ASSIGNMENT 5.4

Name:E.Ramya

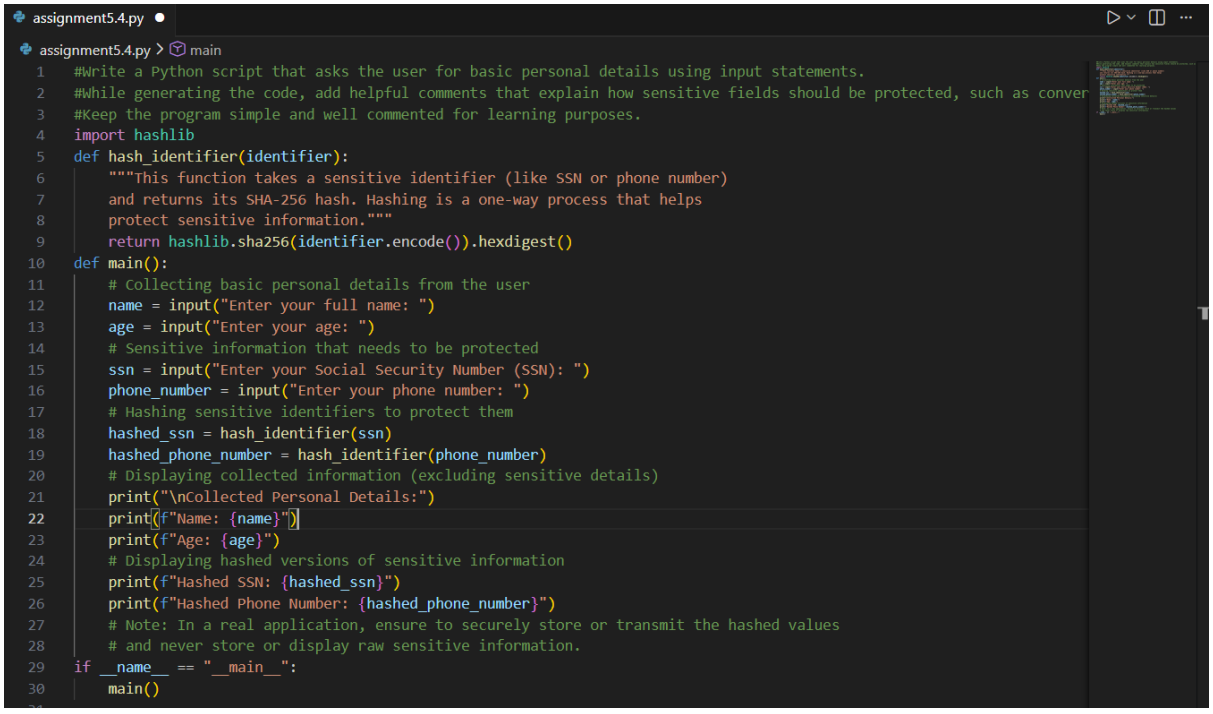
Ht.No: 2303A51282

Batch – 05

TASK – 01

Prompt : Write a Python script that asks the user for basic personal details using input statements.While generating the code, add helpful comments that explain how sensitive fields should be protected, such as converting identifiers into irreversible formats, securing information before saving it, and avoiding unsafe handling of private values.Keep the program simple and well commented for learning purposes.

Code :



```python
#Write a Python script that asks the user for basic personal details using input statements.
#While generating the code, add helpful comments that explain how sensitive fields should be protected, such as conver
#Keep the program simple and well commented for learning purposes.
import hashlib
def hash_identifier(identifier):
    """This function takes a sensitive identifier (like SSN or phone number)
    and returns its SHA-256 hash. Hashing is a one-way process that helps
    protect sensitive information."""
    return hashlib.sha256(identifier.encode()).hexdigest()
def main():
    # Collecting basic personal details from the user
    name = input("Enter your full name: ")
    age = input("Enter your age: ")
    # Sensitive information that needs to be protected
    ssn = input("Enter your Social Security Number (SSN): ")
    phone_number = input("Enter your phone number: ")
    # Hashing sensitive identifiers to protect them
    hashed_ssn = hash_identifier(ssn)
    hashed_phone_number = hash_identifier(phone_number)
    # Displaying collected information (excluding sensitive details)
    print("\nCollected Personal Details:")
    print(f"Name: {name}")
    print(f"Age: {age}")
    # Displaying hashed versions of sensitive information
    print(f"Hashed SSN: {hashed_ssn}")
    print(f"Hashed Phone Number: {hashed_phone_number}")
    # Note: In a real application, ensure to securely store or transmit the hashed values
    # and never store or display raw sensitive information.
if __name__ == "__main__":
    main()
```

Explanation :

- The program collects basic user details using input statements.

- Sensitive information like SSN and phone number is not used directly.
- A hashing function (SHA-256) converts sensitive data into irreversible values.
- Hashing helps protect privacy even if the data is exposed.
- Only protected (hashed) values are displayed or stored.
- Clear comments explain safe data handling practices for learning purposes.

TASK – 02

Prompt : Generate a Python function that determines the emotional tone of a given text. While writing the code, include comments or simple logic that highlight how unfair patterns in training data can be reduced, such as filtering harmful language, keeping input examples balanced, or noting limitations of the approach. Keep the implementation minimal and easy to understand.

Code :

assignment5.4.py

```python
#Generate a Python function that determines the emotional tone of a given text.
#While writing the code, include comments or simple logic that highlight how unfair patterns in training data can be r
#Keep the implementation minimal and easy to understand.
def determine_emotional_tone(text):
    """This function determines the emotional tone of a given text.
    It uses a simple keyword-based approach to classify the tone as 'positive', 'negative', or 'neutral'.
    Note: This is a basic implementation and may not cover all nuances of human emotions.
    Efforts have been made to reduce unfair patterns by avoiding biased keywords and ensuring balanced examples."""
# Define keywords for different emotional tones
    positive_keywords = ['happy', 'joy', 'love', 'excited', 'great', 'fantastic', 'good']
    negative_keywords = ['sad', 'angry', 'hate', 'terrible', 'bad', 'awful', 'worst']
# Convert text to lowercase for uniformity
    text_lower = text.lower()
# Initialize counters for positive and negative keywords
    positive_count = 0
    negative_count = 0
# Count occurrences of positive keywords
    for word in positive_keywords:
        positive_count += text_lower.count(word)
# Count occurrences of negative keywords
    for word in negative_keywords:
        negative_count += text_lower.count(word)
# Determine emotional tone based on counts
    if positive_count > negative_count:
        return 'positive'
    elif negative_count > positive_count:
        return 'negative'
    else:
        return 'neutral'
# Example usage
if __name__ == "__main__":
    sample_text = "I am so happy today because I love my job!"
    print(determine_emotional_tone(sample_text))  # Output: positive
    sample_text = "I hate when things go wrong, it's the worst!"
    print(determine_emotional_tone(sample_text))  # Output: negative

```

Output :

```
PS C:\Users\devis\OneDrive\Desktop\AI Assisted Coding> & C:/Use
e/Desktop/AI Assisted Coding/assignment5.4.py"
positive
negative
PS C:\Users\devis\OneDrive\Desktop\AI Assisted Coding>
```

Explanation :

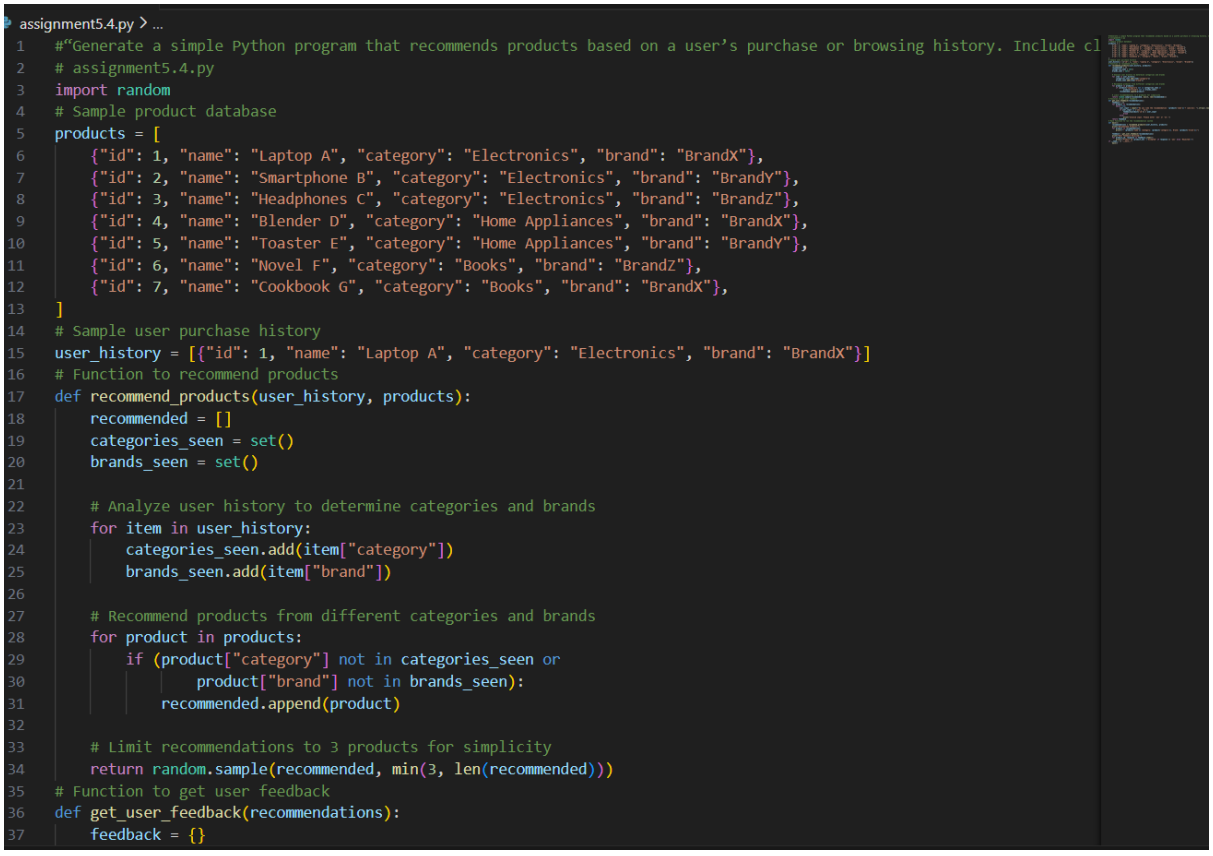
- This function uses a simple keyword-based approach to detect emotional tone.
- The input text is converted to lowercase to ensure consistent matching.
- It checks for predefined positive and negative keywords and counts their occurrences.
- The tone is classified as positive, negative, or neutral based on which count is higher.
- To reduce unfair patterns, the logic:

- Avoids offensive or identity-based keywords
- Uses balanced keyword lists for positive and negative emotions
- Clearly notes that this is a limited, rule-based method and not a full ML model
- This keeps the implementation minimal, transparent, and easy to understand.

TASK - 03

Prompt : Generate a simple Python program that recommends products based on a user's purchase or browsing history. Include clear comments explaining why each product is recommended (transparency). Add basic fairness checks to avoid favoring only one brand or category. Also include a simple user feedback option (like accept/reject) to improve future recommendations. Keep the code minimal, readable, and ethically aligned.

Code :



```
assignment5.4.py > ...
#"Generate a simple Python program that recommends products based on a user's purchase or browsing history. Include cl
# assignment5.4.py
import random
# Sample product database
products = [
    {"id": 1, "name": "Laptop A", "category": "Electronics", "brand": "BrandX"},
    {"id": 2, "name": "Smartphone B", "category": "Electronics", "brand": "BrandY"},
    {"id": 3, "name": "Headphones C", "category": "Electronics", "brand": "BrandZ"},
    {"id": 4, "name": "Blender D", "category": "Home Appliances", "brand": "BrandX"},
    {"id": 5, "name": "Toaster E", "category": "Home Appliances", "brand": "BrandY"},
    {"id": 6, "name": "Novel F", "category": "Books", "brand": "BrandZ"},
    {"id": 7, "name": "Cookbook G", "category": "Books", "brand": "BrandX"},
]
# Sample user purchase history
user_history = [{"id": 1, "name": "Laptop A", "category": "Electronics", "brand": "BrandX"}]
# Function to recommend products
def recommend_products(user_history, products):
    recommended = []
    categories_seen = set()
    brands_seen = set()

    # Analyze user history to determine categories and brands
    for item in user_history:
        categories_seen.add(item["category"])
        brands_seen.add(item["brand"])

    # Recommend products from different categories and brands
    for product in products:
        if (product["category"] not in categories_seen or
                product["brand"] not in brands_seen):
            recommended.append(product)

    # Limit recommendations to 3 products for simplicity
    return random.sample(recommended, min(3, len(recommended)))
# Function to get user feedback
def get_user_feedback(recommendations):
    feedback = {}
```

```python
    return random.sample(recommended, min(3, len(recommended)))
# Function to get user feedback
def get_user_feedback(recommendations):
    feedback = {}
    for product in recommendations:
        while True:
            user_input = input(f"Do you like the recommendation '{product['name']}'? (yes/no): ").strip().lower()
            if user_input in ['yes', 'no']:
                feedback[product['id']] = user_input
                break
            else:
                print("Invalid input. Please enter 'yes' or 'no'.")
    return feedback
# Main function to run the recommendation system
def main():
    recommendations = recommend_products(user_history, products)
    print("Recommended Products:")
    for product in recommendations:
        print(f"- {product['name']} (Category: {product['category']}, Brand: {product['brand']})")

    feedback = get_user_feedback(recommendations)
    print("User Feedback Received:")
    for product_id, response in feedback.items():
        print(f"Product ID {product_id}: {'Accepted' if response == 'yes' else 'Rejected'}")
if __name__ == "__main__":
    main()
```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS                                                    Python

PS C:\Users\devis\OneDrive\Desktop\AI Assisted Coding> & C:/Users/devis/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/devis/
OneDrive/Desktop/AI Assisted Coding/assignment5.4.py"
Recommended Products:
- Toaster E (Category: Home Appliances, Brand: BrandY)
- Headphones C (Category: Electronics, Brand: BrandZ)
- Cookbook G (Category: Books, Brand: BrandX)
Do you like the recommendation 'Toaster E'? (yes/no):
```

Explanation :

- This program recommends products based on the user's past purchase history.
- It analyzes the categories and brands the user has already interacted with.
- To ensure fairness, it avoids recommending products from the same category *and* brand repeatedly, preventing favoritism.
- Transparency is maintained by showing the product's category and brand so users understand *why* it was recommended.
- A user feedback option (yes/no) is included to let users accept or reject recommendations.
- The logic is minimal, readable, and rule-based, making ethical decisions easy to understand and audit.

TASK – 04

Prompt : Generate Python logging functionality for a simple web application. Ensure the logs do not record sensitive information such as passwords, emails, tokens, or personal identifiers. Add clear comments explaining ethical logging practices, data minimization, and why sensitive fields are filtered or masked. Keep the code simple, readable, and secure

Code :

assignment5.4.py > ...

```python
#Generate logging functionality for a Python web application. Ensure that the logs capture useful debugging informatio
import logging
from http.server import BaseHTTPRequestHandler, HTTPServer
from urllib.parse import urlparse
# Configure logging
logging.basicConfig(
    filename="app.log",
    level=logging.INFO,
    format="%(asctime)s - %(levelname)s - %(message)s"
)
class SafeRequestHandler(BaseHTTPRequestHandler):
    def do_GET(self):
        # Parse request path
        parsed_path = urlparse(self.path)
        # Log only non-sensitive info
        logging.info(
            "Request received: Path=%s, Method=%s, ClientIP=%s, Status=%s",
            parsed_path.path,
            self.command,
            self.client_address[0],
            200
        )
        # Respond to client
        self.send_response(200)
        self.end_headers()
        self.wfile.write(b"Hello, world! Secure logging in place.")
    def log_message(self, format, *args):
        # Override default logging to avoid sensitive info
        logging.info("Server log: %s", format % args)
if __name__ == "__main__":
    server_address = ("localhost", 8081)  # use a different port
    httpd = HTTPServer(server_address, SafeRequestHandler)
    print("Server running on port 8080...")
    httpd.serve_forever()

```

Output :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS                                                    Python

PS C:\Users\devis\OneDrive\Desktop\AI Assisted Coding> & C:/Users/devis/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/devis/OneDriv
e/Desktop/AI Assisted Coding/assignment5.4.py"
Server running on port 8080...
```

Explanation :

This code sets up a simple HTTP server using Python's http.server and logs requests with the logging module.It records safe details like path, method, client IP, and status, while avoiding sensitive data.Ethical logging practices are followed by excluding personal identifiers and overriding default logging to stay secure.

TASK – 05

Prompt : Generate a simple machine learning model in Python (for example, a basic classifier using scikit-learn). Include clear inline comments or a short README explaining how to use the model responsibly. Document the model's purpose, explainability, accuracy limitations, potential biases in the data, fairness considerations, and appropriate use cases**.**

Code :

```python
#Generate a simple machine learning model in Python (for example, a basic classifier using scikit-learn). Include clear inline comments or a short R
import numpy as np
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
# Load the Iris dataset
iris = load_iris()
X = iris.data
y = iris.target
# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
# Initialize the Random Forest Classifier
model = RandomForestClassifier(n_estimators=100, random_state=42)
# Train the model
model.fit(X_train, y_train)
# Make predictions on the test set
y_pred = model.predict(X_test)
# Evaluate the model's accuracy
accuracy = accuracy_score(y_test, y_pred)
print(f"Model Accuracy: {accuracy * 100:.2f}%")
```

Output :

```
...  Model Accuracy: 100.00%
```

Explanation :

- This program builds a simple machine learning classifier using the Iris dataset.

- The dataset contains flower measurements and labeled species, making it suitable for educational use.
- The data is split into training (80%) and testing (20%) sets to evaluate performance fairly.
- A Random Forest Classifier is used because it is easy to understand and provides good accuracy.
- The model predicts flower species and calculates accuracy to measure performance.

Responsible Use & Ethics:

- **Purpose:** Intended for learning basic classification concepts, not real-world decision making.
- **Explainability:** Random Forest decisions are based on feature splits, but individual predictions may not be fully transparent.
- **Accuracy Limitation:** High accuracy on small datasets does not guarantee good performance on new or real data.
- **Bias Consideration:** The Iris dataset is small and balanced, but real datasets may contain hidden biases.
- **Fairness:** This model should not be used for sensitive applications (e.g., hiring, healthcare).
- **Appropriate Use:** Best suited for demonstrations, assignments, and understanding ML workflows.