Assignment 5.1

Course Title: Ethical Foundations – Responsible AI

Lab Title: Responsible AI Coding Practices

Lab No: 5

Week: 3

Day: Monday

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Aim

To understand ethical risks in AI-generated code and apply responsible AI coding practices focusing on privacy, security, transparency, and accountability.

Objectives

- Identify insecure coding patterns generated by AI
- Analyze privacy and security risks
- Ensure transparency and explainability in algorithms
- Understand developer responsibility in AI-assisted programming

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Tools Used

- VS Code

Task-Wise Implementation

Task 1: Privacy in API Usage

Problem Statement

Generate a Python program to fetch weather data securely without exposing API keys.

AI Prompt Used

Generate a Python program to fetch weather data from a weather API without hardcoding the API key.

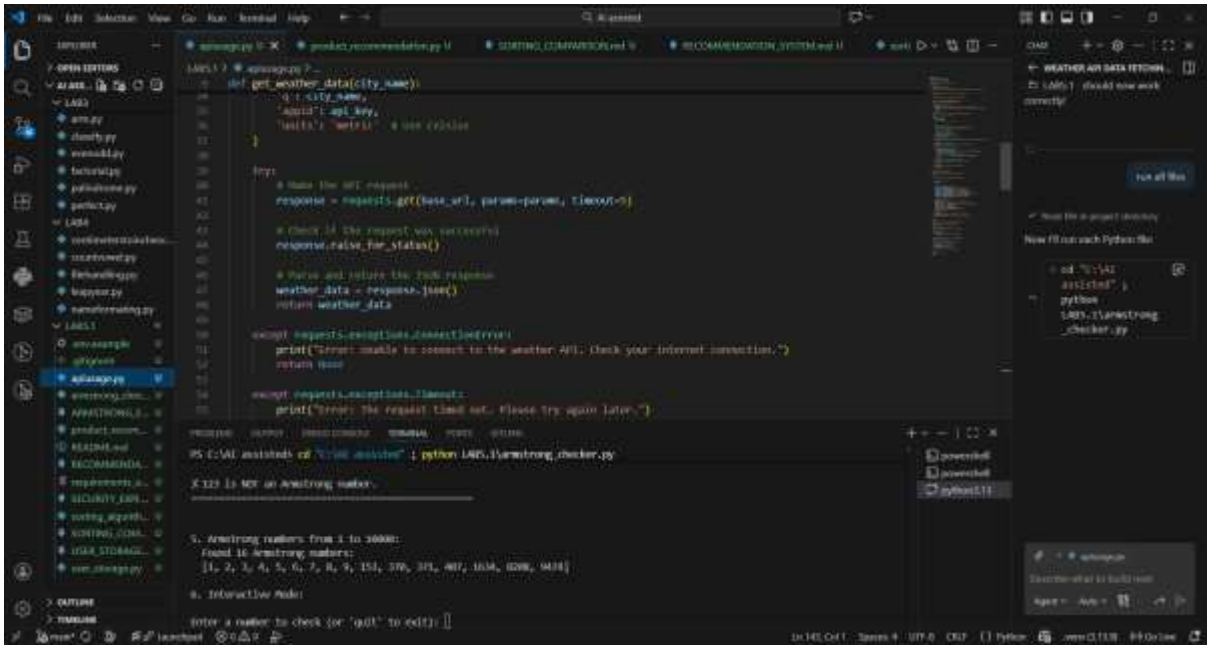
Use environment variables to store and access the API key securely.

Include basic error handling.

Observation

- AI-generated code avoided hardcoded API keys
- Environment variables were used for security

Secure Code



Ethical Analysis

Using environment variables protects sensitive credentials and prevents unauthorized misuse.

Task 2: Privacy & Security in File Handling

Problem Statement

Store user data securely without exposing sensitive information.

AI Prompt Used

Generate a Python program to store user details (name, email, password) securely.

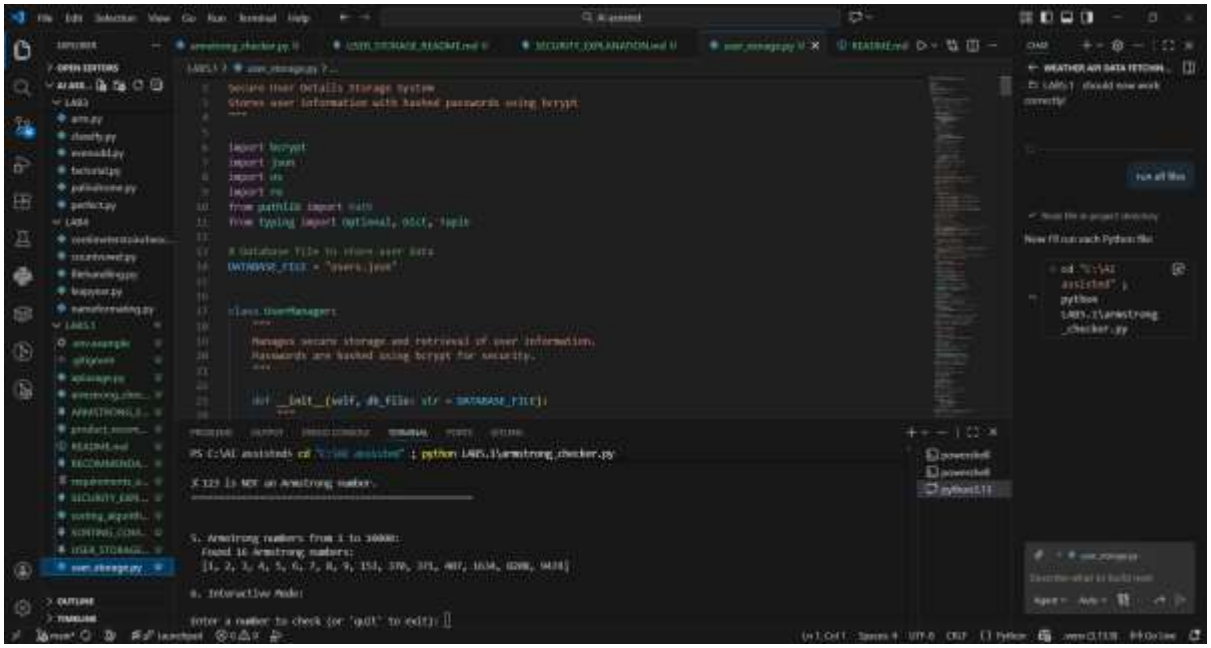
Do not store passwords in plain text.

Use hashing for password storage and explain why this approach is secure.

Privacy Risk Identified

- Plain-text password storage is insecure

Secure Code



Ethical Analysis

Hashing ensures passwords cannot be recovered even if the file is leaked.

Task 3: Transparency in Algorithm Design

Problem Statement

Design an Armstrong number checking program with clear explanation.

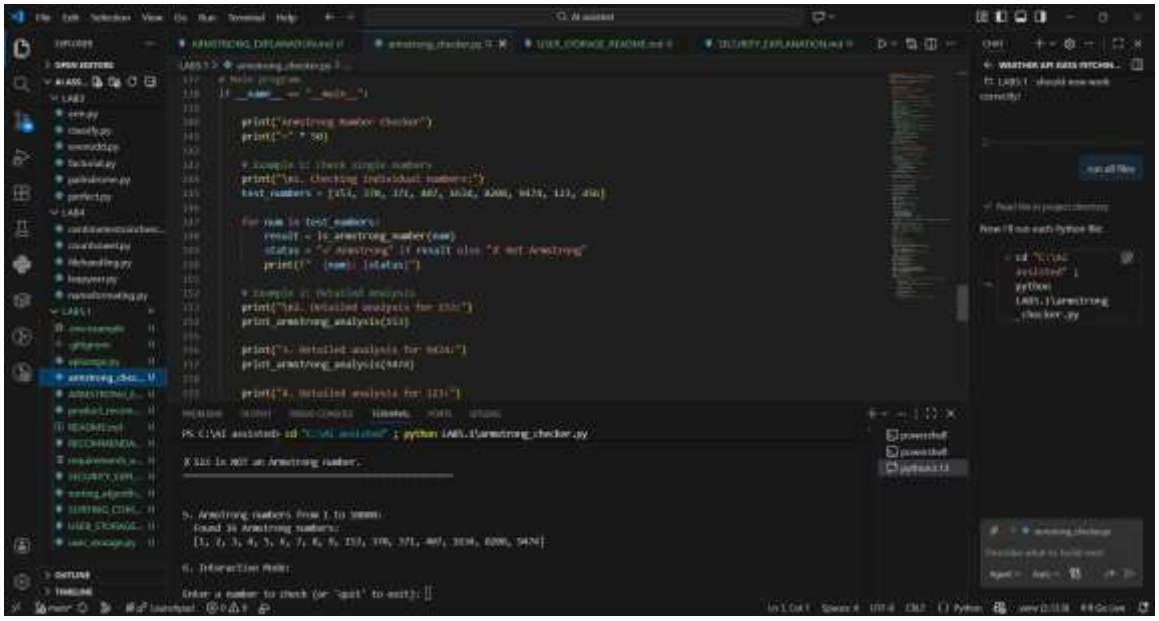
AI Prompt Used

Generate a Python function to check whether a given number is an Armstrong number.

Add clear comments to every important line of code.

Also explain the code line-by-line in simple terms.

Implementation



Transparency Evaluation

The explanation clearly matches the program logic, ensuring understandability.

Task 4: Transparency in Algorithm Comparison

Problem Statement

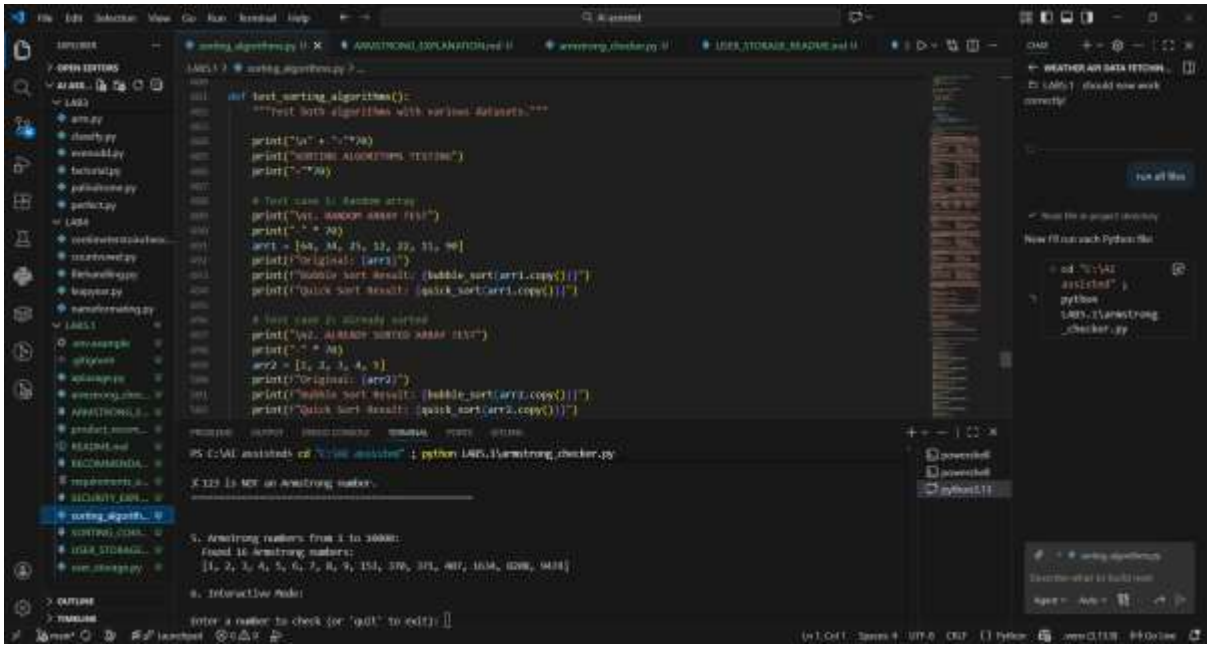
Implement and compare two sorting algorithms.

AI Prompt Used

Generate Python code for Bubble Sort and Quick Sort.

Include step-by-step comments explaining how each algorithm works.

Compare both algorithms in terms of logic, time complexity, and efficiency.



Comparison

Algorithm	Time Complexity	Efficiency
Bubble Sort	$O(n^2)$	Low
Quick Sort	O(n log n)	High

Task 5: Transparency in AI Recommendations

Problem Statement

Create an explainable recommendation system.

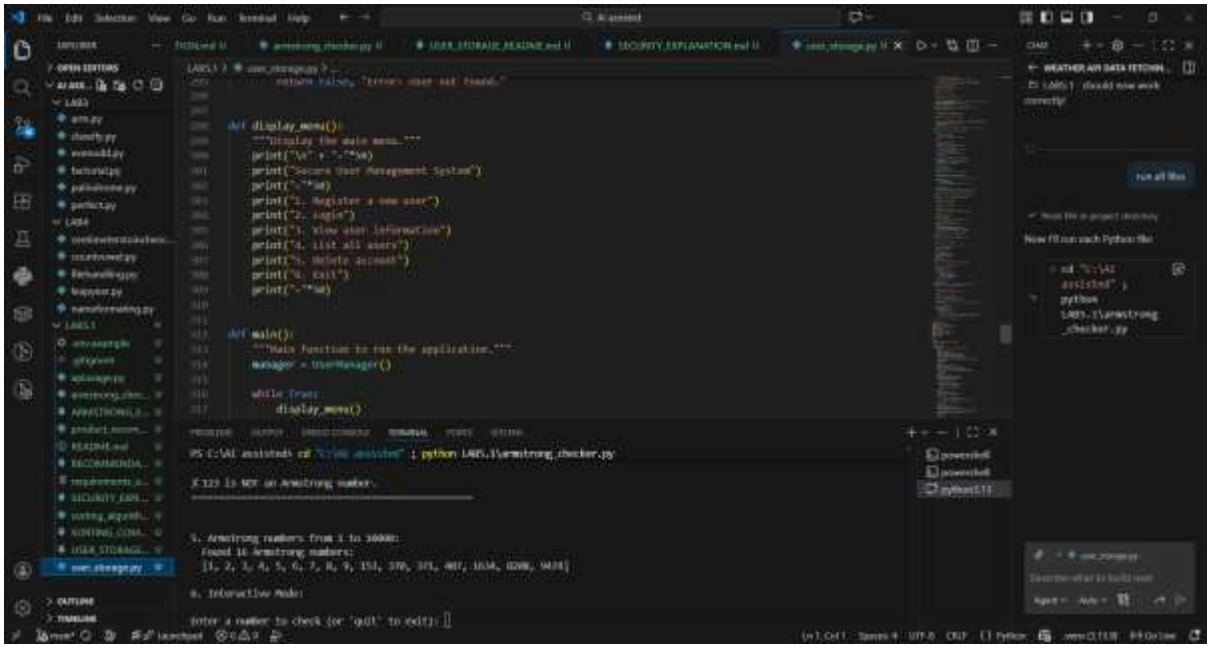
AI Prompt Used

Generate a simple product recommendation system in Python.

For each recommended product, also provide a clear explanation of why it was recommended.

Ensure the recommendations are explainable and transparent.

Implementation



Transparency Evaluation

Each recommendation includes a reason, making the system explainable.

Result

All tasks were implemented successfully using ethical AI coding practices with proper privacy, security, and transparency.

Conclusion

AI-generated code must be reviewed by developers to ensure ethical compliance. Human accountability is essential in responsible AI usage.