

Lab 5: Ethical Foundations – Responsible AI Coding Practices

Week 3 – Monday

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Lab Objectives

- To understand ethical risks involved in AI-generated code.
- To identify issues related to privacy, security, and transparency.
- To analyze the responsibility of developers when using AI tools.
- To promote responsible and ethical AI coding practices.

Lab Outcomes

After completing this lab, students will be able to:

- Identify insecure coding patterns generated by AI tools.
- Analyze privacy and security risks in AI-generated programs.
- Understand the importance of transparency and explainability.
- Recognize the role of human responsibility in ethical AI coding.

Task Description #1: Privacy in API Usage

Objective:

To generate a Python program that fetches weather data securely without exposing API keys.

Risk Analysis:

AI-generated code may hardcode API keys directly in the program. This is unsafe and may lead to security breaches.

Conclusion:

Using environment variables protects sensitive credentials and follows ethical security practices.

```
pp > weather_insecure.py > api_key
 1 import requests
 2
 3 # INSECURE: API key is hardcoded directly in the source code
 4 api_key = "7ff52d0e6028e2fd7e3d3a81653a90e2"
 5 city = "Hyderabad"
 6 url = f"https://api.openweathermap.org/data/2.5/weather?q={city}&appid={api_key}"
 7
 8 print(f"Fetching weather for {city}...")
 9 response = requests.get(url)
10
11 if response.status_code == 200:
12     print(response.json())
13 else:
14     print(f"Error: {response.status_code}")
15     print(response.text)
16
```

View 1 edited file weather_secure.py >

Problems 3 Output Debug Console Terminal Ports

```
/bin/python3 /home/tejas/Desktop/java/pp/weather_insecure.py
● tejas@tejas-dellg15:~/Desktop/java$ /bin/python3 /home/tejas/Desktop/java/pp/weather_insecure.py
Fetching weather for Hyderabad...
{"coord": {"lon": 78.4744, "lat": 17.3753}, "weather": [{"id": 721, "main": "Haze", "description": "haze", "icon": "50n"}], "base": "stations", "main": {"temp": 297.38, "feels_like": 297.43, "temp_min": 294.88, "temp_max": 297.38, "pressure": 1017, "humidity": 60}, "sea_level": 1017, "grnd_level": 954}, "visibility": 3000, "wind": {"speed": 2.57, "deg": 100}, "clouds": {"all": 40}, "dt": 1770219529, "sys": {"type": 1, "id": 9214, "country": "IN", "sunrise": 1770167841, "sunset": 1770208956}, "timezone": 19800, "id": 1269843, "name": "Hyderabad", "cod": 200}
```

Task Description #2: Privacy & Security in File Handling

Objective:

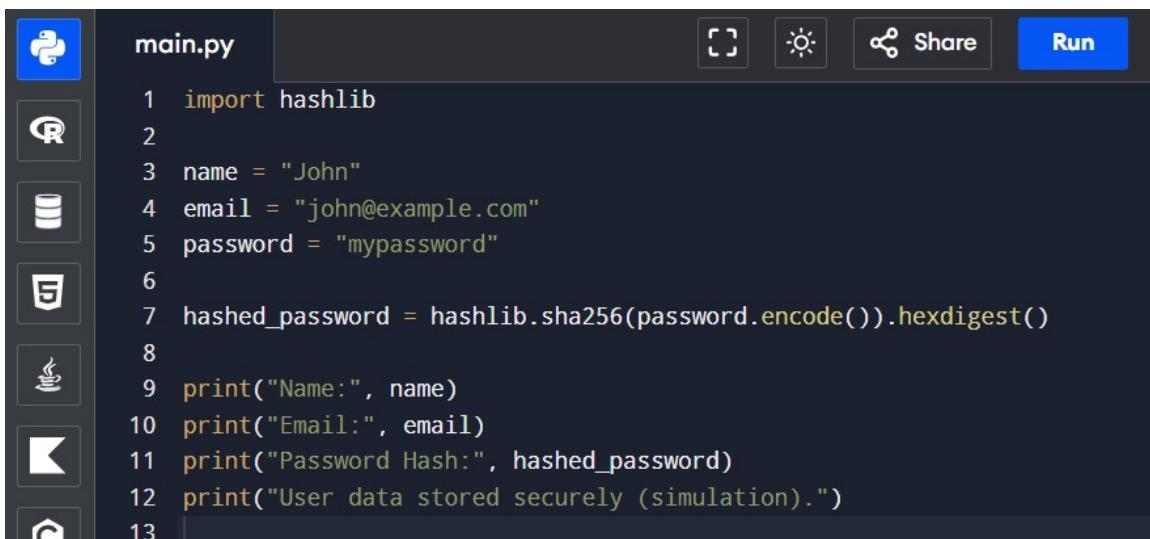
To analyze how AI-generated code stores user data and improve its security.

Privacy Risk Identified:

Storing passwords in plain text can compromise user accounts.

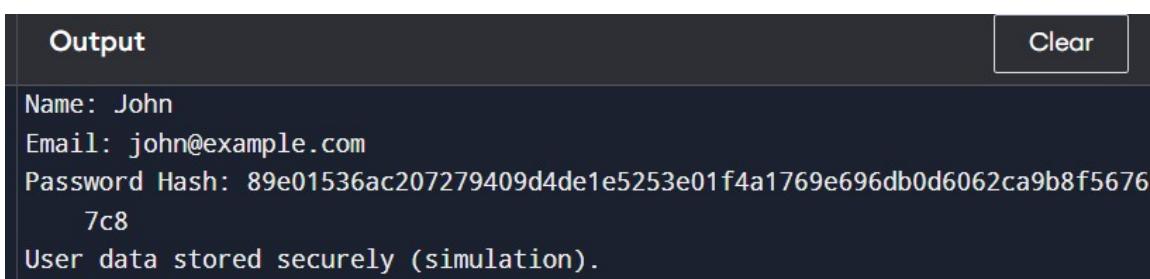
Conclusion:

Hashing passwords ensures data privacy and security.



The screenshot shows a Python code editor interface. On the left, there's a vertical toolbar with icons for Python, R, Databricks, Jupyter Notebook, Colab, and a terminal. The main area is titled "main.py" and contains the following code:

```
1 import hashlib
2
3 name = "John"
4 email = "john@example.com"
5 password = "mypassword"
6
7 hashed_password = hashlib.sha256(password.encode()).hexdigest()
8
9 print("Name:", name)
10 print("Email:", email)
11 print("Password Hash:", hashed_password)
12 print("User data stored securely (simulation).")
13
```



The "Output" tab shows the results of running the program:

```
Name: John
Email: john@example.com
Password Hash: 89e01536ac207279409d4de1e5253e01f4a1769e696db0d6062ca9b8f5676
7c8
User data stored securely (simulation).
```

Task Description #3: Transparency in Algorithm Design

Objective:

To create an Armstrong number checking program with clear explanation.

Explanation:

The program checks whether the sum of digits raised to the power of total digits equals the original number.

Conclusion:

The logic is simple, transparent, and easy to understand.

Programiz
Python Online Compiler

The screenshot shows the Programiz Python Online Compiler interface. On the left, there's a sidebar with icons for various languages: Python (selected), R, SQL, HTML, CSS, Java, C, C++, C#, and JS. The main area has a dark background with white text. It displays the following Python code in a file named `main.py`:

```
1 def is_armstrong(number):
2     temp = number
3     total = 0
4     digits = len(str(number))
5
6     while temp > 0:
7         digit = temp % 10
8         total += digit ** digits
9         temp //= 10
10
11    return total == number
12
13
14 num = int(input("Enter a number: "))
15
16 if is_armstrong(num):
17     print(num, "is an Armstrong number")
18 else:
19     print(num, "is not an Armstrong number")
20
```

Below the code, there are several buttons: a copy icon, a brightness icon, a share icon, and a blue "Run" button. The "Output" section shows the user input "Enter a number: 153" and the program's response "153 is an Armstrong number". There is also a "Clear" button in the output section.

Task Description #4: Transparency in Algorithm Comparison

Objective:

To implement and compare Bubble Sort and Quick Sort algorithms.

Explanation:

Bubble Sort is easy to understand but slow, whereas Quick Sort is faster and efficient for large datasets.

Conclusion:

Choosing the right algorithm improves performance and ethical decision-making.

Programiz
Python Online Compiler

main.py

Run

```
1 def bubble_sort(arr):
2     n = len(arr)
3     for i in range(n):
4         for j in range(0, n - i - 1):
5             if arr[j] > arr[j + 1]:
6                 arr[j], arr[j + 1] = arr[j + 1], arr[j]
7     return arr
8
9
10 def quick_sort(arr):
11     if len(arr) <= 1:
12         return arr
13
14     pivot = arr[len(arr) // 2]
15     left = [x for x in arr if x < pivot]
16     middle = [x for x in arr if x == pivot]
17     right = [x for x in arr if x > pivot]
18
19     return quick_sort(left) + middle + quick_sort(right)
20
21
22 arr = [5, 2, 9, 1, 7]
23
24 print("Original Array:", arr)
25 print("Bubble Sort Output:", bubble_sort(arr.copy()))
26 print("Quick Sort Output:", quick_sort(arr))
```

Output

```
Original Array: [5, 2, 9, 1, 7]
Bubble Sort Output: [1, 2, 5, 7, 9]
Quick Sort Output: [1, 2, 5, 7, 9]
```

Task Description #5: Transparency in AI Recommendations

Objective:

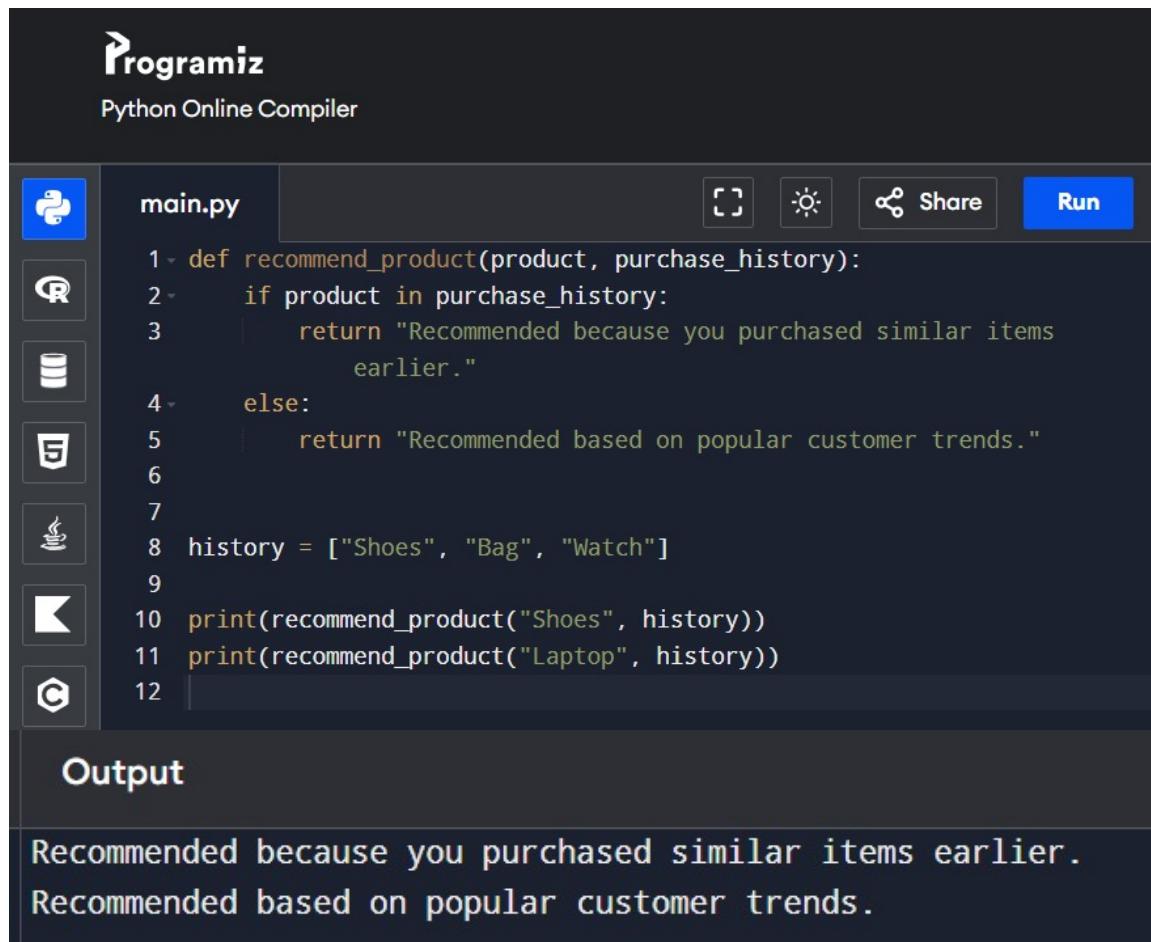
To build a recommendation system that explains why items are suggested.

Explanation:

Providing reasons for recommendations improves transparency and trust.

Conclusion:

Explainable AI systems are more ethical and user-friendly.



The screenshot shows the Programiz Python Online Compiler interface. On the left, there's a sidebar with icons for Python, R, MySQL, Git, Jupyter Notebook, and Docker. The main area has tabs for 'main.py' and 'Output'. The 'main.py' tab contains the following Python code:

```
1 def recommend_product(product, purchase_history):
2     if product in purchase_history:
3         return "Recommended because you purchased similar items
earlier."
4     else:
5         return "Recommended based on popular customer trends."
6
7
8 history = ["Shoes", "Bag", "Watch"]
9
10 print(recommend_product("Shoes", history))
11 print(recommend_product("Laptop", history))
12
```

The 'Output' tab displays the results of running the code:

```
Recommended because you purchased similar items earlier.
Recommended based on popular customer trends.
```

Overall Reflection

This lab emphasizes that AI tools assist developers, but ethical responsibility lies with humans. Ensuring security, privacy, and transparency is essential in responsible AI coding.