

AI ASSISTED CODING

LAB – 5.1

CH.Yashwanth

2303A51093

BATCH-11

Task Description #1 (Privacy in API Usage)

Task: Use an AI tool to generate a Python program that connects to a weather API.

Prompt:

"Generate code to fetch weather data securely without exposing API keys in the code."

Expected Output:

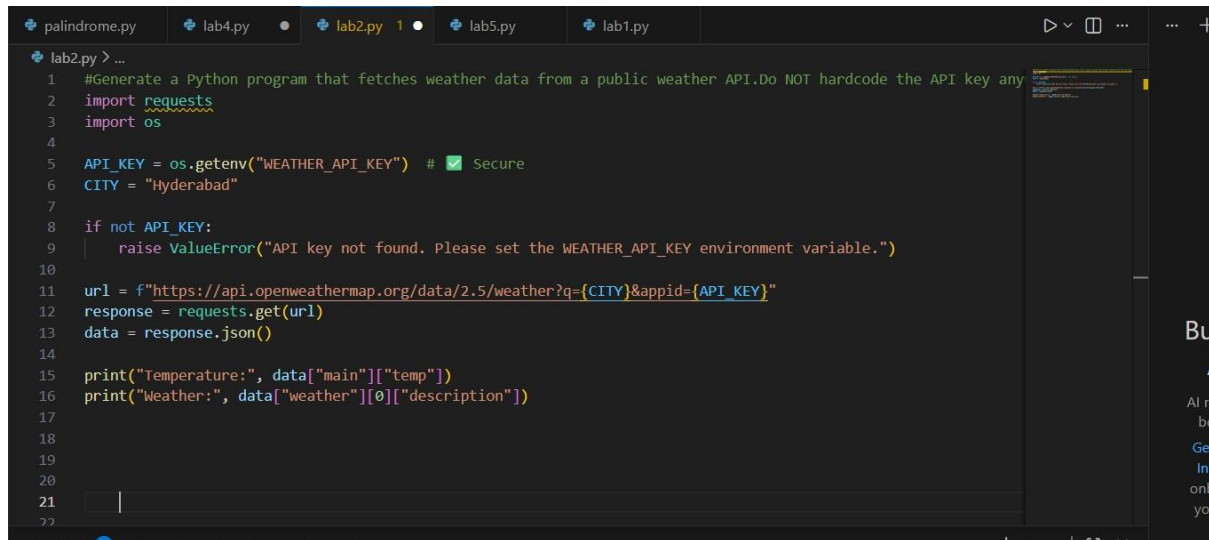
- Original AI code (check if keys are hardcoded).
- Secure version using **environment variables**.

PROMPT:

#Generate a Python program that fetches weather data from a public weather API. Do NOT hardcode the API key anywhere in the source code. The API key MUST be read only from an environment variable using the os module. If the API key is missing, the program should

raise an error. Do not include placeholder API keys in the code.

CODE:

A screenshot of a code editor with a dark theme. The editor shows a Python script in a file named 'lab2.py'. The script is a program that fetches weather data from a public weather API. It uses the 'requests' library to make a GET request to the OpenWeatherMap API. The API key is retrieved from an environment variable 'WEATHER_API_KEY'. If the key is not found, it raises a 'ValueError' with a message. The script then prints the temperature and weather description for the city of Hyderabad. The code is as follows:

```
1 #Generate a Python program that fetches weather data from a public weather API. Do NOT hardcode the API key any
2 import requests
3 import os
4
5 API_KEY = os.getenv("WEATHER_API_KEY") # Secure
6 CITY = "Hyderabad"
7
8 if not API_KEY:
9     raise ValueError("API key not found. Please set the WEATHER_API_KEY environment variable.")
10
11 url = f"https://api.openweathermap.org/data/2.5/weather?q={CITY}&appid={API_KEY}"
12 response = requests.get(url)
13 data = response.json()
14
15 print("Temperature:", data["main"]["temp"])
16 print("Weather:", data["weather"][0]["description"])
17
18
19
20
21
22
```

Task Description #2 (Privacy & Security in File Handling)

Task: Use an AI tool to generate a Python script that stores user data

(name, email, password) in a file.

Analyze: Check if the AI stores sensitive data in plain text or without encryption.

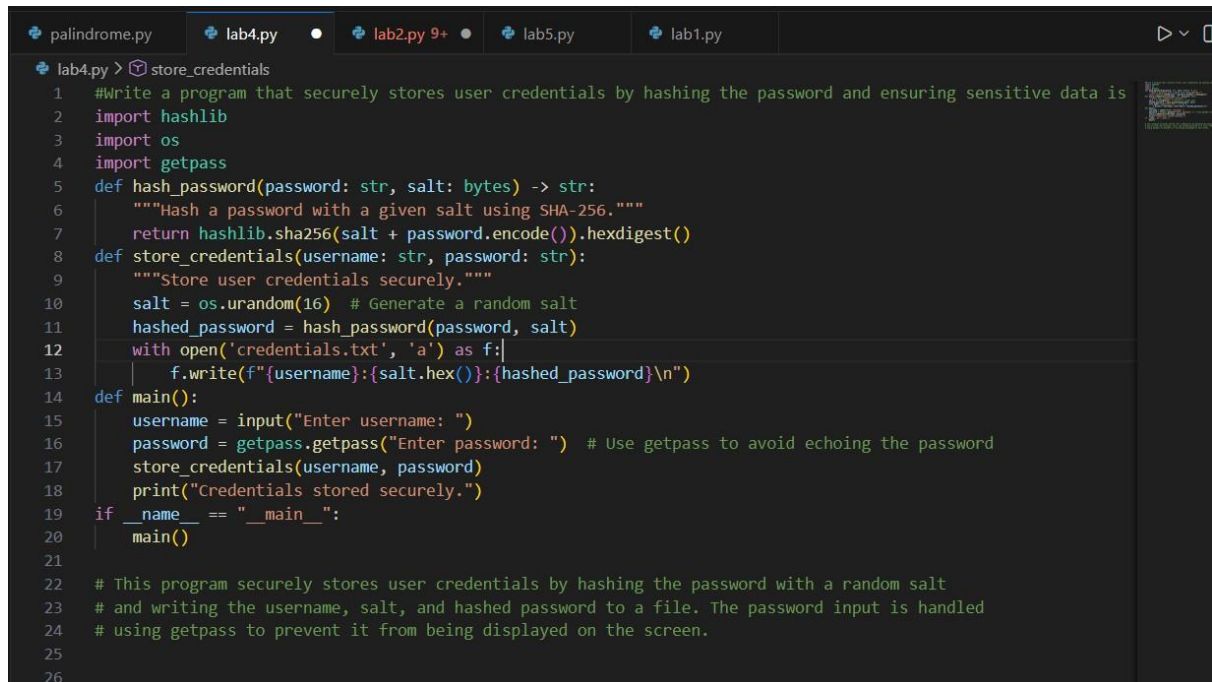
Expected Output:

- Identified privacy risks.
- Revised version with encrypted password storage (e.g., hashing).

PROMPT:

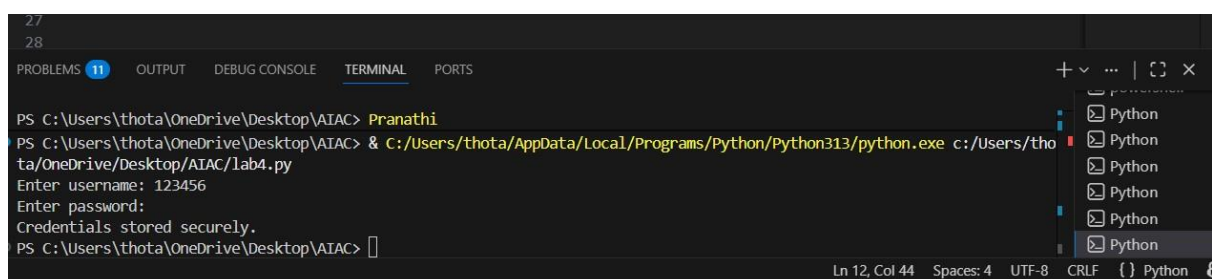
#Write a program that securely stores user credentials by hashing the password and ensuring sensitive data is not stored in plain text.

CODE:



```
lab4.py > store_credentials
1 #Write a program that securely stores user credentials by hashing the password and ensuring sensitive data is
2 import hashlib
3 import os
4 import getpass
5 def hash_password(password: str, salt: bytes) -> str:
6     """Hash a password with a given salt using SHA-256."""
7     return hashlib.sha256(salt + password.encode()).hexdigest()
8 def store_credentials(username: str, password: str):
9     """Store user credentials securely."""
10    salt = os.urandom(16) # Generate a random salt
11    hashed_password = hash_password(password, salt)
12    with open('credentials.txt', 'a') as f:
13        f.write(f"{username}:{salt.hex()}:{hashed_password}\n")
14 def main():
15     username = input("Enter username: ")
16     password = getpass.getpass("Enter password: ") # Use getpass to avoid echoing the password
17     store_credentials(username, password)
18     print("Credentials stored securely.")
19 if __name__ == "__main__":
20     main()
21
22 # This program securely stores user credentials by hashing the password with a random salt
23 # and writing the username, salt, and hashed password to a file. The password input is handled
24 # using getpass to prevent it from being displayed on the screen.
25
26
```

OUTPUT:



```
27
28
PROBLEMS 11 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\thota\OneDrive\Desktop\AIAC> Pranathi
PS C:\Users\thota\OneDrive\Desktop\AIAC> & c:/Users/thota/AppData/Local/Programs/Python/Python313/python.exe c:/Users/thota/OneDrive/Desktop/AIAC/lab4.py
Enter username: 123456
Enter password:
Credentials stored securely.
PS C:\Users\thota\OneDrive\Desktop\AIAC> []

Ln 12, Col 44 Spaces: 4 UTF-8 CRLF {} Python
```

Task Description #3 (Transparency in Algorithm Design)

Objective: Use AI to generate an Armstrong number checking function with comments and explanations.

Instructions:

1. Ask AI to explain the code line-by-line.
2. Compare the explanation with code functionality.

Expected Output:

- Transparent, commented code.
- Correct, easy-to-understand explanation **PROMPT:**

#write a code to generate armstrong number checking functions with comments
CODE:

```
lab1.py > ...
1  #write a code to generate armstrong number checking functions with comments
2  def is_armstrong_number(num):
3      """
4      This function checks if a number is an Armstrong number.
5      An Armstrong number is a number that is equal to the sum of its own digits
6      each raised to the power of the number of digits.
7      For example, 153 is an Armstrong number because 1^3 + 5^3 + 3^3 = 153.
8      """
9      # Convert the number to string to easily iterate over digits
10     digits = str(num)
11     num_digits = len(digits)
12
13     # Calculate the sum of each digit raised to the power of num_digits
14     sum_of_powers = sum(int(digit) ** num_digits for digit in digits)
15
16     # Check if the sum of powers is equal to the original number
17     return sum_of_powers == num
18
19 # Example usage
20 if __name__ == "__main__":
21     test_number = 153
22     if is_armstrong_number(test_number):
23         print(f"{test_number} is an Armstrong number.")
24     else:
25         print(f"{test_number} is not an Armstrong number.")
26     test_number = 123
27     if is_armstrong_number(test_number):
28         print(f"{test_number} is an Armstrong number.")
29     else:
30         print(f"{test_number} is not an Armstrong number.")
31
```

OUTPUT:

```
PROBLEMS 11 OUTPUT DEBUG CONSOLE TERMINAL PORTS
Credentials stored securely.
PS C:\Users\thota\OneDrive\Desktop\AIAC> ^C
PS C:\Users\thota\OneDrive\Desktop\AIAC> & C:/Users/thota/AppData/Local/Programs/Python/Python313/python.exe c:/Users/thota/OneDrive/Desktop/AIAC/lab1.py
153 is an Armstrong number.
123 is not an Armstrong number.
PS C:\Users\thota\OneDrive\Desktop\AIAC> []
```

Task Description #4 (Transparency in Algorithm Comparison)

Task: Use AI to implement two sorting algorithms (e.g., QuickSort and BubbleSort).

Prompt:

"Generate Python code for QuickSort and BubbleSort, and include comments explaining step-by-step how each works and where they differ." Expected Output:

- Code for both algorithms.
- Transparent, comparative explanation of their logic and efficiency.

PROMPT:

#Generate Python code for QuickSort and BubbleSort, and include comments explaining step-by-step how each works and where they differ.

CODE:

```
palindrome.py X lab4.py lab2.py lab3.py lab1.py
1 #Generate Python code for QuickSort and BubbleSort, and include comments explaining step-by-step how each works and where they differ
2 def bubble_sort(arr):
3     """
4     Bubble Sort algorithm sorts an array by repeatedly stepping through the list,
5     comparing adjacent elements and swapping them if they are in the wrong order.
6     The process is repeated until the list is sorted.
7     """
8     n = len(arr)
9     # Traverse through all array elements
10    for i in range(n):
11        # Last i elements are already sorted, no need to check them
12        for j in range(0, n-i-1):
13            # Compare adjacent elements
14            if arr[j] > arr[j+1]:
15                # Swap if they are in the wrong order
16                arr[j], arr[j+1] = arr[j+1], arr[j]
17    return arr
18
19 def quick_sort(arr):
20     """
21     Quick Sort algorithm sorts an array by selecting a 'pivot' element and partitioning
22     the other elements into two sub-arrays according to whether they are less than or greater
23     than the pivot. The sub-arrays are then sorted recursively.
24     """
25     if len(arr) <= 1:
26         return arr
27     else:
28         # Choose the pivot element (here we choose the last element)
29         pivot = arr[-1]
30         # Create sub-arrays for elements less than and greater than the pivot
31         less_than_pivot = [x for x in arr[:-1] if x <= pivot]
32         greater_than_pivot = [x for x in arr[:-1] if x > pivot]
33         # Recursively apply quick_sort to the sub-arrays and combine with the pivot
34         return quick_sort(less_than_pivot) + [pivot] + quick_sort(greater_than_pivot)
35
36 # Example usage:
37 if __name__ == "__main__":
38     sample_array = [64, 34, 25, 12, 22, 11, 90]
39     print("Original array:", sample_array)
40
41     # Using Bubble Sort
42     sorted_array_bubble = bubble_sort(sample_array.copy())
43     print("Sorted array using Bubble Sort:", sorted_array_bubble)
44
45     # Using Quick Sort
46     sorted_array_quick = quick_sort(sample_array.copy())
47     print("Sorted array using Quick Sort:", sorted_array_quick)
48
49
50
```

OUTPUT:

```
70 pivot = arr[-1]
PROBLEMS 11 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\thota\OneDrive\Desktop\AIAC> & C:/Users/thota/AppData/Local/Programs/Python/Python313/python.exe c:/Users/thota/OneDrive/Desktop/AIAC/palindrome.py
Original array: [64, 34, 25, 12, 22, 11, 90]
Sorted array using Bubble Sort: [11, 12, 22, 25, 34, 64, 90]
Sorted array using Quick Sort: [11, 12, 22, 25, 34, 64, 90]
PS C:\Users\thota\OneDrive\Desktop\AIAC>
```

Task Description #5 (Transparency in AI Recommendations)

Task: Use AI to create a product recommendation system.

Prompt:

"Generate a recommendation system that also provides reasons for each suggestion."

Expected Output:

- Code with explainable recommendations.
- Evaluation of whether explanations are understandable.

PROMPT:

#Generate a recommendation system that also provides reasons for each suggestion." **CODE:**

```
lab5.py > RecommendationSystem > generate_reason
1 #Generate a recommendation system that also provides reasons for each suggestion."
2 import random
3 class RecommendationSystem:
4     def __init__(self, items):
5         self.items = items
6
7     def recommend(self, user_preferences, num_recommendations=5):
8         recommendations = []
9         for _ in range(num_recommendations):
10             item = random.choice(self.items)
11             reason = self.generate_reason(item, user_preferences)
12             recommendations.append((item, reason))
13         return recommendations
14
15     def generate_reason(self, item, user_preferences):
16         reasons = [
17             f"This item matches your interest in {user_preferences}.",
18             f"Based on your previous choices, you might like this item.",
19             f"This item is popular among users with similar preferences.",
20             f"You have shown interest in similar items before.",
21             f"This item has high ratings in categories you prefer."
22         ]
23         return random.choice(reasons)
24
25 # Example usage
26 if __name__ == "__main__":
27     items = [
28         "Wireless Headphones",
29         "Smart Watch",
30         "E-book Reader",
31         "Fitness Tracker",
32         "Bluetooth Speaker",
33         "Noise Cancelling Earbuds",
34         "4K Action Camera",
35         "Portable Charger",
36         "Smart Home Hub",
37         "VR Headset"
38     ]
39     user_preferences = "technology and gadgets"
40     recommender = RecommendationSystem(items)
41     recommendations = recommender.recommend(user_preferences)
42
43     for item, reason in recommendations:
44         print(f"Recommended Item: {item}\nReason: {reason}\n")
```

OUTPUT:

```
PS C:\Users\thota\OneDrive\Desktop\AIAC> & C:/Users/thota/AppData/Local/Programs/Python/Python313/python.exe c:/Users/thota/OneDrive/Desktop/AIAC/lab5.py
Reason: This item matches your interest in technology and gadgets.

Recommended Item: Smart Home Hub
Reason: This item matches your interest in technology and gadgets.

Recommended Item: Noise Cancelling Earbuds
Reason: Based on your previous choices, you might like this item.

Recommended Item: Noise Cancelling Earbuds
Reason: Based on your previous choices, you might like this item.

PS C:\Users\thota\OneDrive\Desktop\AIAC>
```

