AI Assisted Coding LAB ASSIGNMENT-5.4

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Batch:13

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Task Description #1:

• Prompt GitHub Copilot to generate a Python script that collects

user data (e.g., name, age, email). Then, ask Copilot to add

comments on how to anonymize or protect this data.

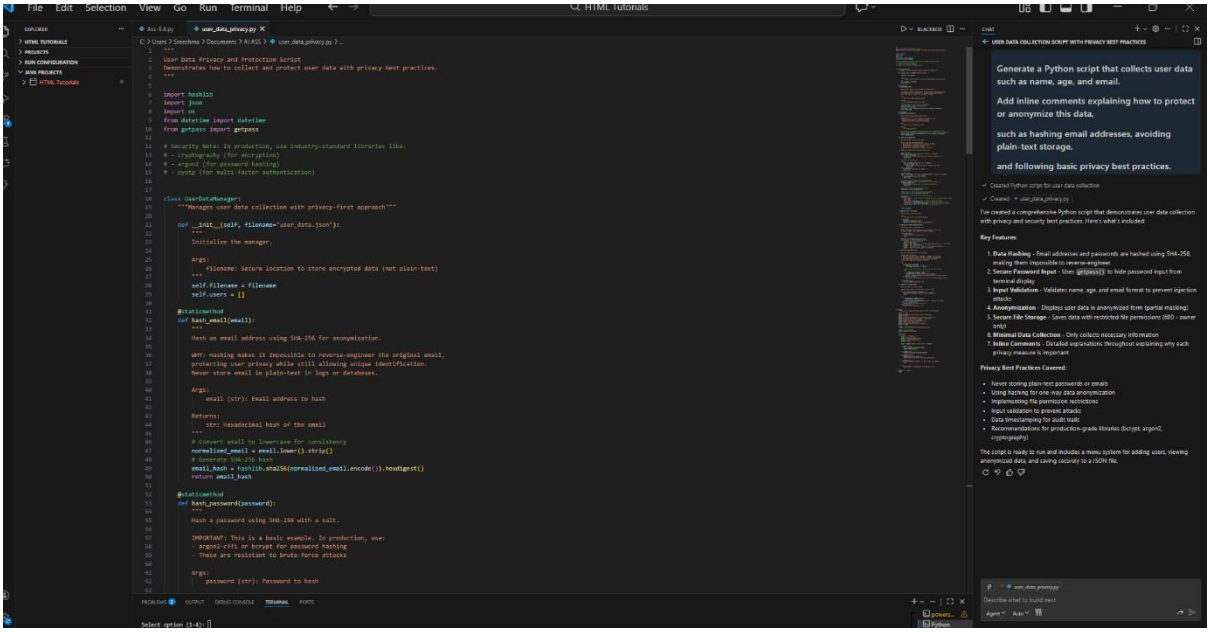
PROMPT

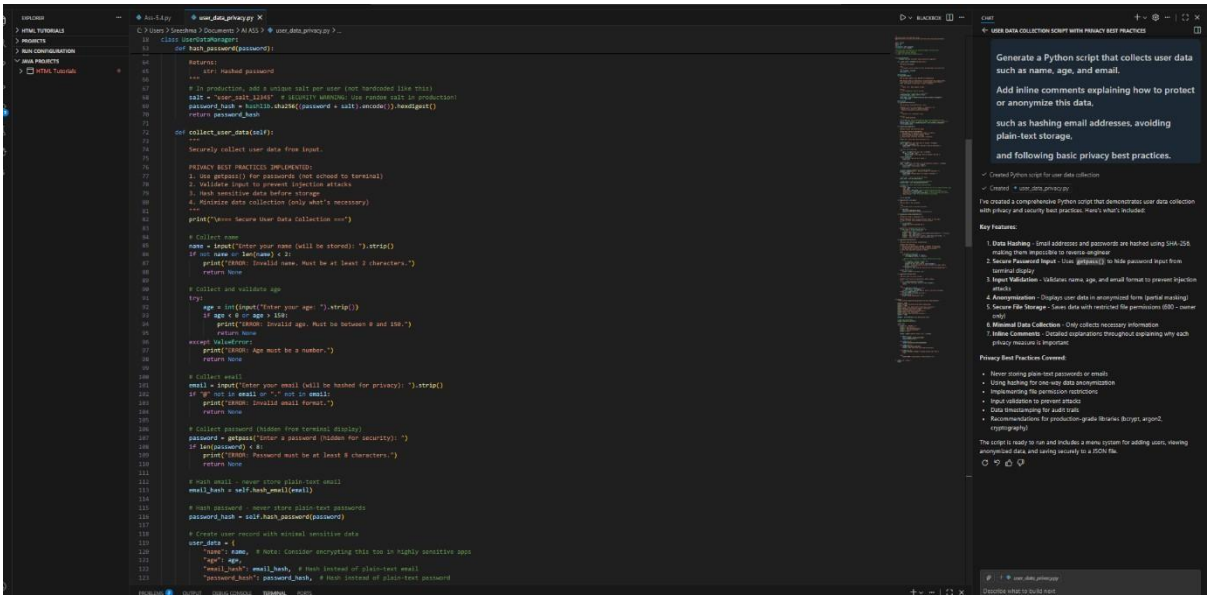
Generate a Python script that collects user data such as name, age, and email.

Add inline comments explaining how to protect or anonymize this data,

such as hashing email addresses, avoiding plain-text storage,

and following basic privacy best practices.


File Edit Selection View Go Run Terminal Help
HTML Tutorials
Generate a Python script that collects user data such as name, age, and email.
Add inline comments explaining how to protect or anonymize this data,
such as hashing email addresses, avoiding plain-text storage,
and following basic privacy best practices.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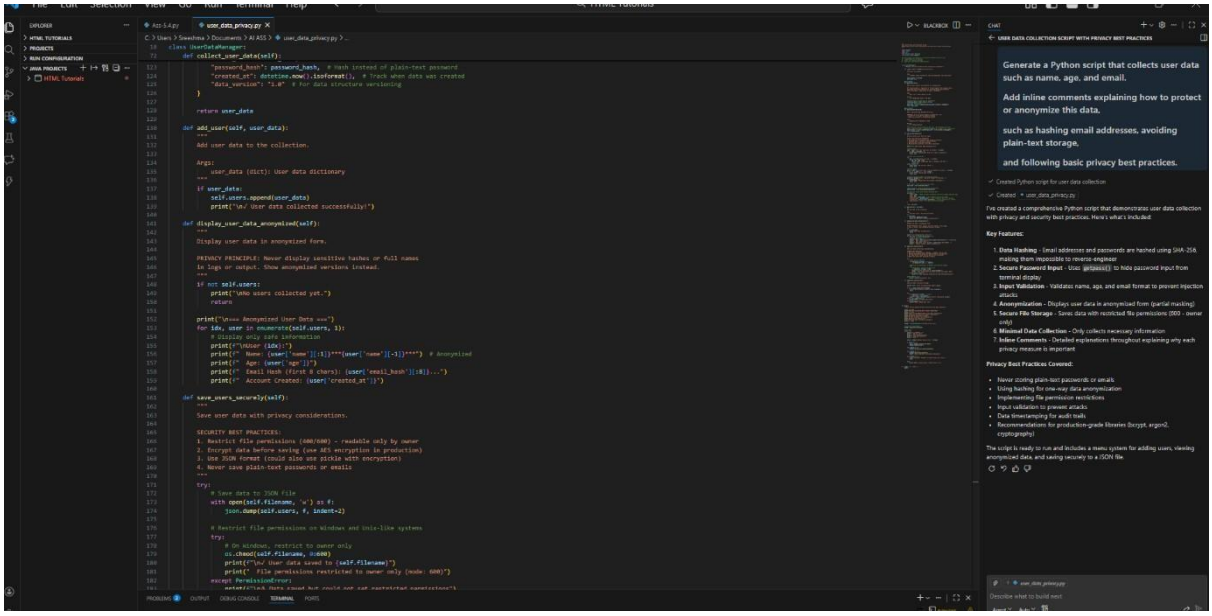
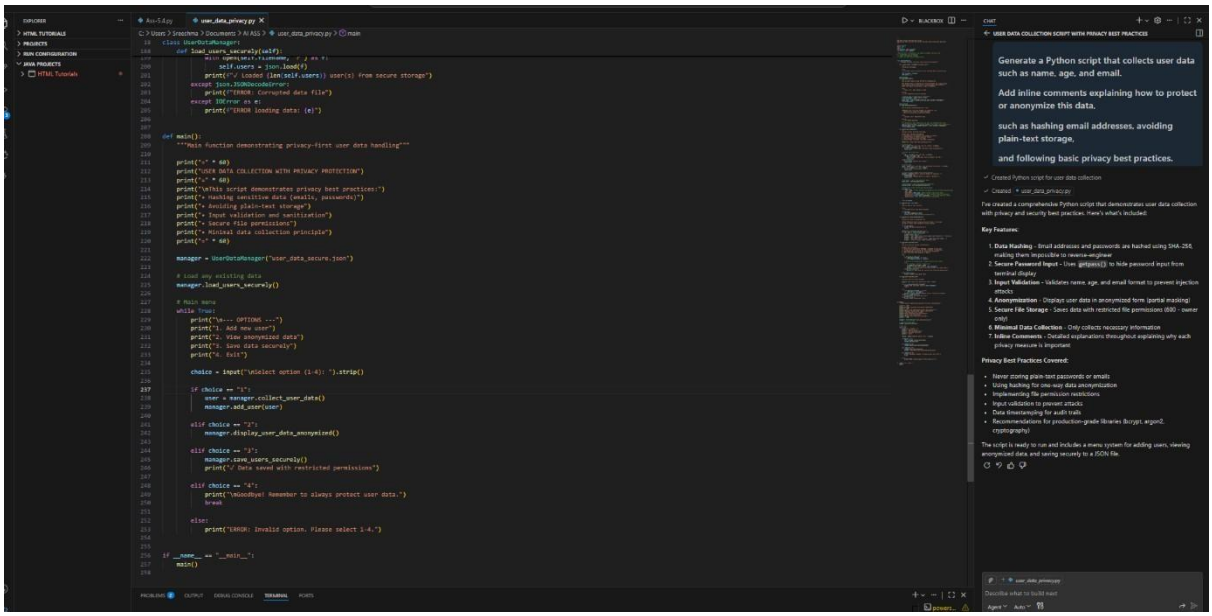




Expected Output #1:

• A script with inline Copilot-suggested code and comments explaining how to safeguard or anonymize user information (e.g., hashing emails, not storing data unencrypted).

Task Description #2:

- Ask Copilot to generate a Python function for sentiment analysis.

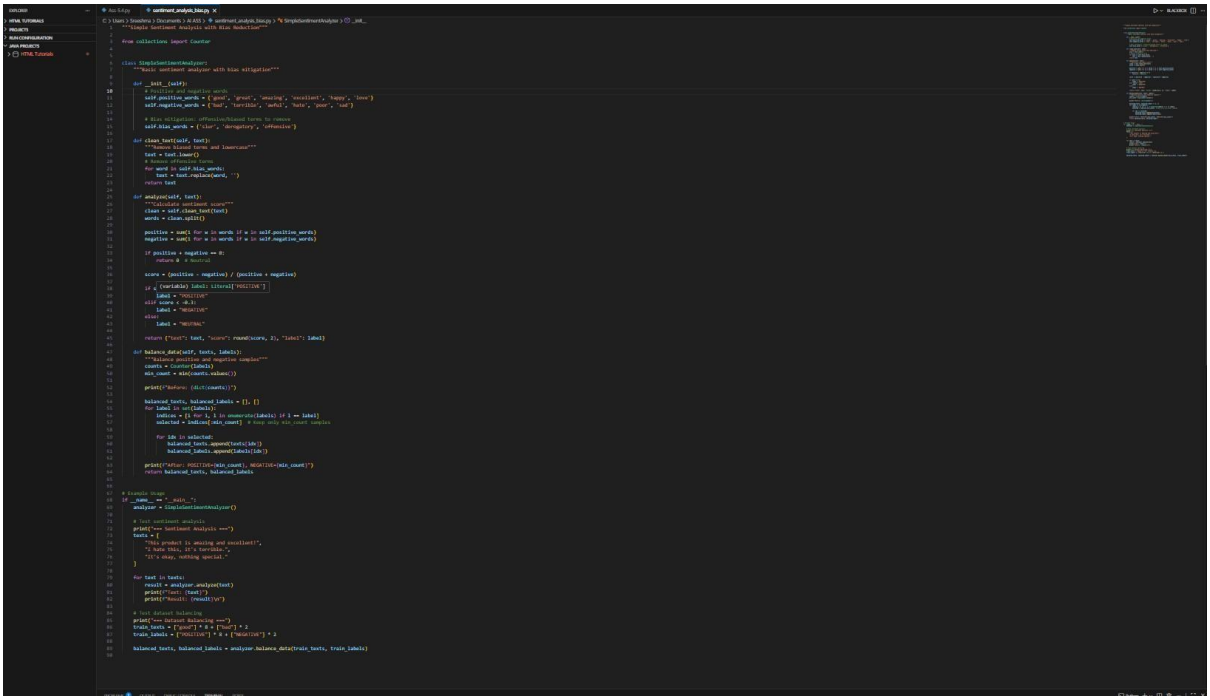
Then prompt Copilot to identify and handle potential biases in the data.

PROMPT: # Generate a Python function for sentiment analysis.

Add comments or code to identify and reduce potential biases in the data,

such as removing offensive terms, balancing positive and negative samples,

and avoiding biased language in predictions.

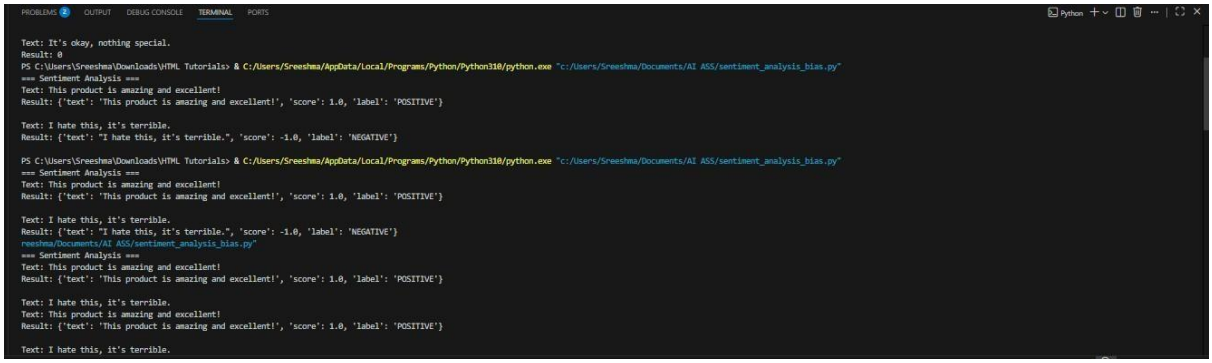


Expected Output #2:

- Copilot-generated code with additions or comments addressing

bias mitigation strategies (e.g., balancing dataset, removing

offensive terms).



Task Description #3:

- Use Copilot to write a Python program that recommends products based on user history. Ask it to follow ethical guidelines

like transparency and fairness

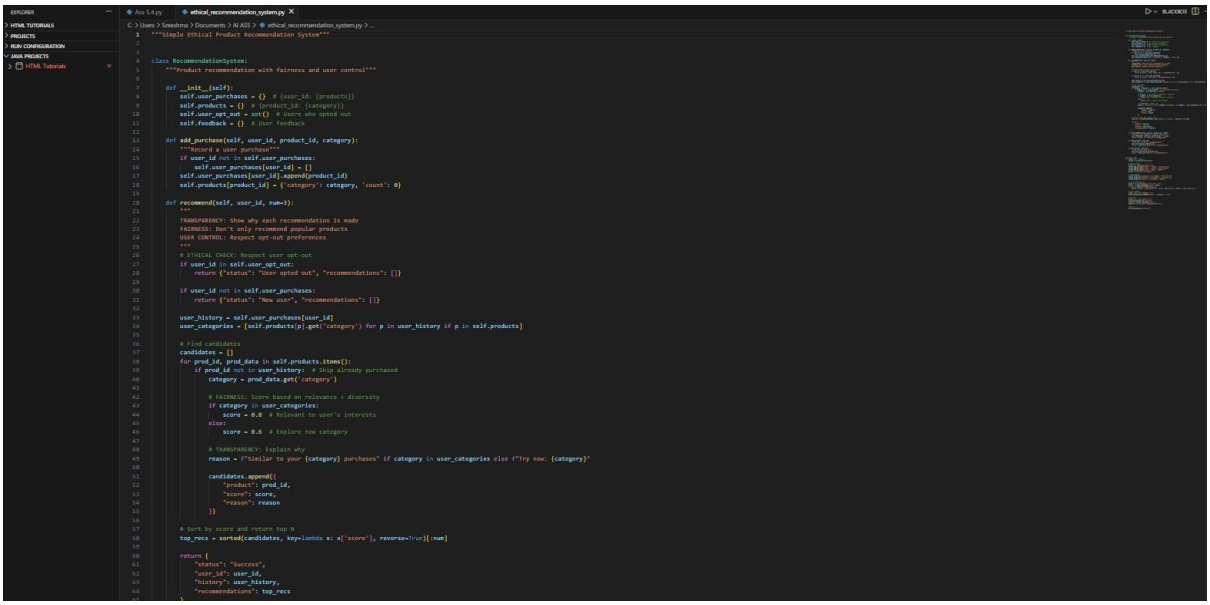
PROMPT: # Generate a Python program that recommends products based on user purchase history.

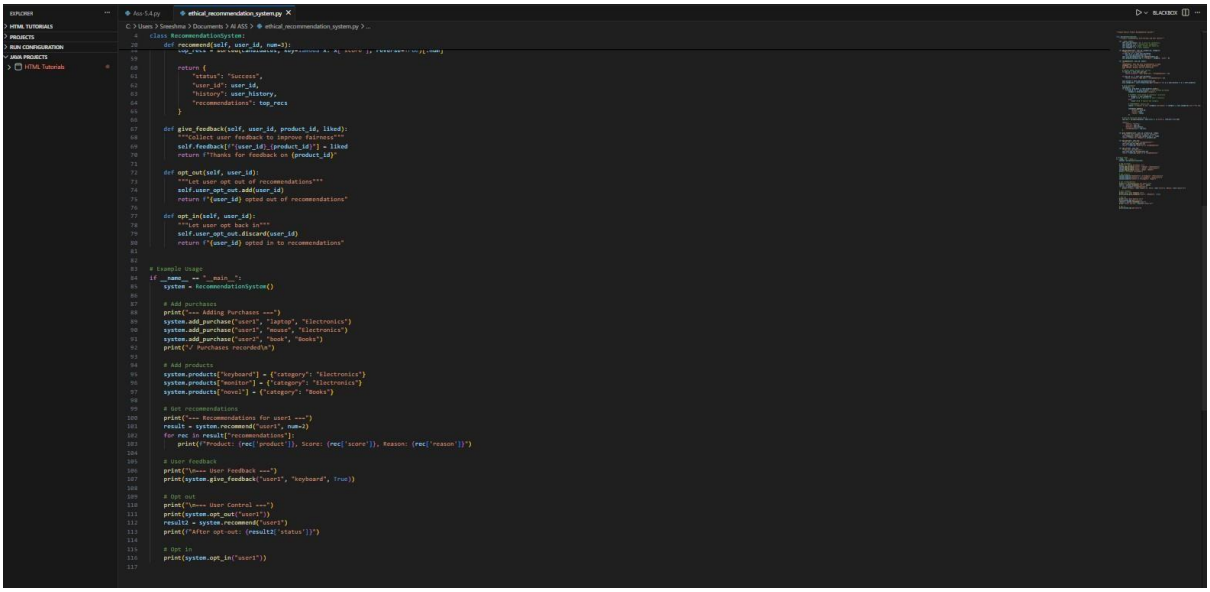
Follow ethical AI guidelines such as transparency, fairness, and user control.

Add comments explaining how recommendations are generated,

avoid favoritism toward only popular products,

and allow users to give feedback or opt out of recommendations.

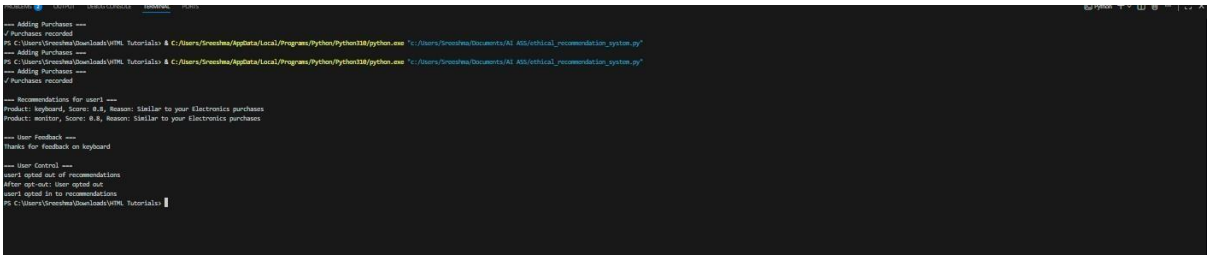




Expected Output #3:

• Copilot suggestions that include explanations, fairness checks

(e.g., avoiding favoritism), and user feedback options in the code.



Task Description #4:

• Prompt Copilot to generate logging functionality in a Python web

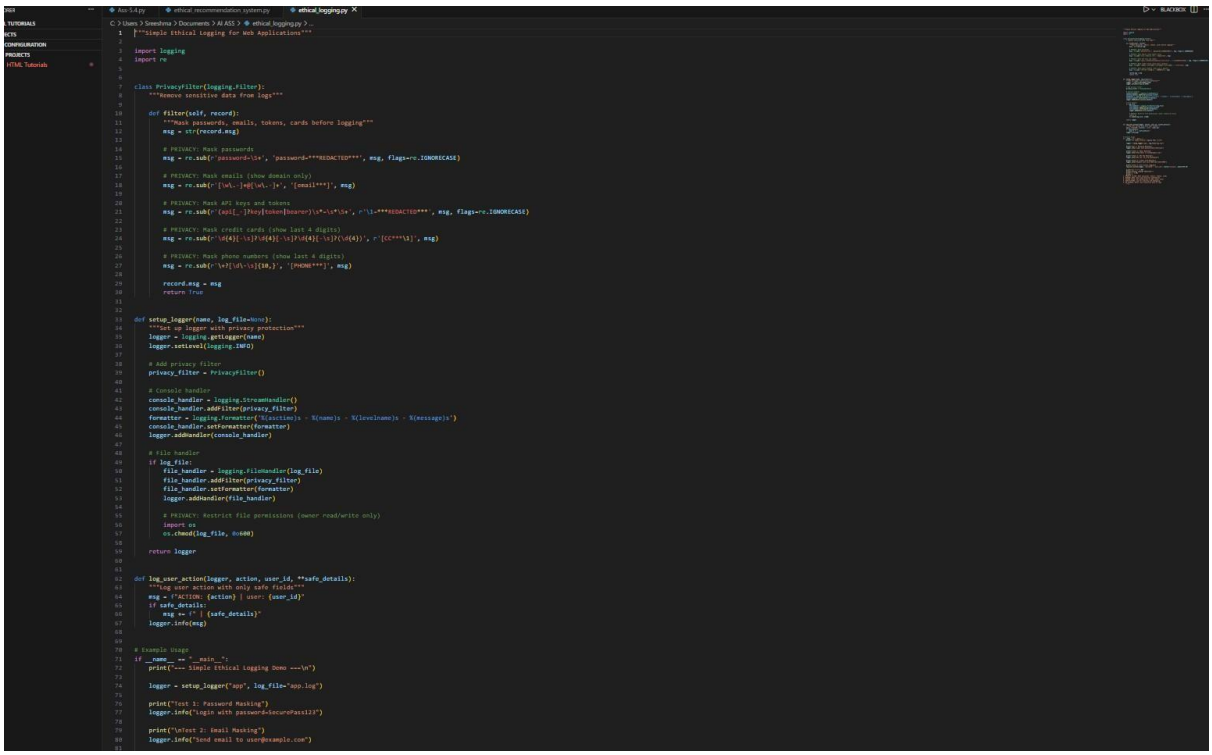
application. Then, ask it to ensure the logs do not record sensitive information.

PROMPT: # Generate logging functionality for a Python web application.

Ensure logs do NOT store sensitive information such as passwords,

emails, or personal identifiers.

Add comments explaining ethical logging practices and privacy protection.



```python
"""Simple Ethical Logging for Web Applications"""

import logging
import re


class PrivacyFilter(logging.Filter):
    """Remove sensitive data from logs"""

    def filter(self, record):
        """Mask passwords, emails, tokens, cards before logging"""
        msg = str(record.msg)

        # PRIVACY: Mask passwords
        msg = re.sub(r'password=\S+', 'password=***REDACTED***', msg, flags=re.IGNORECASE)

        # PRIVACY: Mask emails (show domain only)
        msg = re.sub(r'[\w\.-]+@[\w\.-]+', '[email***]', msg)

        # PRIVACY: Mask API keys and tokens
        msg = re.sub(r'(api[_-]?key|token|bearer)\s*=\s*\S+', r'\1=***REDACTED***', msg, flags=re.IGNORECASE)

        # PRIVACY: Mask credit cards (show last 4 digits)
        msg = re.sub(r'\d{4}[-\s]?\d{4}[-\s]?\d{4}[-\s]?(\d{4})', r'[CC***\1]', msg)

        # PRIVACY: Mask phone numbers (show last 4 digits)
        msg = re.sub(r'\+?[\d\-\s]{10,}', '[PHONE***]', msg)

        record.msg = msg
        return True


def setup_logger(name, log_file=None):
    """Set up logger with privacy protection"""
    logger = logging.getLogger(name)
    logger.setLevel(logging.INFO)

    # Add privacy filter
    privacy_filter = PrivacyFilter()

    # Console handler
    console_handler = logging.StreamHandler()
    console_handler.addFilter(privacy_filter)
    formatter = logging.Formatter('%(asctime)s - %(name)s - %(levelname)s - %(message)s')
    console_handler.setFormatter(formatter)
    logger.addHandler(console_handler)

    # File handler
    if log_file:
        file_handler = logging.FileHandler(log_file)
        file_handler.addFilter(privacy_filter)
        file_handler.setFormatter(formatter)
        logger.addHandler(file_handler)

        # PRIVACY: Restrict file permissions (owner read/write only)
        import os
        os.chmod(log_file, 0o600)

    return logger

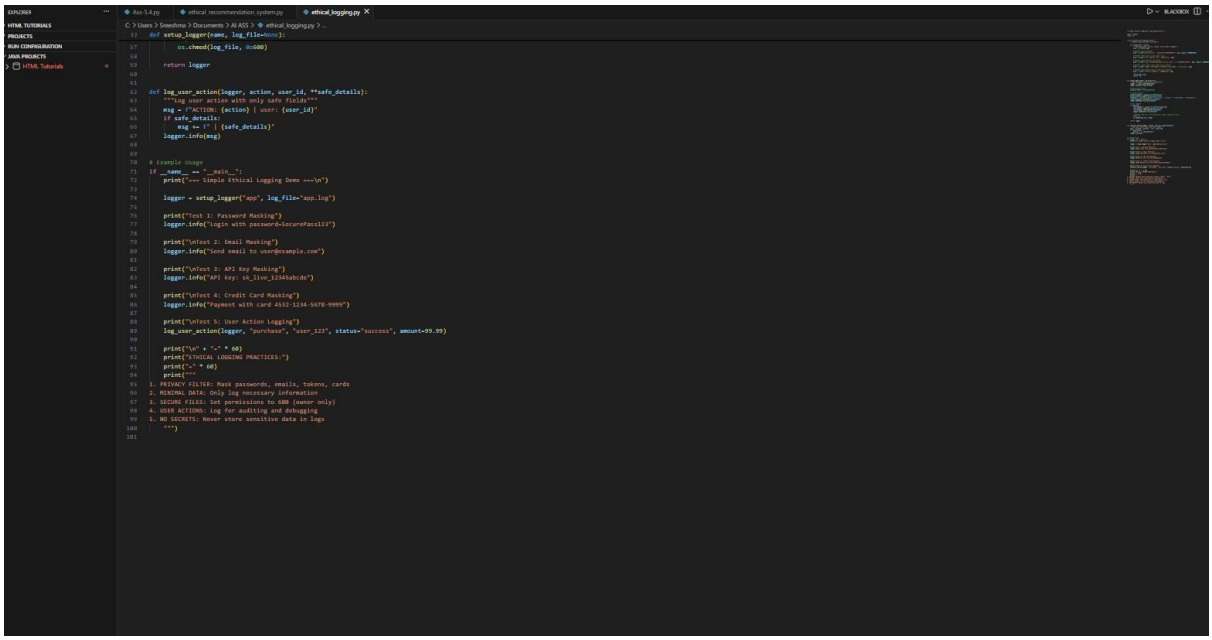

def log_user_action(logger, action, user_id, **safe_details):
    """Log user action with only safe fields"""
    msg = f"ACTION: {action} | user: {user_id}"
    if safe_details:
        msg += f" | {safe_details}"
    logger.info(msg)


# Example Usage
if __name__ == "__main__":
    print("=== Simple Ethical Logging Demo ===\n")

    logger = setup_logger("app", log_file="app.log")

    print("Test 1: Password Masking")
    logger.info("login with password=SecurePass123")

    print("\nTest 2: Email Masking")
    logger.info("Send email to user@example.com")
```



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def setup_logger(name, log_file=None):
            os.chmod(log_file, 0o600)

        return logger


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    print("Test 1: Password Masking")
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    print("\nTest 2: Email Masking")
    logger.info("Send email to user@example.com")

    print("\nTest 3: API Key Masking")
    logger.info("API key: sk_live_51945abcde")

    print("\nTest 4: Credit Card Masking")
    logger.info("Payment with card 4532-1234-5678-9999")

    print("\nTest 5: User Action Logging")
    log_user_action(logger, "purchase", "user_123", status="success", amount=99.99)

    print("\n" + "-" * 60)
    print("ETHICAL LOGGING PRACTICES:")
    print("-" * 60)
    print("""
1. PRIVACY FILTER: Mask passwords, emails, tokens, cards
2. MINIMAL DATA: Only log necessary information
3. SECURE FILES: Set permissions to 600 (owner only)
4. USER ACTIONS: Log for auditing and debugging
5. NO SECRETS: Never store sensitive data in logs
    """)
```

Expected Output #4:

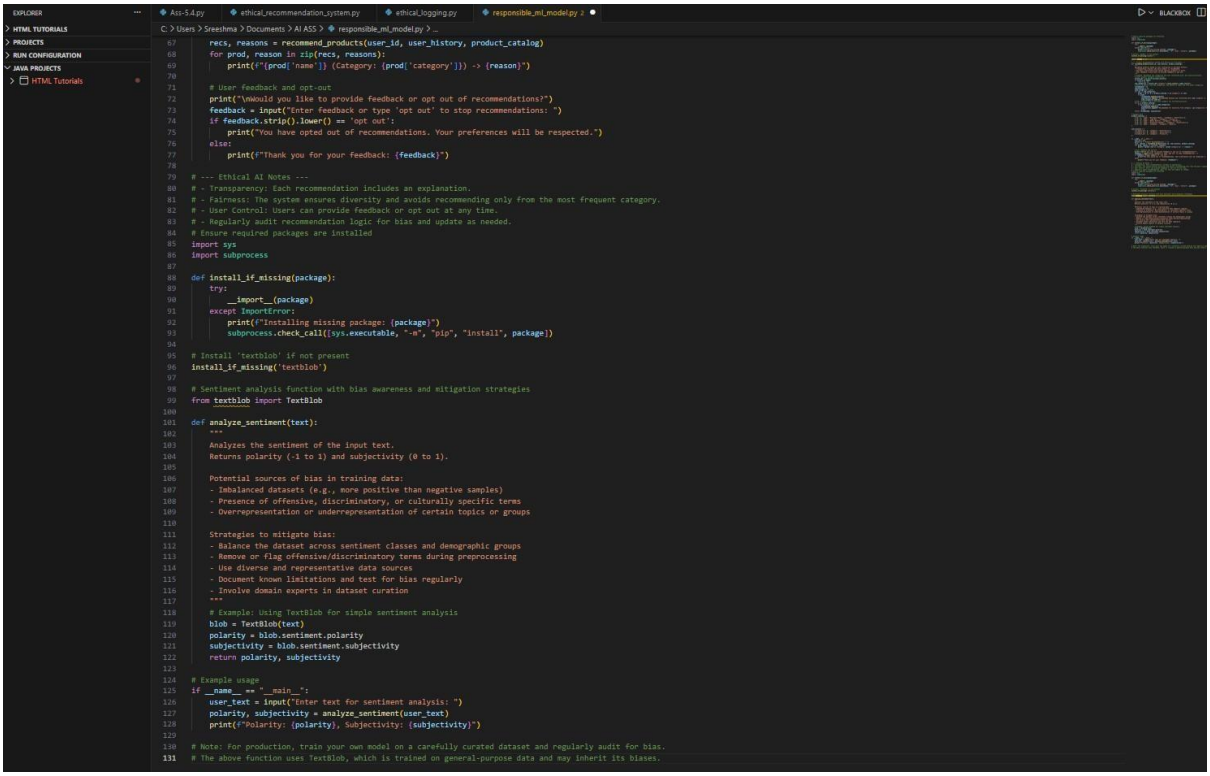
- Logging code that avoids saving personal identifiers (e.g., passwords, emails), and includes comments about ethical logging practices.

Task Description #5:

- Ask Copilot to generate a machine learning model. Then, prompt it to add documentation on how to use the model responsibly (e.g., explainability, accuracy limits).

PROMPT: Generate a Python machine learning model (including data loading, training, and prediction steps).

Add inline documentation or a README-style comment section explaining how to use the model responsibly, including accuracy limitations, explainability considerations, fairness concerns, and appropriate use cases and restrictions.



```
    recs, reasons = recommend_products(user_id, user_history, product_catalog)
    for prod, reason in zip(recs, reasons):
        print(f"{prod['name']} (Category: {prod['category']}) -> {reason}")

    # User Feedback and opt-out
    print("\nWould you like to provide feedback or opt out of recommendations?")
    feedback = input("Enter feedback or type 'opt out' to stop recommendations: ")
    if feedback.strip().lower() == 'opt out':
        print("You have opted out of recommendations. Your preferences will be respected.")
    else:
        print(f"Thank you for your feedback: {feedback}")

# --- Ethical AI Notes ---
# - Transparency: Each recommendation includes an explanation.
# - Fairness: The system ensures diversity and avoids recommending only from the most frequent category.
# - User Control: Users can provide feedback or opt out at any time.
# - Regularly audit recommendation logic for bias and update as needed.
# Ensure required packages are installed
import sys
import subprocess

def install_if_missing(package):
    try:
        __import__(package)
    except ImportError:
        print(f"Installing missing package: {package}")
        subprocess.check_call([sys.executable, "-m", "pip", "install", package])

# Install 'textblob' if not present
install_if_missing('textblob')

# Sentiment analysis function with bias awareness and mitigation strategies
from textblob import TextBlob

def analyze_sentiment(text):
    """
    Analyzes the sentiment of the input text.
    Returns polarity (-1 to 1) and subjectivity (0 to 1).

    Potential sources of bias in training data:
    - Imbalanced datasets (e.g., more positive than negative samples)
    - Presence of offensive, discriminatory, or culturally specific terms
    - Overrepresentation or underrepresentation of certain topics or groups

    Strategies to mitigate bias:
    - Balance the dataset across sentiment classes and demographic groups
    - Remove or flag offensive/discriminatory terms during preprocessing
    - Use diverse and representative data sources
    - Document known limitations and test for bias regularly
    - Involve domain experts in dataset curation
    """
    # Example: Using TextBlob for simple sentiment analysis
    blob = TextBlob(text)
    polarity = blob.sentiment.polarity
    subjectivity = blob.sentiment.subjectivity
    return polarity, subjectivity

# Example usage
if __name__ == "__main__":
    user_text = input("Enter text for sentiment analysis: ")
    polarity, subjectivity = analyze_sentiment(user_text)
    print(f"Polarity: {polarity}, Subjectivity: {subjectivity}")

# Note: For production, train your own model on a carefully curated dataset and regularly audit for bias.
# The above function uses TextBlob, which is trained on general-purpose data and may inherit its biases.
```

Expected Output #5:

- Copilot-generated model code with a README or inline documentation suggesting responsible usage, limitations, and fairness considerations.