

# AI ASSISTED CODING

## LAB-5.1

**M.ABHISHEK**

**2303A51762**

### **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:

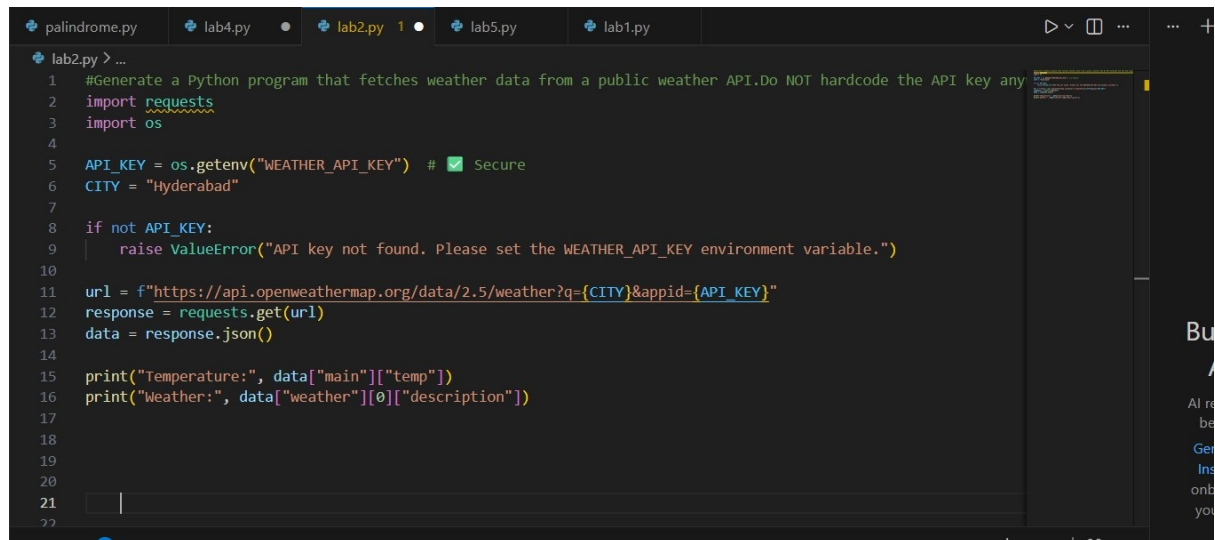
- Original AI code (check if keys are hardcoded).
- Secure version using **environment variables**.

#### **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 has several tabs at the top: 'palindrome.py', 'lab4.py', 'lab2.py' (selected), 'lab5.py', and 'lab1.py'. The 'lab2.py' tab shows a Python script. The script starts with a comment: '#Generate a Python program that fetches weather data from a public weather API. Do NOT hardcode the API key any'. It imports 'requests' and 'os'. It then sets 'API\_KEY = os.getenv("WEATHER\_API\_KEY")' with a comment '# Secure' and a green checkmark icon. 'CITY' is set to 'Hyderabad'. There is a conditional check 'if not API\_KEY:' which raises a 'ValueError' with a message: 'API key not found. Please set the WEATHER\_API\_KEY environment variable.'. The script then constructs a URL: 'url = f"https://api.openweathermap.org/data/2.5/weather?q={CITY}&appid={API\_KEY}"'. It uses 'requests.get(url)' to fetch data and 'response.json()' to parse it. Finally, it prints the temperature and weather description. The bottom of the editor shows a 'TERMINAL' tab which is currently empty.

```
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:

```
palindrome.py lab4.py lab2.py 9+ lab5.py lab1.py
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/tho
ta/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:

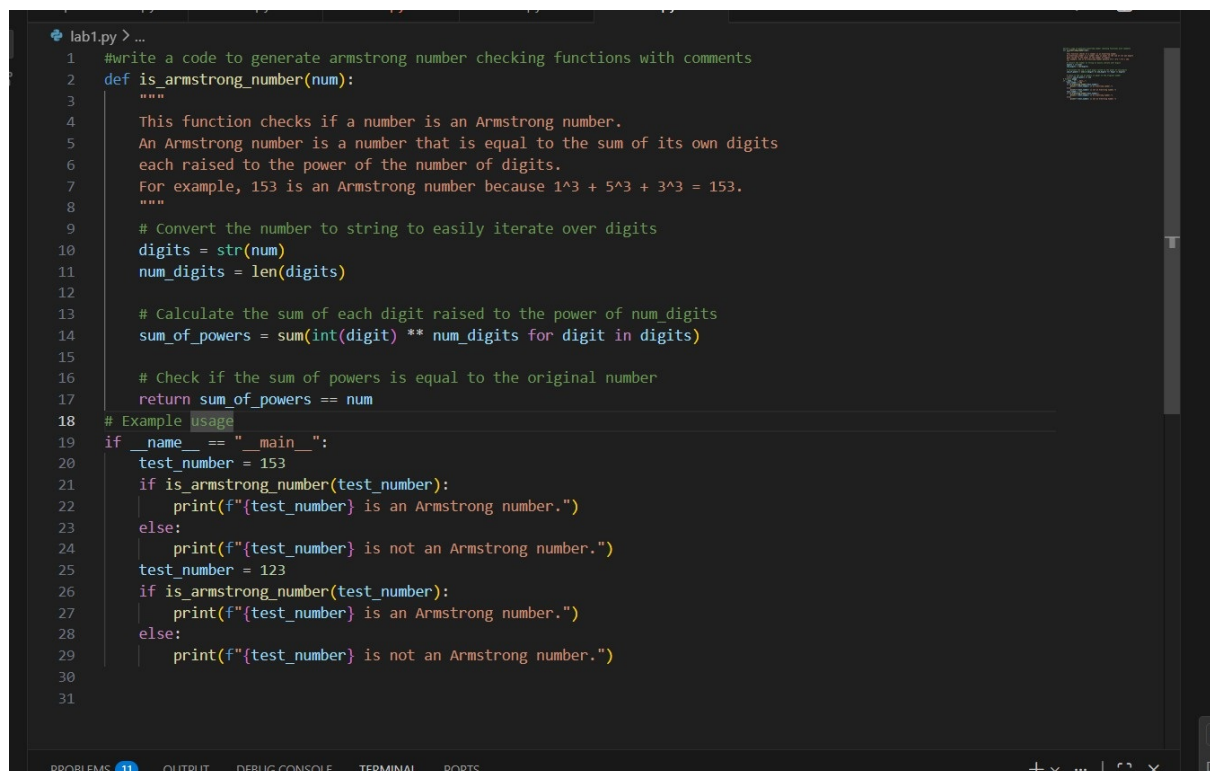
1. Ask AI to explain the code line-by-line.
2. Compare the explanation with code functionality.

Expected Output:

- Transparent, commented code.
- Correct, easy-to-understand explanation

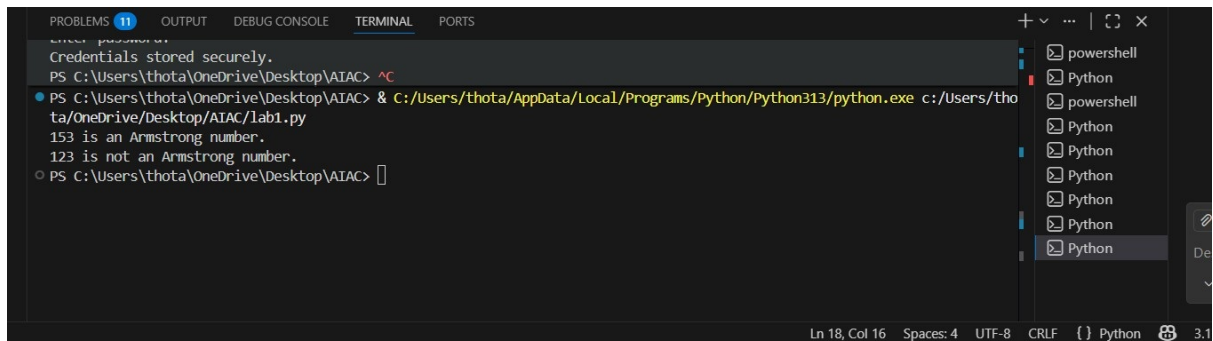
## PROMPT:

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

A screenshot of a code editor window titled 'lab1.py > ...'. The code is written in Python and defines a function 'is\_armstrong\_number(num)'. The function's docstring explains that an Armstrong number is equal to the sum of its own digits raised to the power of the number of digits, with the example 153 (1^3 + 5^3 + 3^3 = 153). The code then implements the logic: it converts the number to a string, counts the digits, calculates the sum of each digit raised to the power of the digit count, and returns True if the sum equals the original number. Below the function, there is an example usage section that tests the function with 153 and 123, printing appropriate messages. The editor interface includes a sidebar on the right, a bottom status bar with tabs for 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', and 'PORTS', and a bottom-right toolbar with icons for zooming and window management.

```
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 lab5.py lab1.py
#Generate Python code for QuickSort and BubbleSort, and include comments explaining step-by-step how each works and where they differ
def bubble_sort(arr):
    """
    Bubble Sort algorithm sorts an array by repeatedly stepping through the list,
    comparing adjacent elements and swapping them if they are in the wrong order.
    The process is repeated until the list is sorted.
    """
    n = len(arr)
    # Traverse through all array elements
    for i in range(n):
        # Last i elements are already sorted, no need to check them
        for j in range(0, n-i-1):
            # Compare adjacent elements
            if arr[j] > arr[j+1]:
                # Swap if they are in the wrong order
                arr[j], arr[j+1] = arr[j+1], arr[j]
    return arr

def quick_sort(arr):
    """
    Quick Sort algorithm sorts an array by selecting a 'pivot' element and partitioning
    the other elements into two sub-arrays according to whether they are less than or greater
    than the pivot. The sub-arrays are then sorted recursively.
    """
    if len(arr) <= 1:
        return arr
    else:
        # Choose the pivot element (here we choose the last element)
        pivot = arr[-1]
        # Create sub-arrays for elements less than and greater than the pivot
        less_than_pivot = [x for x in arr[:-1] if x <= pivot]
        greater_than_pivot = [x for x in arr[:-1] if x > pivot]
        # Recursively apply quick_sort to the sub-arrays and combine with the pivot
        return quick_sort(less_than_pivot) + [pivot] + quick_sort(greater_than_pivot)

# Example usage:
if __name__ == "__main__":
    sample_array = [64, 34, 25, 12, 22, 11, 90]
    print("Original array:", sample_array)

    # Using Bubble Sort
    sorted_array_bubble = bubble_sort(sample_array.copy())
    print("Sorted array using Bubble Sort:", sorted_array_bubble)

    # Using Quick Sort
    sorted_array_quick = quick_sort(sample_array.copy())
    print("Sorted array using Quick Sort:", sorted_array_quick)
```

## OUTPUT:

```
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]
```

## Task Description #5 (Transparency in AI Recommendations)

Task: Use AI to create a product recommendation system.

Prompt:

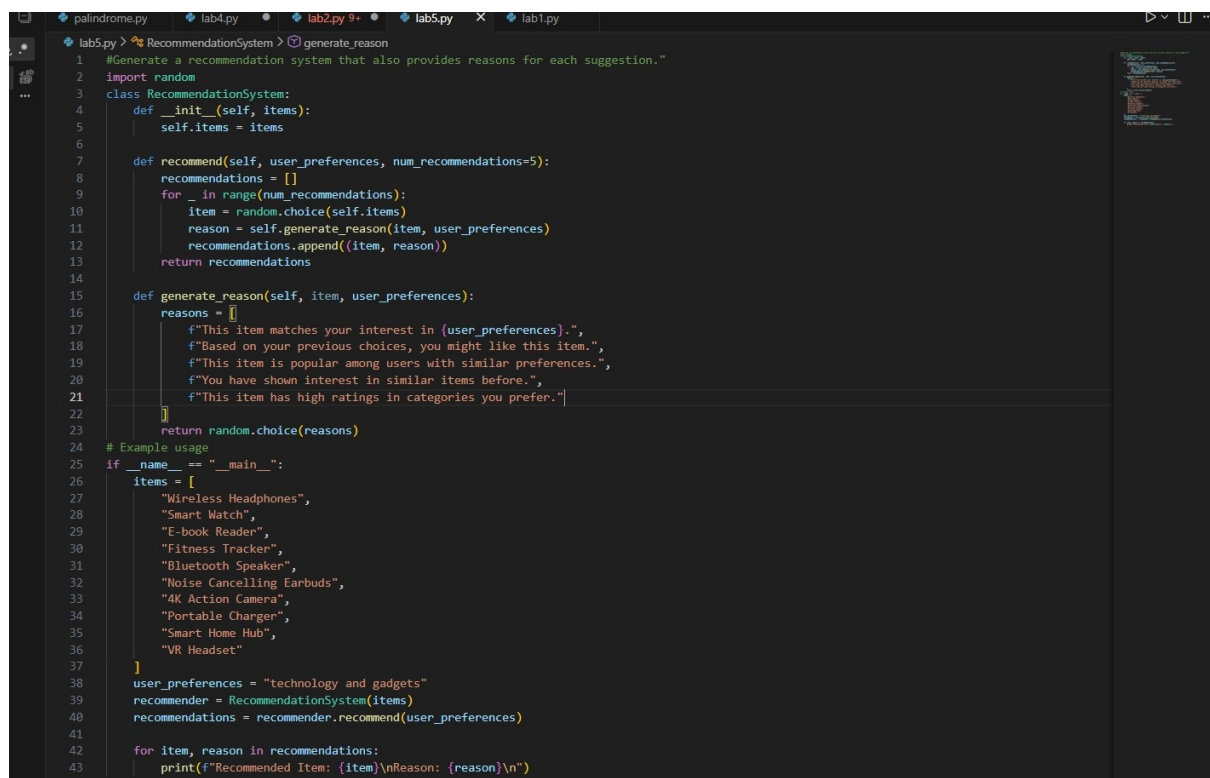
"Generate a recommendation system that also provides reasons for each suggestion."

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:**

A screenshot of a Python code editor with a dark theme. The code defines a 'RecommendationSystem' class. The 'init' method takes 'items' and assigns them to 'self.items'. The 'recommend' method takes 'user\_preferences' and 'num\_recommendations' (default 5), loops through that number, randomly selects an item from 'self.items', generates a reason using 'generate\_reason', and appends the item and reason to a 'recommendations' list. The 'generate\_reason' method takes 'item' and 'user\_preferences', creates a list of five possible reasons (e.g., 'This item matches your interest in {user\_preferences}.', 'Based on your previous choices, you might like this item.'), and returns a random choice from that list. An example usage section at the bottom creates a list of items like 'Wireless Headphones', 'Smart Watch', etc., sets 'user\_preferences' to 'technology and gadgets', creates a 'RecommendationSystem' instance, and prints the recommendations.

```
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         return random.choice(reasons)
23
24 # Example usage
25 if __name__ == "__main__":
26     items = [
27         "Wireless Headphones",
28         "Smart Watch",
29         "E-book Reader",
30         "Fitness Tracker",
31         "Bluetooth Speaker",
32         "Noise Cancelling Earbuds",
33         "4K Action Camera",
34         "Portable Charger",
35         "Smart Home Hub",
36         "VR Headset"
37     ]
38     user_preferences = "technology and gadgets"
39     recommender = RecommendationSystem(items)
40     recommendations = recommender.recommend(user_preferences)
41
42     for item, reason in recommendations:
43         print(f"Recommended Item: {item}\nReason: {reason}\n")
44
```

**OUTPUT:**



```
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/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> 
```

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