

IDC4U Interdisciplinary Studies: Artificial Intelligence and Business Innovation

Midterm Test: Inquiry-Based Problem Solving with AI Tools

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(This serves as a demo workflow for the midterm project.)

You can resubmit your test using this as a reference.)

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.

Input File

File Name: grade.csv

name,math,english,computer,Al, 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

Part 1: Workflow Steps

1. Ask ChatGPT what is csv file

What is csv file?



A **CSV (Comma-Separated Values) file** is a plain text file that stores tabular data (such as numbers and text) in a structured format. Each line in the file represents a row, and each value in a row is separated by a comma (or sometimes a semicolon or tab, depending on regional settings).

Example of a CSV File:

pgsql

Copy Edit

```
Name, Age, Country
John Doe, 25, USA
Jane Smith, 30, Canada
Michael Lee, 28, UK
```

2. Ask ChatGPT how to create a csv file?



You can create a **CSV (Comma-Separated Values)** file in several ways, depending on the tools you want to use. Below are different methods:

Method 1: Using a Text Editor (Notepad, VS Code, etc.)

1. Open **Notepad** (or any text editor).
2. Enter your data, separating values with commas:

```
pgsql Copy Edit

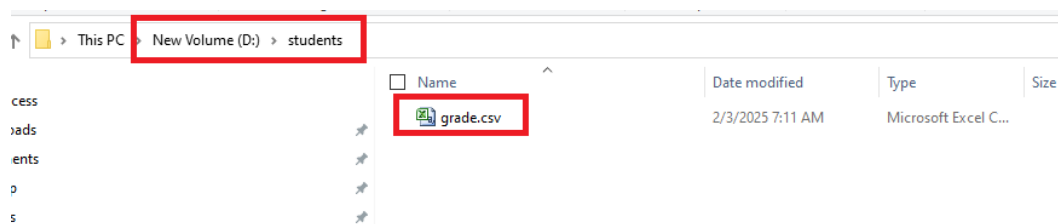
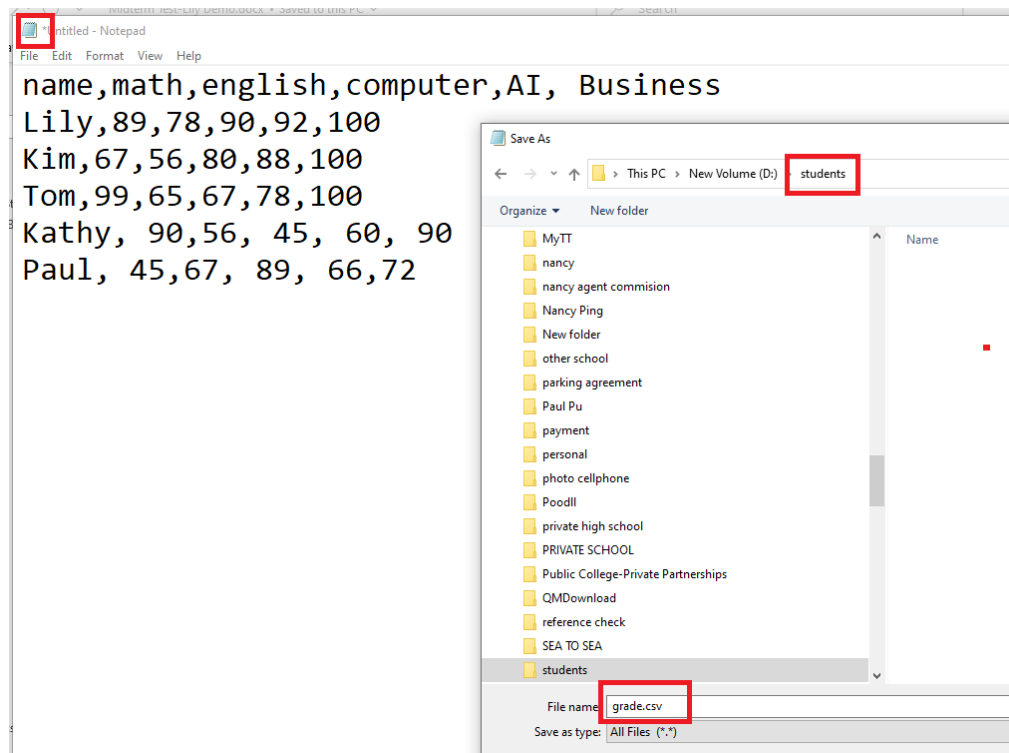
Name, Age, Country
John Doe, 25, USA
Jane Smith, 30, Canada
Michael Lee, 28, UK
```

3. Click **File** → **Save As**.
4. Choose a location, enter the file name with a **.csv** extension (e.g., **data.csv**).
5. Select **All Files** as the file type, then click **Save**.

Method 3: Using Google Sheets

1. Open [Google Sheets](#).
2. Enter your data.
3. Click **File** → **Download** → **Comma Separated Values (.csv)**.
4. The file will be downloaded as a **.csv** file.

*I learned there are five ways to create a CSV file. I used **Notepad** to create the **grade.csv** file as shown below. I use **grade.csv** file in d drive students' folder.*



3. Ask ChatGPT How to read a csv file using Python?



How to Read a CSV File Using Python

Python provides several ways to read a CSV file, including the **pandas library** (recommended for data analysis) and the built-in **csv module** (for basic operations).

1. Using **pandas** (Recommended for Data Analysis)

The **pandas** library makes reading CSV files easy and efficient.

Example: Read a CSV File

```
python Copy Edit  
  
import pandas as pd  
  
# Read CSV file  
df = pd.read_csv("data.csv")  
  
# Display data  
print(df)
```

*I learned there are four ways to read a CSV file using Python. I tried to use **pandas** to read the grade.csv file as shown below. I changed data.csv to grade.cvs in codes.*

```
import pandas as pd  
  
# Read CSV file  
df = pd.read_csv("grade.csv")  
  
# Display data  
print(df)
```

4. Ask ChatGPT How to run Python?



How to Run Python

There are several ways to run Python, depending on your operating system and preferences. Here are the most common methods:

5. Run Python Online (No Installation Needed)

If you don't want to install anything, you can run Python online in your browser:

Online Python Compilers:

- [Google Colab](#) (Best for AI & Machine Learning)
- [Replit](#)
- [OnlineGDB](#)

I learned there are six ways to run Python. I decided to use Google Colab because I didn't want to install Python on my computer.

5. Run Python with Google Colab

*I copied the code to **Google Colab** and named the file **gradeCalculation**. When I ran it, I encountered a **FileNotFoundError** as shown below.*

The screenshot shows a Google Colab notebook titled "gradeCalculation.ipynb". The code cell contains the following Python code:

```
import pandas as pd
# Read CSV file
df = pd.read_csv("grade.csv")
# Display data
print(df)
```

The code cell is highlighted with a red box. Below the code cell, the output shows a **FileNotFoundError** traceback. The error message is "FileNotFoundError" and the traceback shows the following code:

```
Traceback (most recent call last)
<ipython-input-1-ad498265568f> in <cell line: 0>()
1 import pandas as pd
2 # Read CSV file
----> 3 df = pd.read_csv("grade.csv")
4 # Display data
5 print(df)
```

The error message "FileNotFoundError" is highlighted with a red box.

6. Ask ChatGPT about the error message

I ran Python code and got a FileNotFoundError. How can I fix it?



A `FileNotFoundError` in Python usually occurs when your code tries to access a file that does not exist in the specified location. Here are steps to troubleshoot and fix the issue:

1. Check the File Path

- Ensure that the file exists at the specified path.
- If using a relative path, confirm that it is correct relative to your script's execution directory.

```
python                                                                    Copy Edit

import os

file_path = "your_file.txt"
if not os.path.exists(file_path):
    print("File not found!")
```

I learned that Python cannot find the grade.csv file.

7. Ask ChatGPT how to read a file from Google Drive.

I wanted to move grade.csv from my local computer to my Google Drive. I asked ChatGPT how to read it from Google Drive using Python.



To read a file from Google Drive using Python, follow these methods depending on your setup:

Method 1: Using Google Colab (Recommended for Colab Users)

If you're using Google Colab, you can mount Google Drive and access files directly.

Steps:

1. Mount Google Drive.
2. Use the file path to read the file.

Code:

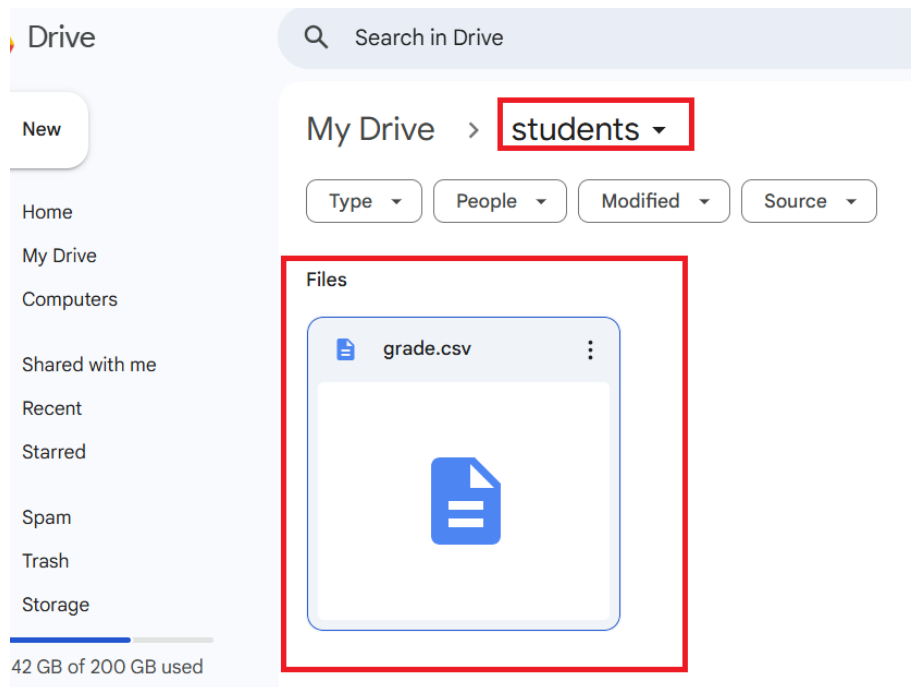
```
python Copy Edit  
  
from google.colab import drive  
import pandas as pd  
  
# Mount Google Drive  
drive.mount('/content/drive')  
  
# Define the file path (adjust as needed)  
file_path = "/content/drive/My Drive/grade.csv"  
  
# Read CSV file  
df = pd.read_csv(file_path)  
print(df.head())
```

↓

I learned there are three ways to run Python. I decided to use first way to do it.

8. Read a file from Google Drive in Google Colab using Python.

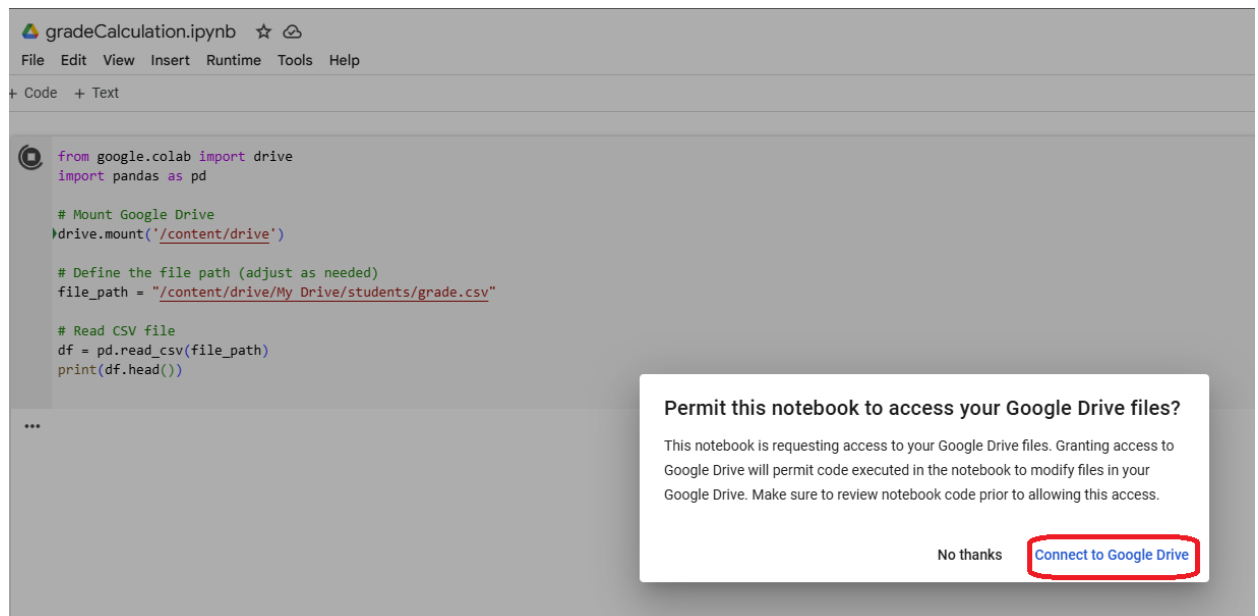
I moved grade.csv from my local computer to the student's folder in Google Drive as shown below:



I changed the file path to point to my file's location and copied codes to Google Colad to run it.

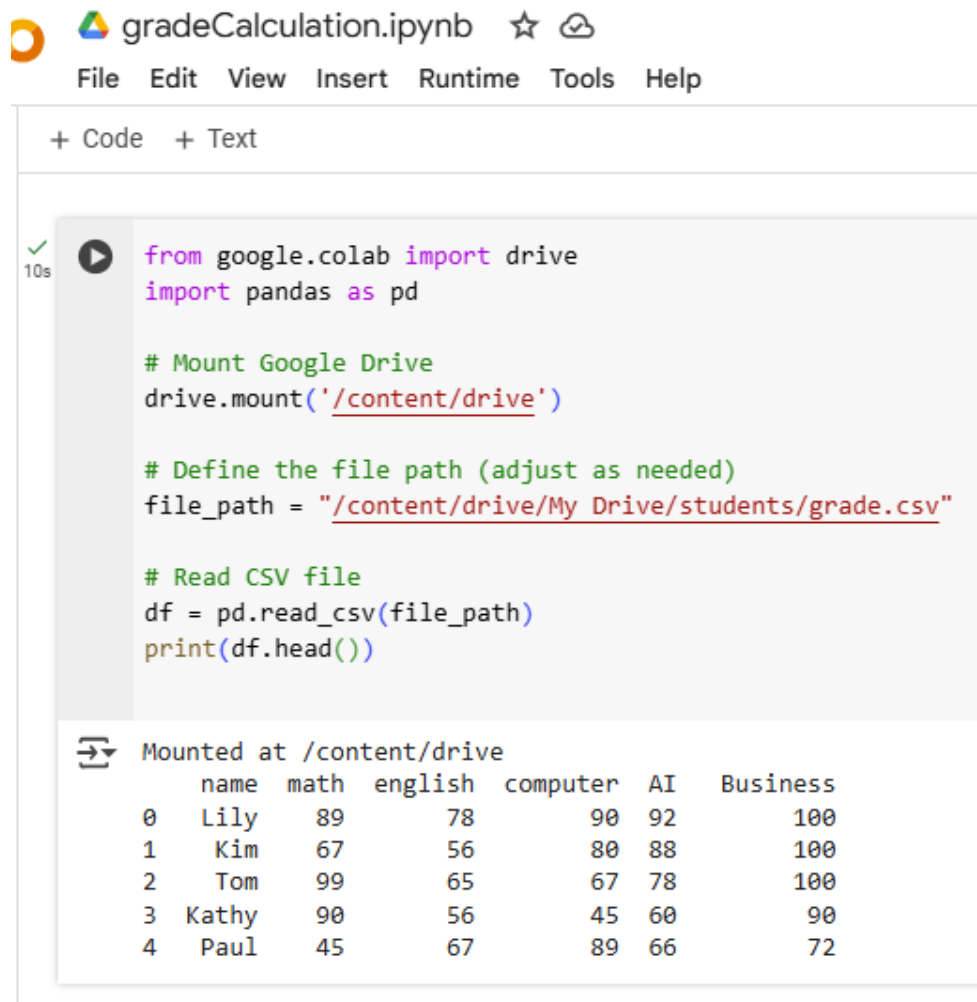
Define the file path

file_path = "/content/drive/My Drive/students/grade.csv"



I received a Permit warning. I accepted it by clicking "Connect to Google Drive"

I successfully read the grade.csv file and print the content out as below:



The image shows a Google Colab notebook titled "gradeCalculation.ipynb". The code cell has been executed successfully, as indicated by a green checkmark and a "10s" execution time. The code imports the 'drive' module from 'google.colab' and 'pandas' as 'pd'. It then mounts Google Drive at '/content/drive', defines the file path as '/content/drive/My Drive/students/grade.csv', reads the CSV file into a DataFrame 'df', and prints the first five rows of the DataFrame. The output shows a table with columns: name, math, english, computer, AI, and Business. The rows represent students: Lily, Kim, Tom, Kathy, and Paul, with their respective scores in each subject.

```
from google.colab import drive
import pandas as pd

# Mount Google Drive
drive.mount('/content/drive')

# Define the file path (adjust as needed)
file_path = "/content/drive/My Drive/students/grade.csv"

# Read CSV file
df = pd.read_csv(file_path)
print(df.head())
```

Mounted at /content/drive

	name	math	english	computer	AI	Business
0	Lily	89	78	90	92	100
1	Kim	67	56	80	88	100
2	Tom	99	65	67	78	100
3	Kathy	90	56	45	60	90
4	Paul	45	67	89	66	72

9. Ask ChatGPT how to calculate the average grade for each course

For below csv file, how to calculate the average grade for each course?

File Name: grade.csv
name,math,english,computer,Al, 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



Average Grades

Now interactive!

		Average Grade	
1	math	78.0	
2	english	64.4	
3	computer	74.2	
4	Al	76.8	
5	Business	92.4	

ChatGPT didn't understand my intention. I reformatted the question as: 'I mean using Python.'



Here's how you can calculate the average grade for each course using Python:

Python Code:

```
python Copy Edit  
  
import pandas as pd  
  
# Load the CSV file  
file_path = "path/to/grade.csv" # Update this with your actual file path  
df = pd.read_csv(file_path)  
  
# Calculate the average grade for each course (excluding the 'name' column)  
average_grades = df.iloc[:, 1:].mean()  
  
# Display the results  
print("Average grades for each course:")  
print(average_grades)
```

Explanation:

1. Load the CSV file into a Pandas DataFrame.
2. Select all columns except the first column (`name`) using `df.iloc[:, 1:]`.
3. Use `.mean()` to calculate the average for each course.
4. Print the results.

Let me know if you need further clarification! 🚀

I copied the highlighted part of the code to Google Colab, expanded the Python code, and ran it as shown below.

```

from google.colab import drive
import pandas as pd

# Mount Google Drive
drive.mount('/content/drive')

# Define the file path (adjust as needed)
file_path = "/content/drive/My Drive/students/grade.csv"

# Read CSV file
df = pd.read_csv(file_path)
print(df.head())

# Calculate the average grade for each course (excluding the 'name' col)
average_grades = df.iloc[:, 1:].mean()

# Display the results
print("Average grades for each course:")
print(average_grades)

```

Drive already mounted at /content/drive; to attempt to forcibly remount

	name	math	english	computer	AI	Business
0	Lily	89	78	90	92	100
1	Kim	67	56	80	88	100
2	Tom	99	65	67	78	100
3	Kathy	90	56	45	60	90
4	Paul	45	67	89	66	72

```

Average grades for each course:
math          78.0
english       64.4
computer      74.2
AI            76.8
Business     92.4
dtype: float64

```

The Python program successfully calculated the average grade for each course.

10. Ask ChatGPT how to create graphs to display each student's grades

How to create graphs to display each student's grades using Python?



You can create graphs to display each student's grades using **Matplotlib** and **Pandas**. Below are different methods to visualize the data:

1. Bar Chart (Recommended)

This method uses a bar chart to show each student's grades across different subjects.

Python Code:

```
python Copy Edit  
  
import pandas as pd  
import matplotlib.pyplot as plt  
  
# Load the CSV file  
file_path = "path/to/grade.csv" # Replace with the actual file path  
df = pd.read_csv(file_path)  
  
# Set student names as index for better visualization  
df.set_index("name", inplace=True)  
  
# Plot each student's grades as a bar chart  
df.plot(kind="bar", figsize=(10, 6))  
  
# Customizing the graph  
plt.title("Grades of Each Student by Course")  
plt.xlabel("Student")  
plt.ylabel("Grade")  
plt.xticks(rotation=45) # Rotate x-axis labels for readability  
plt.legend(title="Courses")  
plt.grid(axis="y", linestyle="--", alpha=0.7)  
  
# Show the plot  
plt.show()
```

I copied the highlighted code above to Google Colab, expanded the Python code, and ran it. The result is shown below:



```
from google.colab import drive
import pandas as pd

import matplotlib.pyplot as plt

# Mount Google Drive
drive.mount('/content/drive')

# Define the file path (adjust as needed)
file_path = "/content/drive/My Drive/students/grade.csv"

# Read CSV file
df = pd.read_csv(file_path)
print(df.head())

# Calculate the average grade for each course (excluding the 'name' column)
average_grades = df.iloc[:, 1:].mean()

# Display the results
print("Average grades for each course:")
print(average_grades)

# Set student names as index for better visualization
df.set_index("name", inplace=True)

# Plot each student's grades as a bar chart
df.plot(kind="bar", figsize=(10, 6))

# Customizing the graph
plt.title("Grades of Each Student by Course")
plt.xlabel("Student")
plt.ylabel("Grade")
plt.xticks(rotation=45) # Rotate x-axis labels for readability
plt.legend(title="Courses")
plt.grid(axis="y", linestyle="--", alpha=0.7)

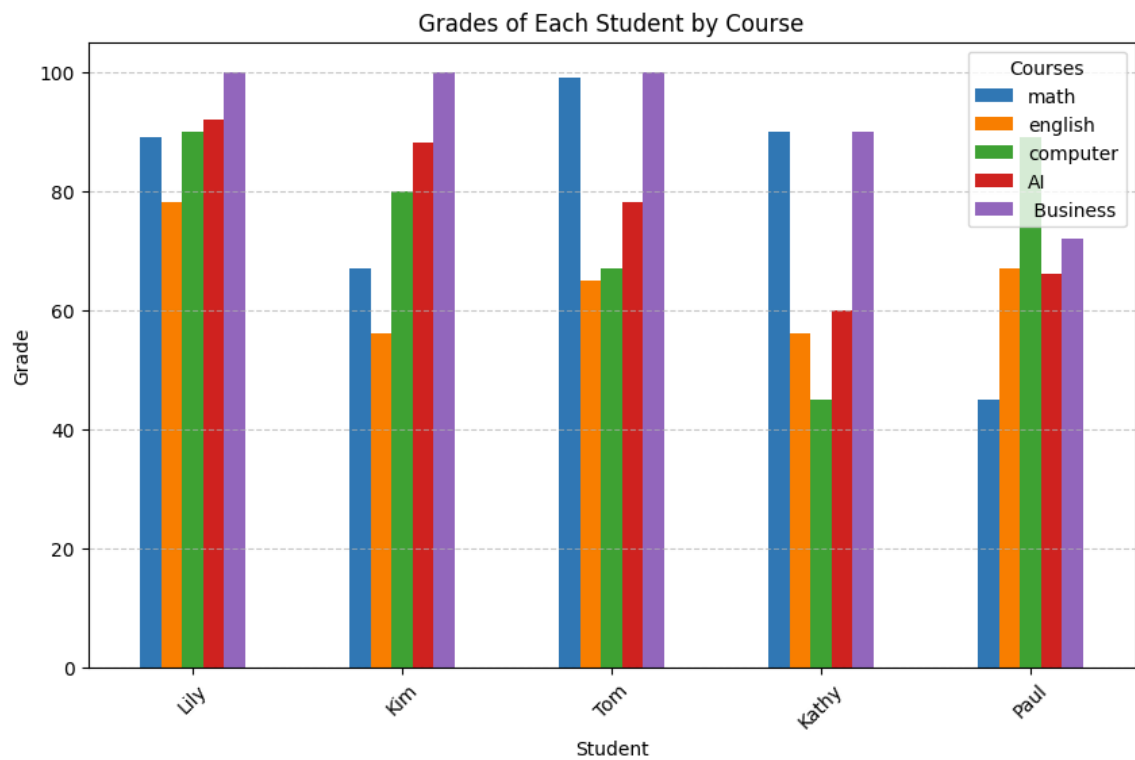
# Show the plot
plt.show()
```



```

0  name  math  english  computer  AI  Business
1  Lily   89    78      90    92    100
2  Kim   67    56      80    88    100
3  Tom   99    65      67    78    100
4  Kathy  90    56      45    60    90
5  Paul  45    67      89    66    72
Average grades for each course:
math      78.0
english   64.4
computer  74.2
AI        76.8
Business  92.4
dtype: float64

```



11.Summary

- *I calculated the average grade for each course in a CSV file using Python.*
- *I created graphs to visualize each student's grades from a CSV file using Python.*

Part 2: Workflow Steps

1. What specific questions did you ask the AI tools, and how effective were the responses?

The workflow steps listed above illustrate all the questions I asked ChatGPT. The responses were effective and provided clear solutions to my queries.

2. What challenges did you face when using AI tools, and how did you address them?

ChatGPT suggested different methods to solve problems, and I had to read through them to choose the best one for me. Sometimes, it was difficult to decide which method to use. I also found it challenging to work solely with ChatGPT without guidance from teachers or peers.

3. How did this process change your understanding of how to use AI for problem-solving?

This interactive dialogue with AI gave me a new perspective on problem-solving. I realized that AI can serve as a learning partner, allowing me to actively explore unknown problems rather than passively waiting for instructions from teachers. Through this process, I was able to:

- 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.

4. What would you do differently to improve your results in the future?

I would like to practice more with AI to improve my ability to ask smart questions and conduct further inquiries based on AI's responses.