:

### Deliverable 2: Strategy Report - A Detailed One

* + Explain Your Logic: Break down the reasoning behind your pseudo-code.
  + Recommendations are Key: Show how your analysis translates into actionable recommendations to improve student accuracy.
  + Be Specific: Provide tailored examples for different data scenarios.

### Deliverable 3: Explainer Video (Optional but increases your chances of selection)

* + Screen record + capture yourself using web-cam. You can explain what you understood about the task, what was your approach and present the report & code logic.

## Evaluation Criteria

- Clarity: Pseudo-code and report are easy to understand.  
- Functionality Logic reflects a comprehensive and accurate analysis.  
- Recommendations: Insights are actionable and designed to boost accuracy directly.  
- Innovation: Demonstration of uniquely effective problem-solving.

## Attachments:

1. Basic Analyses of a student for multiple test attempts.
2. Detailed Analyses of a student for multiple test attempts.
3. Screenshots (Existing Visualizations) - Nothing Predictive as of now.

Go through all the key value pair and screenshots, to identify what data we have and in which format

## Additional Notes

1. Apart from the data we have shared, we also have data for each question - i.e., chapter, topic and concept to which a particular question belongs to. Level and ideal time to solve that question.