ASSIGNMENT FOR DATA SCIENCE / AI INTERNS
marks (100)

Description :

This assignment consists of 4 exercises designed to test your Python programming skills across various domains including date/time operations, mathematical computations, string manipulations, file handling, and data processing with NumPy/Pandas.

Tasks:

Exercise 1: Age Calculator (20 points)

Create a program that:

1. Asks the user to input their birth date in mm/dd/yyyy format
2. Validates the input format and ensures it's a valid date
3. Calculates and displays their current age in years
4. Converts and displays the birthdate in European format (dd/mm/yyyy)
5. Handles all possible errors gracefully with appropriate messages

Exercise 2: Prime Number Generator (20 points)

Write a program that:

1. Takes two positive integers as input (range start and end)
2. Validates the input (must be positive integers)
3. Finds all prime numbers within the given range (inclusive)
4. Displays the primes in a formatted output (10 numbers per line)
5. Handles invalid inputs gracefully

Exercise 3 : Student Marks Processor (20 points)

Develop a program that:

1. Reads student marks data from a file (registration number, exam mark, coursework mark)
2. Computes overall marks using given weighting
3. Assigns grades based on specific rules
4. Creates a structured NumPy array

5. Sorts students by overall mark
6. Writes results to an output file
7. Displays grade statistics
8. Handles all errors gracefully

Exercise 4 : **Weather Data Fetcher & Analyzer** (20 points)

Use the **OpenWeatherMap API** (free tier) to fetch weather data, process it, and generate insights.

Task Requirements

1. Sign up for a free API key at OpenWeatherMap.
2. Install requests (if needed): pip install requests

Fetch Weather Data

Write a function fetch_weather(city: str, api_key: str) -> dict:

- Takes a city name and API key.
- Calls the OpenWeatherMap API (https://api.openweathermap.org/data/2.5/weather?q={city}&appid={api_key}&units=metric).
- Returns the JSON response.
- Handles errors (invalid city, network issues, etc.) gracefully.

Analyze Data

Write a function analyze_weather(weather_data: dict) -> str:

- Takes the API response.
- Returns a summary like: *"Cold (≤10°C)"*, *"Mild (11-24°C)"*, or *"Hot (≥25°C)"* based on temperature.
- Adds warnings if:
    - Wind speed > 10 m/s → *"High wind alert!"*
    - Humidity > 80% → *"Humid conditions!"*

Save to File

Write a function log_weather(city: str, filename: str):

- Fetches weather for city.
- Appends the data to filename in CSV format:

Whenever you write code **explain what each line does** using(#)comments.

Submission Requirements:

- Submit your work in **.py format**
- Create a separate Python file for each exercise
- Include comments explaining your code
- Test your programs with the provided data files
- Submit all files in a single zip folder named YourName_PythonAssignment.zip
- Run the output and record the video of Exercise 6 output
- **Introduction conclusion is must (if skipped -10points)**

Post the video on **LinkedIn** with: (10points)

- Post title : **"How I Built an AI-Powered Career Storyteller"**
- What you learned
- Proper hashtags (e.g., #AI #DataScience #InternshipJourney)

Engage with comments on your post and share it in groups—it'll **boost visibility** and show your consistency to future recruiters!

If you have portfolio add this assignment into that to impress recruiters!

GitHub Repository Setup (10 points)

Step 1 :

- Go to github
- Log in.
- Click the **"+" icon** in the top-right corner → Select **"New repository"**
- **Repository name:** Use a clear name like Python Asssignment-Week1

Add a short description *(eg: sales analysis)*

Step 2 : Keep the repo **Public**

- Click **Create repository**

Step 2 : Upload Your .py or zip File

- Open your new repository
- Click **“Add file” → “Upload files”**
- Upload your .py
- Click **“Commit changes”**

Final Submission

Share both of the following links in the WhatsApp group**:**

- **Your GitHub repo link**
- **Your LinkedIn post link**

Important note : (Submission format consist of 20 points if you didn’t follow submission format you may loss 20p).