Assignment: Inquiry-Based Problem Solving with AI Tools

Learning Goal

The primary goal of this assignment is to help you develop the skills to **learn how to learn** in the AI age. By completing this task, you will:

- Learn to effectively use AI tools like ChatGPT to guide problem-solving and exploration.
- Develop critical thinking skills by breaking down problems into manageable steps.
- Practice asking clear and targeted questions to AI tools and analyzing the responses.
- Gain confidence in solving unfamiliar problems by leveraging AI as a learning partner.

Success Criteria：

- Students can articulate the importance of AI tools in inquiry-based problem-solving and explain how AI can be used as a learning partner.
- Students can demonstrate their ability to break down complex problems into manageable steps and use AI to assist in problem-solving.
- Students can effectively ask targeted questions to AI tools like ChatGPT and critically evaluate the responses.
- Students can use AI-generated solutions to read and process a CSV file, compute averages, and generate visual representations of data.
- Students can reflect on their learning process by identifying challenges, analyzing the effectiveness of AI assistance, and suggesting improvements for future AI-based problem-solving.
- Students can submit a well-structured inquiry-based solution, including AI interaction logs, a final program, and a reflection on their learning experience.

Scenario

You are provided with a student grade table saved as a CSV file named `grade.csv` (example below). Your first step is to upload this file to your Google Drive so it can be accessed during the assignment.

Your task is to:

1. Write a program to calculate the average grade for each course.
2. Create graphs to display each student's grades.

This assignment is not intended to teach you Python or any programming language. Instead, the goal is to explore how to use AI tools like ChatGPT to assist you in problem-solving. You are

not required to fully understand the code unless you choose to delve deeper. The focus is on developing the skills to ask the right questions, explore solutions independently, and apply AI-generated responses to complete the task.

What You Will Do

Understand the Problem

- **Input**: A CSV file containing student names and grades for various courses.
- **Output**:
  - Calculate the average grade for each course.
  - Create graphs to visualize each student's grades.

Learn to Use AI Tools

- Break the problem into smaller, manageable parts.
- Ask targeted questions to AI tools like ChatGPT.
- Test and refine the AI-provided solutions.
- Focus on **how to ask questions**, evaluate the responses, and apply them effectively.

Final Goal

Complete the task by leveraging AI tools effectively:

- Use AI to guide you in reading the CSV file.
- Use AI to help you calculate averages.
- Use AI to create graphs for visualizing the data.

Steps to Complete the Assignment

Step 1: Define the Problem

- **Example Question to Ask AI**:
  "How can I use Python to read a CSV file named grade.csv?"
- **Expected Response**: The AI may suggest using tools like `pandas` to load the CSV file and provide example code.

Step 2: Execute Programs

- **Example Question to Ask AI**:
  "How can I run a Python program?"

- **Expected Response**: The AI may suggest tools like **Google Colab**, **Kaggle**, or setting up Python locally.

Step 3: Calculate Averages

- **Example Question to Ask AI**:
  "How can I calculate the average for each column in a CSV file using Python?"
- **Expected Response**: The AI will explain how to calculate averages using functions like `mean()` and provide example code.

Step 4: Visualize Data

- **Example Question to Ask AI**:
  "How can I create a bar graph for student grades using Python?"
- **Expected Response**: The AI will provide instructions and example code to generate graphs using libraries like `matplotlib`.

Step 5: Combine Steps

- **Example Question to Ask AI**:
  "How do I write a program that combines reading a CSV file, calculating averages, and creating graphs?"
- **Expected Response**: The AI will guide you in organizing your code and combining all parts.

Reflection Questions

1. What specific questions did you ask the AI tools, and how effective were the responses?
2. What challenges did you face when using AI tools, and how did you address them?
3. How did this process change your understanding of how to use AI for problem-solving?
4. What would you do differently to improve your results in the future?

Evaluation Criteria

You will be assessed on the following:

1. **Effective Use of AI**:
   - Did you ask clear, targeted questions?
   - Did you apply the solutions provided by AI effectively?
2. **Problem-Solving Process**:
   - Did you break the problem into manageable steps and solve each one methodically?

3. **Completion**:
   o Did you successfully complete the task of calculating averages and visualizing the data?
4. **Reflection**:
   o Did you provide thoughtful and detailed reflections on your process and learning?

Stretch Goals (Optional)

For students who wish to explore further:

1. Ask AI tools to explain the code provided to deepen your understanding.
2. Enhance the program by:
   o Adding error handling for missing or incorrect CSV files.
   o Customizing the graphs (e.g., adding titles, labels, or annotations).
3. Explore solving the task using another programming language (e.g., JavaScript or R).

Submission Requirements

1. **Detailed AI Interaction**: Submit a transcript of your conversations with the AI tool, showing the questions you asked and the responses you received.
2. **Final Program**: Submit the final program that calculates averages and generates graphs.

Evaluation Methods

1. **Review of Submissions**:
   o Evaluate the steps you took and the solutions you submitted based on clarity, accuracy, and completeness.
2. **Follow-Up Interview**:
   o Discuss your process, challenges, and reflections during a brief interview.

Summary

This assignment is designed to help you explore how to use AI tools like ChatGPT to solve problems effectively. By focusing on **how to learn and inquire**, you will develop essential skills for navigating the AI age. The goal is not just to complete the task but to build confidence in using AI as a learning partner and enhance your ability to tackle unfamiliar challenges.

Good luck, and enjoy your journey of inquiry and discovery!

Attachment:

`grade.csv`

```
name,math,english,computer,AI, Business
Lily,89,78,90,92,100
Kim,67,56,80,88,100
Tom,99,65,67,78,100
Kathy, 90,56, 45, 60, 90
Paul, 45,67, 89, 66,72
```