

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech		Assignment Type : Lab	Academic Year : 2025-2026
CourseCode	23CS002PC304	Course Title	AI Assisted Coding
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Date and Day of Assignment	Week3 – Monday	Batch	23CSBTB48
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Assignment Number: 5.1			
Q.No.	Question		
	<p><b>Lab 5: Ethical Foundations – Responsible AI Coding Practices</b></p> <p><b>Lab Objectives:</b></p> <ul style="list-style-type: none"> <li>To explore the ethical risks associated with AI-generated code.</li> <li>To recognize issues related to security, bias, transparency, and copyright.</li> <li>To reflect on the responsibilities of developers when using AI tools in software development.</li> <li>To promote awareness of best practices for responsible and ethical AI coding.</li> </ul> <p><b>Lab Outcomes (LOs):</b></p> <p>After completing this lab, students will be able to:</p> <ul style="list-style-type: none"> <li>Identify and avoid insecure coding patterns generated by AI tools.</li> <li>Detect and analyze potential bias or discriminatory logic in AI-generated outputs.</li> <li>Evaluate originality and licensing concerns in reused AI-generated code.</li> <li>Understand the importance of explainability and transparency in AI-assisted programming.</li> <li>Reflect on accountability and the human role in ethical AI coding practices.</li> </ul> <p><b>Task Description #1 (Privacy in API Usage)</b></p> <p>Task: Use an AI tool to generate a Python program that connects to a weather API.</p> <p>Prompt:</p> <p><i>"Generate code to fetch weather data securely without exposing API keys in the code."</i></p> <p>Expected Output:</p> <ul style="list-style-type: none"> <li>Original AI code (check if keys are hardcoded).</li> <li>Secure version using environment variables.</li> </ul>		

```

lab_5.py > lab_5.py > ...
1 #TASK 1:Generate code to fetch weather data securely without exposing API keys in the code.
2 |
3 import os
4 import requests
5 from dotenv import load_dotenv
6
7 load_dotenv()
8 API_KEY = os.getenv("WEATHER_API_KEY")
9
10 #Task 2:
11 #Generate a Python script that stores user details (name, email, password) in a file. Then analyze if storing the password is secure and modify the script to store the password
12 import os
13 import hashlib
14 Qodo: Test this function
15 def hash_password(password):
16     return hashlib.sha256(password.encode()).hexdigest()
17 Qodo: Test this function
18 def store_user_details(name, email, password):
19     hashed_password = hash_password(password)
20     with open("user_details.txt", "a") as file:
21         file.write(f"Name: {name}, Email: {email}, Password: {hashed_password}\n")
22 if __name__ == "__main__":
23     name = input("Enter your name: ")
24     email = input("Enter your email: ")
25     password = input("Enter your password: ")
26     store_user_details(name, email, password)
27     print("User details stored securely.")
28
29 # Storing passwords in plain text is insecure as it exposes sensitive information to anyone who has access to the file.
30 # Hashing the password before storing it enhances security by ensuring that the actual password is not saved directly.
31
32 weather = data["weather"][0]["description"]
33 temperature = data["main"]["temp"]
34 return f"Weather in {city}: {weather}, Temperature: {temperature}°C"
35
36 PS C:\Users\srina\OneDrive\Desktop\aiac> & C:/Users/srina/AppData/Local/Programs/Python/Python313/python.exe
37 Enter your name: Yashuu
38 Enter your email: mittapalliyashu@gmail.com
39 Enter your password: yashu
40 User details stored securely.
41 print(get_weather(city))
42
43 #Task 3:

```

AI saves name, email, password straight to file readable by anyone, total hack risk.

Fix: Mash password into unreadable hash + random salt; store that instead can't steal real password.

Output:

Task Description

Objective:

Instructions

```

PS C:\Users\srina\OneDrive\Desktop\aiac> & C:/Users/srina/AppData/Local/Programs/Python/Python313/python.exe
Enter city name: warangal
Weather in warangal: clear sky, Temperature: 30.67°C
PS C:\Users\srina\OneDrive\Desktop\aiac>

```

1. Ask AI to explain the code line-by-line.

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

2. Compare the explanation with code functionality.

Task: Use an AI tool to generate a Python script that stores user data (name, email, password) in a file.

Expected Output:

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

- Transparent, commented code.

Expected Output:

- Correct, easy-to-understand explanation.
- Identified privacy risks.

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

**Prompt:** generate an Armstrong number checking function with comments and explanations and explain the

**Prompt:** by line, compare the explanation with full code functionality.

Generate a Python script that stores user details (name, email, password) in a file. Then analyze if storing the password is secure and modify the script to store the password safely using hashing instead of plain text.

## Code :

```
lab_5.py > lab_5.py > ...
55 def is_armstrong_number(num):
56     """
57     This function checks if a number is an Armstrong number.
58     An Armstrong number for a given number of digits is an integer such that the sum of its own digits each raised to the power of the number of digits is equal to the number itself.
59     For example, 153 is an Armstrong number because  $1^3 + 5^3 + 3^3 = 153$ .
60     """
61     # Convert the number to string to easily iterate over each digit
62     str_num = str(num)
63     # Get the number of digits in the number
64     num_digits = len(str_num)
65     # Initialize a variable to hold the sum of the digits raised to the power of num_digits
66     sum_of_powers = 0
67
68     # Iterate over each digit in the string representation of the number
69     for digit in str_num:
70         # Convert the digit back to integer and raise it to the power of num_digits, then add it to sum_of_powers
71         sum_of_powers += int(digit) ** num_digits
72
73     # Check if the calculated sum_of_powers is equal to the original number
74     return sum_of_powers == num
75
76 # Example usage
77 number = int(input("Enter a number to check if it's an Armstrong number: "))
78 if is_armstrong_number(number):
79     print(f"{number} is an Armstrong number.")
80 else:
81     print(f"{number} is not an Armstrong number.")
82
83 # Explanation of the code:
84 # 1. The function 'is_armstrong_number' takes an integer 'num' as input.
85 # 2. It converts the number to a string to facilitate iteration over each digit.
86 # 3. It calculates the number of digits in the number.
87 # 4. It initializes a variable 'sum_of_powers' to store the cumulative sum of each digit raised to the power of the number of digits.
88 # 5. It iterates over each digit, converts it back to an integer, raises it to the power of 'num_digits', and adds it to 'sum_of_powers'.
89 # 6. Finally, it checks if 'sum_of_powers' is equal to the original number and returns True if they are equal (indicating that it is an Armstrong number) or False otherwise.
90 # The functionality of the code matches the explanation provided, as it correctly identifies Armstrong numbers based on the defined criteria.
```

## Output :

```
PS C:\Users\srina\OneDrive\Desktop\aiac> 153
Enter a number to check if it's an Armstrong number: 153
153 is an Armstrong number.
PS C:\Users\srina\OneDrive\Desktop\aiac> & C:/Users/srina/AppData/L
Enter a number to check if it's an Armstrong number: 123
123 is not an Armstrong number.
PS C:\Users\srina\OneDrive\Desktop\aiac> |
```

## Explanation:

Armstrong number: A number equals the sum of its digits each raised to the power of total digit count. Here my Code grabs each digit, powers it correctly and also adds them up, then checks if that matches the original.

## 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.

Codes :

```

lab_5.py X .env
lab_5.py > lab_5.py > ...
91 #TASK 4:
92 #Generate Python code for QuickSort and BubbleSort, and include comments explaining step-by-step how each works and where they differ.
93 Qodo: Test this function
94 def quicksort(arr):
95     """
96     QuickSort is a divide-and-conquer algorithm that sorts an array by selecting a 'pivot' element
97     and partitioning the other elements into two sub-arrays according to whether they are less than or greater than the pivot.
98     The sub-arrays are then sorted recursively.
99     """
100     if len(arr) <= 1:
101         return arr # Base case: arrays with 0 or 1 element are already sorted
102     else:
103         pivot = arr[len(arr) // 2] # Choose the middle element as the pivot
104         left = [x for x in arr if x < pivot] # Elements less than the pivot
105         middle = [x for x in arr if x == pivot] # Elements equal to the pivot
106         right = [x for x in arr if x > pivot] # Elements greater than the pivot
107         return quicksort(left) + middle + quicksort(right) # Recursively sort and combine the sub-arrays
108
109 Qodo: Test this function
110 def bubblesort(arr):
111     """
112     BubbleSort is a simple sorting algorithm that repeatedly steps through the list,
113     compares adjacent elements and swaps them if they are in the wrong order.
114     The process is repeated until the list is sorted.
115     """
116     n = len(arr)
117     for i in range(n):
118         # Track if a swap was made; if no swaps occur, the array is sorted
119         swapped = False
120         for j in range(0, n-i-1): # Last i elements are already sorted
121             if arr[j] > arr[j+1]: # Compare adjacent elements
122                 arr[j], arr[j+1] = arr[j+1], arr[j] # Swap if they are in the wrong order
123                 swapped = True
124             if not swapped:
125                 break # If no swaps were made, the array is sorted
126         return arr
127
128 if __name__ == "__main__":
129     arr = list(map(int, input("Enter numbers separated by space: ").split()))
130     print("Original array:", arr)
131     print("QuickSort result:", quicksort(arr))
132     print("BubbleSort result:", bubblesort(arr.copy()))

```

Output :

```

PS C:\Users\srina\OneDrive\Desktop\aiac> & C:/Users/srina/
Enter numbers separated by space: 5 2 9 1 7
Original array: [5, 2, 9, 1, 7]
QuickSort result: [1, 2, 5, 7, 9]
BubbleSort result: [1, 2, 5, 7, 9]
PS C:\Users\srina\OneDrive\Desktop\aiac>

```

Explanation:

**BubbleSort** slowly swaps neighbor pairs until none needed simple but crawls on big lists. whereas, **QuickSort** picks middle value, splits smaller/larger sides, repeats divide fast splitter for real work.

**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."

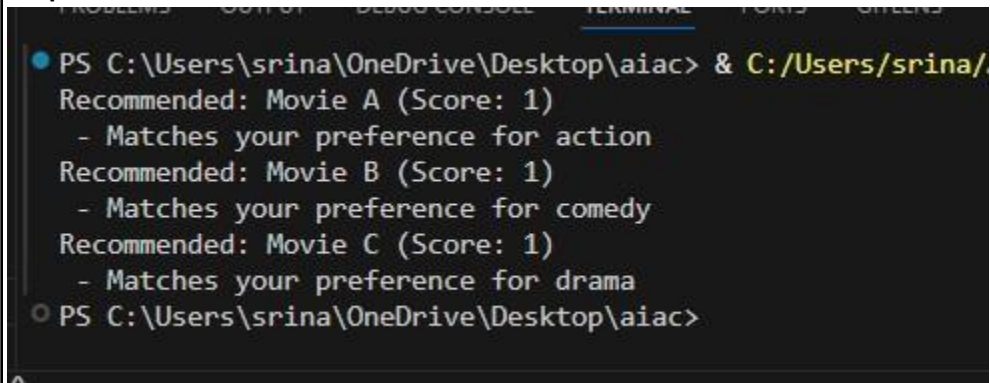
Expected Output:

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

Code :

```
lab_5.py > lab 5.py > ...
130     print("BubbleSort result:", bubblesort(arr.copy()))
131
132     ...
133 #TASK 5:
134 #Generate a recommendation system that also provides reasons for each suggestion.
135 import random
136 Qodo: Test this function
137 def recommend_items(user_preferences, items):
138     recommendations = []
139     for item in items:
140         score = 0
141         reasons = []
142         for preference in user_preferences:
143             if preference in item['tags']:
144                 score += 1
145                 reasons.append(f"Matches your preference for {preference}")
146         if score > 0:
147             recommendations.append((item['name'], score, reasons))
148     recommendations.sort(key=lambda x: x[1], reverse=True)
149     return recommendations
150 if __name__ == "__main__":
151     user_preferences = ['action', 'comedy', 'drama']
152     items = [
153         {'name': 'Movie A', 'tags': ['action', 'thriller']},
154         {'name': 'Movie B', 'tags': ['comedy', 'romance']},
155         {'name': 'Movie C', 'tags': ['drama', 'biography']},
156         {'name': 'Movie D', 'tags': ['horror', 'thriller']},
157     ]
158     recommendations = recommend_items(user_preferences, items)
159     for name, score, reasons in recommendations:
160         print(f"Recommended: {name} (Score: {score})")
161         for reason in reasons:
162             print(f" - {reason}")
```

### Output:

A screenshot of a Windows command prompt window. The title bar shows 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', 'TOOLS', and 'SETTINGS'. The terminal content shows a PowerShell prompt 'PS C:\Users\srina\OneDrive\Desktop\aiac>' followed by a command '& C:/Users/srina/'. The output lists three recommended movies, each with a score of 1 and a reason: 'Recommended: Movie A (Score: 1) - Matches your preference for action', 'Recommended: Movie B (Score: 1) - Matches your preference for comedy', and 'Recommended: Movie C (Score: 1) - Matches your preference for drama'. The prompt returns to 'PS C:\Users\srina\OneDrive\Desktop\aiac>'.

### Explanation:

Recommendation system scans other users' tastes matching ours, then they suggest the matches according to our preferences and tastes so that every person can watch their own genre or taste preferences.