ASSIGNMENT-5.4

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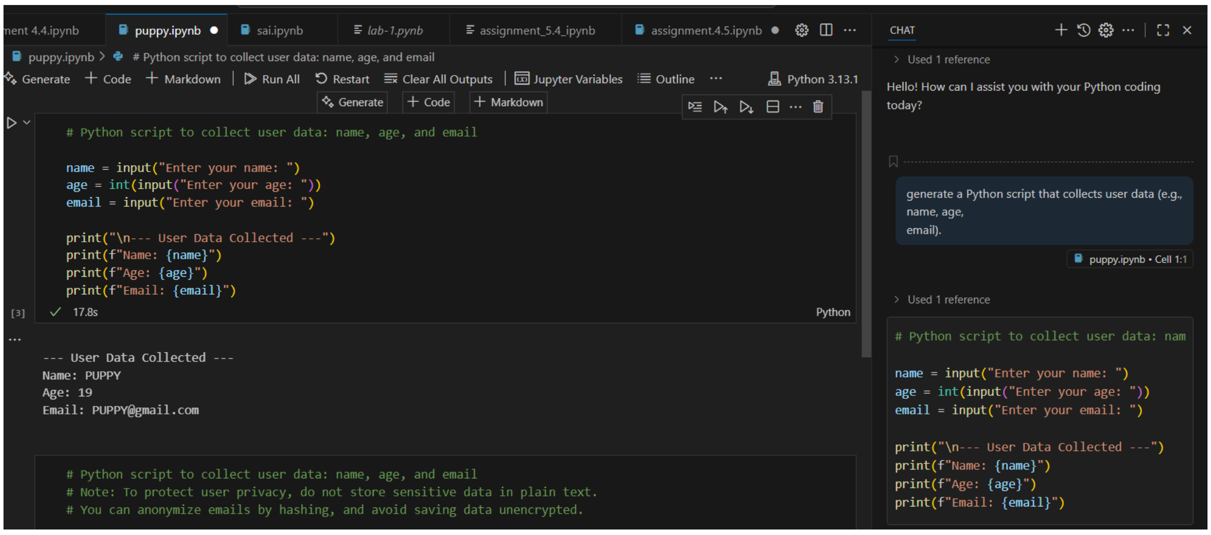
TASK-1:

PROMPT:

generate a Python script that collects user data (e.g., name, age, email)

CODE:



```python
# Python script to collect user data: name, age, and email

name = input("Enter your name: ")
age = int(input("Enter your age: "))
email = input("Enter your email: ")

print("\n--- User Data Collected ---")
print(f"Name: {name}")
print(f"Age: {age}")
print(f"Email: {email}")
```

```
--- User Data Collected ---
Name: PUPPY
Age: 19
Email: PUPPY@gmail.com
```

```python
# Python script to collect user data: name, age, and email
# Note: To protect user privacy, do not store sensitive data in plain text.
# You can anonymize emails by hashing, and avoid saving data unencrypted.
```

Hello! How can I assist you with your Python coding today?

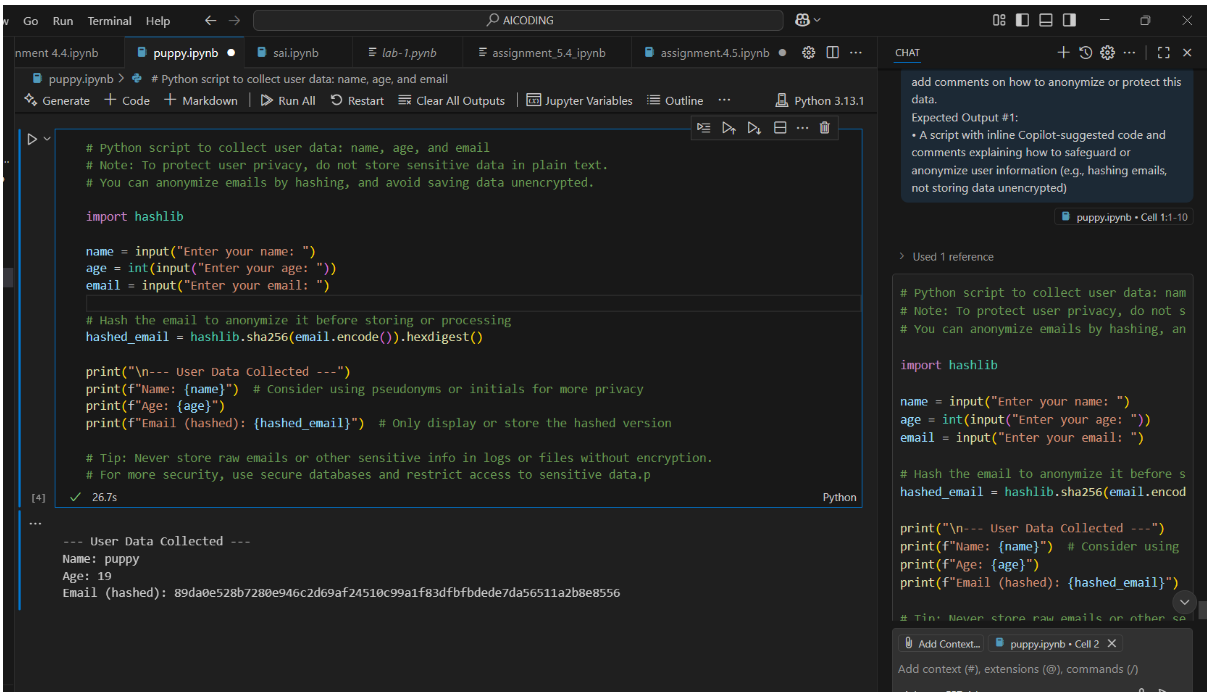
generate a Python script that collects user data (e.g., name, age, email).

```python
# Python script to collect user data: nam

name = input("Enter your name: ")
age = int(input("Enter your age: "))
email = input("Enter your email: ")

print("\n--- User Data Collected ---")
print(f"Name: {name}")
print(f"Age: {age}")
print(f"Email: {email}")
```

Prompt:

add comments on how to anonymize or protect this data of 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)

Code:



```python
# Python script to collect user data: name, age, and email
# Note: To protect user privacy, do not store sensitive data in plain text.
# You can anonymize emails by hashing, and avoid saving data unencrypted.

import hashlib

name = input("Enter your name: ")
age = int(input("Enter your age: "))
email = input("Enter your email: ")

# Hash the email to anonymize it before storing or processing
hashed_email = hashlib.sha256(email.encode()).hexdigest()

print("\n--- User Data Collected ---")
print(f"Name: {name}")  # Consider using pseudonyms or initials for more privacy
print(f"Age: {age}")
print(f"Email (hashed): {hashed_email}")  # Only display or store the hashed version

# Tip: Never store raw emails or other sensitive info in logs or files without encryption.
# For more security, use secure databases and restrict access to sensitive data.p
```

```
--- User Data Collected ---
Name: puppy
Age: 19
Email (hashed): 89da0e528b7280e946c2d69af24510c99a1f83dfbfbdede7da56511a2b8e8556
```

add comments on how to anonymize or protect this data.
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)

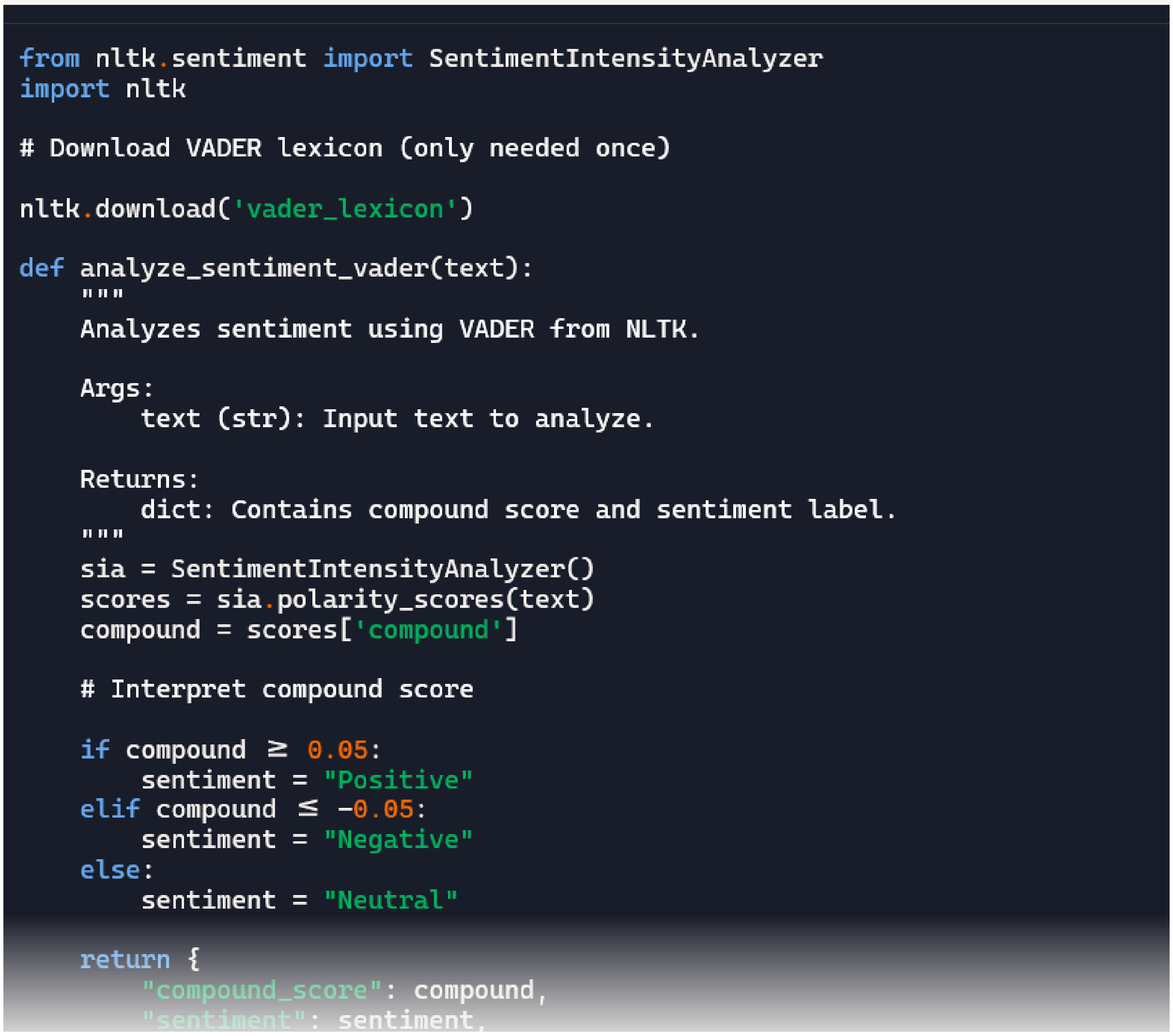
```python
# Python script to collect user data: nam
# Note: To protect user privacy, do not s
# You can anonymize emails by hashing, an

import hashlib

name = input("Enter your name: ")
age = int(input("Enter your age: "))
email = input("Enter your email: ")

# Hash the email to anonymize it before s
hashed_email = hashlib.sha256(email.encod

print("\n--- User Data Collected ---")
print(f"Name: {name}")  # Consider using
print(f"Age: {age}")
print(f"Email (hashed): {hashed_email}")
```

TASK-2:

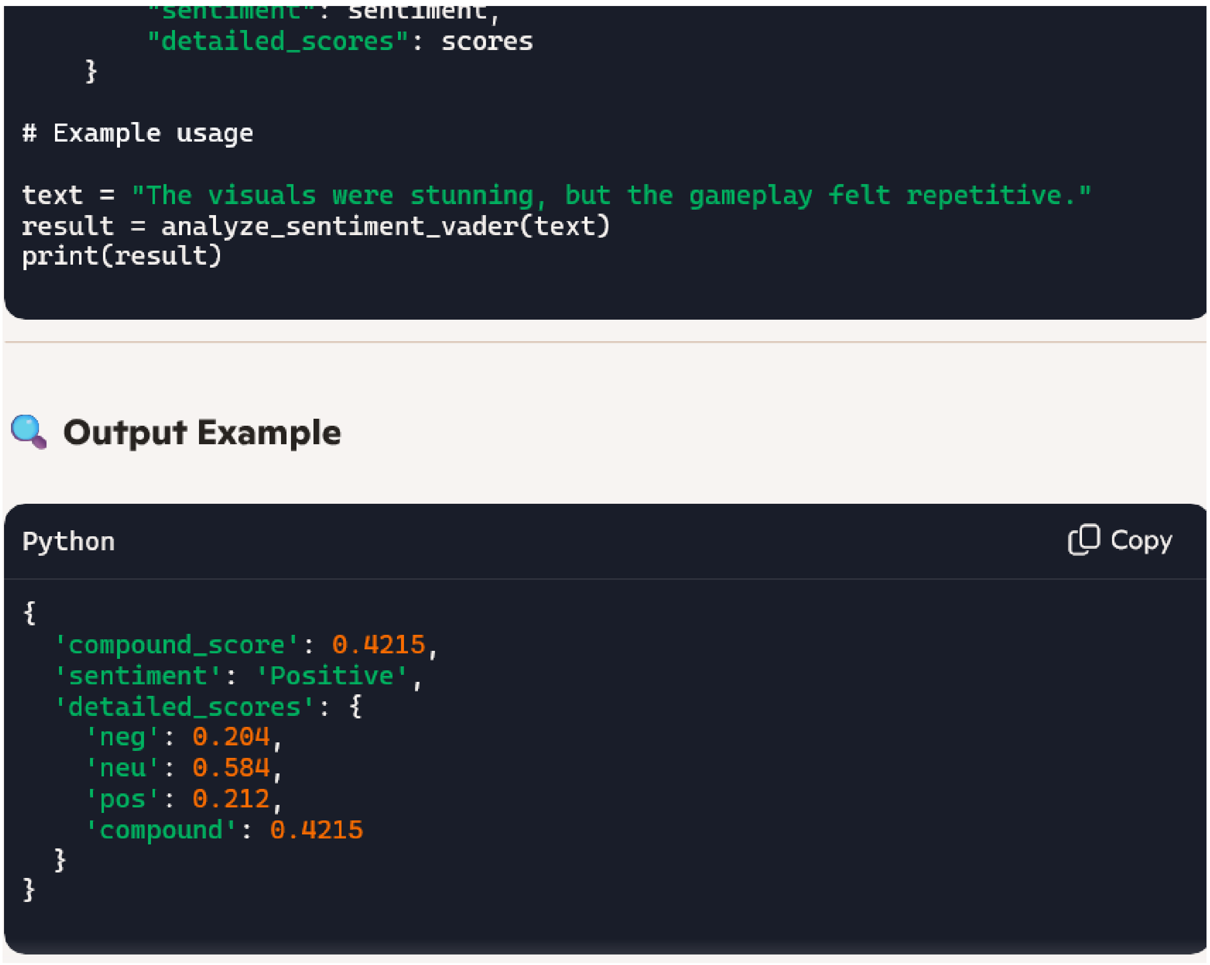
Prompt :

generate a Python function for sentiment analysis.

Code:



```python
from nltk.sentiment import SentimentIntensityAnalyzer
import nltk

# Download VADER lexicon (only needed once)

nltk.download('vader_lexicon')

def analyze_sentiment_vader(text):
    """
    Analyzes sentiment using VADER from NLTK.

    Args:
        text (str): Input text to analyze.

    Returns:
        dict: Contains compound score and sentiment label.
    """
    sia = SentimentIntensityAnalyzer()
    scores = sia.polarity_scores(text)
    compound = scores['compound']

    # Interpret compound score

    if compound >= 0.05:
        sentiment = "Positive"
    elif compound <= -0.05:
        sentiment = "Negative"
    else:
        sentiment = "Neutral"

    return {
        "compound_score": compound,
        "sentiment": sentiment,
```



```python
        "sentiment": sentiment,
        "detailed_scores": scores
    }

# Example usage

text = "The visuals were stunning, but the gameplay felt repetitive."
result = analyze_sentiment_vader(text)
print(result)
```

🔍 Output Example

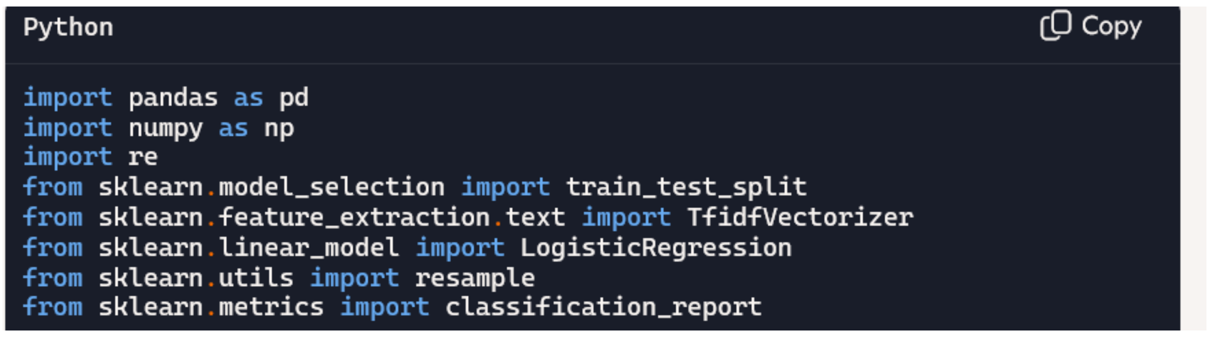
Python Copy

```python
{
  'compound_score': 0.4215,
  'sentiment': 'Positive',
  'detailed_scores': {
    'neg': 0.204,
    'neu': 0.584,
    'pos': 0.212,
    'compound': 0.4215
  }
}
```

Prompt:

identify and handle potential biases in the data at which the output should be like Copilot-generated code with additions or comments addressing bias mitigation strategies (e.g.,balancing dataset, removing offensive terms)

code:



Python Copy

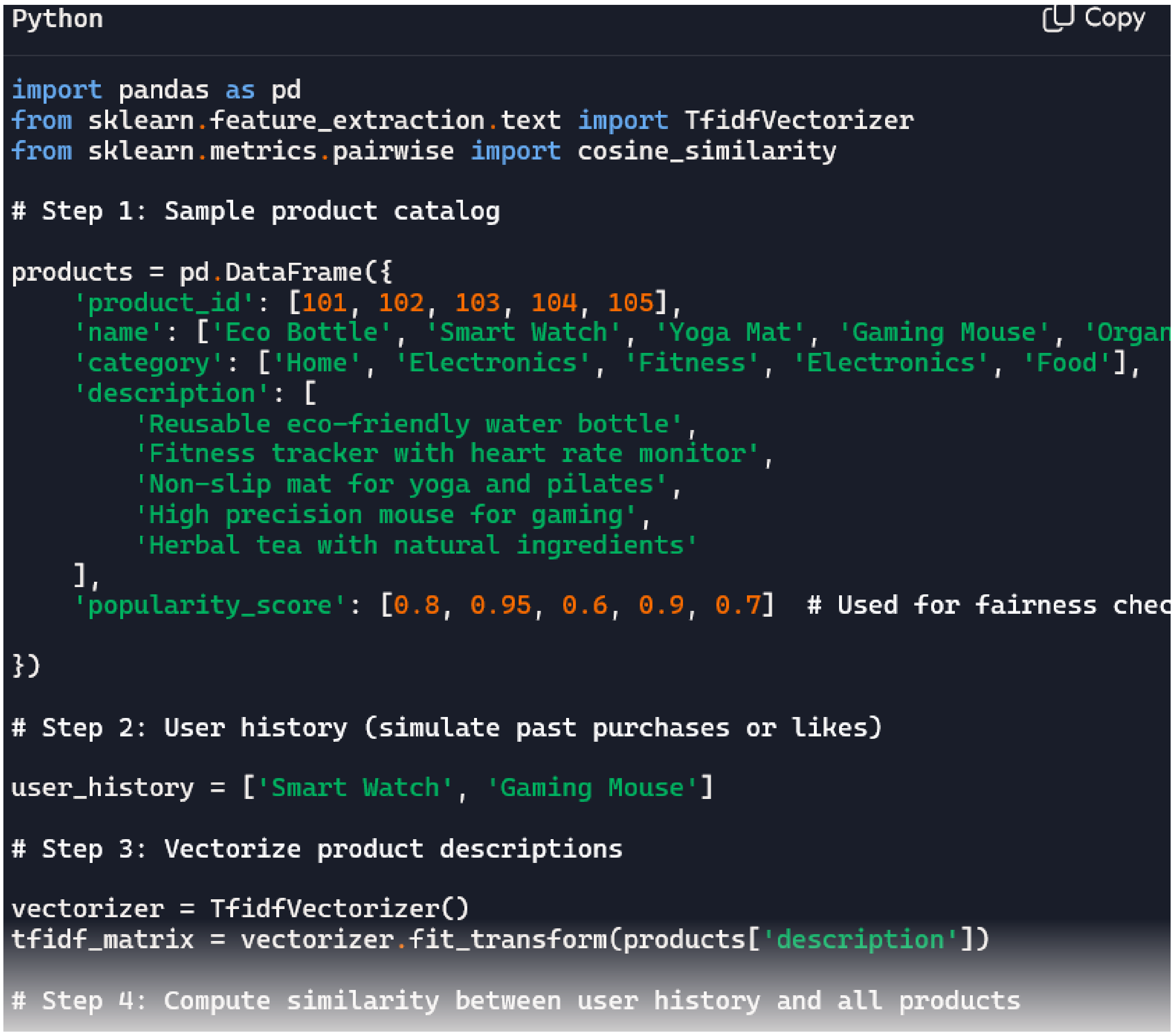
```python
import pandas as pd
import numpy as np
import re
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.utils import resample
from sklearn.metrics import classification_report
```

TASK-3:

Prompt:

write a Python program that recommends products based on user history.and also include explanations, fairness checks (e.g., avoiding favoritism), and user feedback options in the code

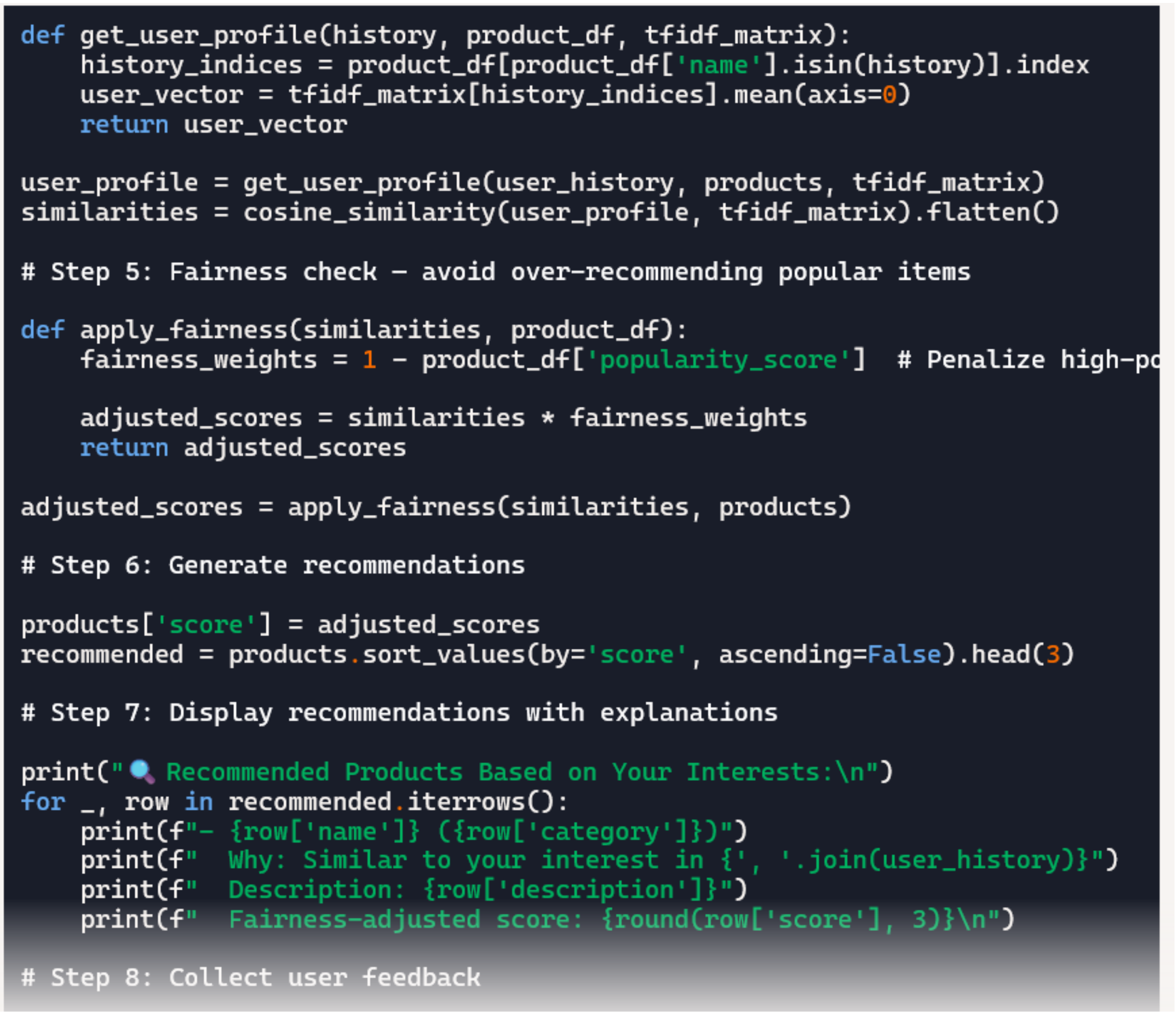
code:



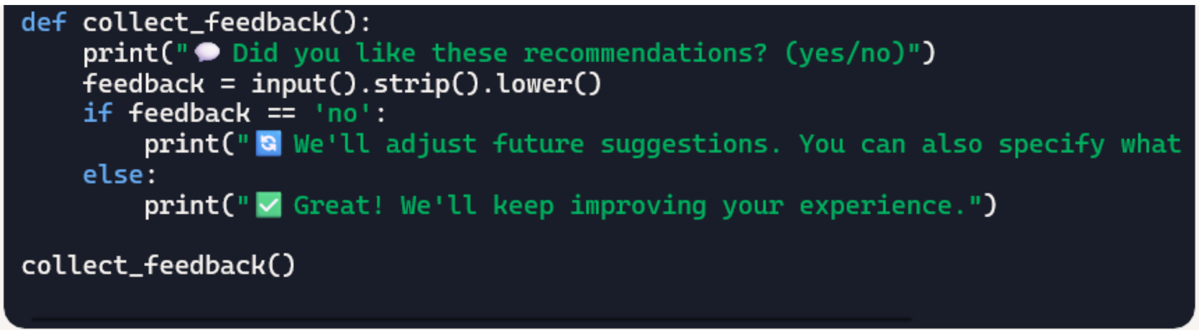
Python

Copy

```python
import pandas as pd
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import cosine_similarity

# Step 1: Sample product catalog

products = pd.DataFrame({
    'product_id': [101, 102, 103, 104, 105],
    'name': ['Eco Bottle', 'Smart Watch', 'Yoga Mat', 'Gaming Mouse', 'Organ
    'category': ['Home', 'Electronics', 'Fitness', 'Electronics', 'Food'],
    'description': [
        'Reusable eco-friendly water bottle',
        'Fitness tracker with heart rate monitor',
        'Non-slip mat for yoga and pilates',
        'High precision mouse for gaming',
        'Herbal tea with natural ingredients'
    ],
    'popularity_score': [0.8, 0.95, 0.6, 0.9, 0.7]  # Used for fairness chec

})

# Step 2: User history (simulate past purchases or likes)

user_history = ['Smart Watch', 'Gaming Mouse']

# Step 3: Vectorize product descriptions

vectorizer = TfidfVectorizer()
tfidf_matrix = vectorizer.fit_transform(products['description'])

# Step 4: Compute similarity between user history and all products
```



```
def get_user_profile(history, product_df, tfidf_matrix):
    history_indices = product_df[product_df['name'].isin(history)].index
    user_vector = tfidf_matrix[history_indices].mean(axis=0)
    return user_vector

user_profile = get_user_profile(user_history, products, tfidf_matrix)
similarities = cosine_similarity(user_profile, tfidf_matrix).flatten()

# Step 5: Fairness check - avoid over-recommending popular items

def apply_fairness(similarities, product_df):
    fairness_weights = 1 - product_df['popularity_score']  # Penalize high-po

    adjusted_scores = similarities * fairness_weights
    return adjusted_scores

adjusted_scores = apply_fairness(similarities, products)

# Step 6: Generate recommendations

products['score'] = adjusted_scores
recommended = products.sort_values(by='score', ascending=False).head(3)

# Step 7: Display recommendations with explanations

print("🔍 Recommended Products Based on Your Interests:\n")
for _, row in recommended.iterrows():
    print(f"- {row['name']} ({row['category']})")
    print(f"  Why: Similar to your interest in {', '.join(user_history)}")
    print(f"  Description: {row['description']}")
    print(f"  Fairness-adjusted score: {round(row['score'], 3)}\n")

# Step 8: Collect user feedback
```



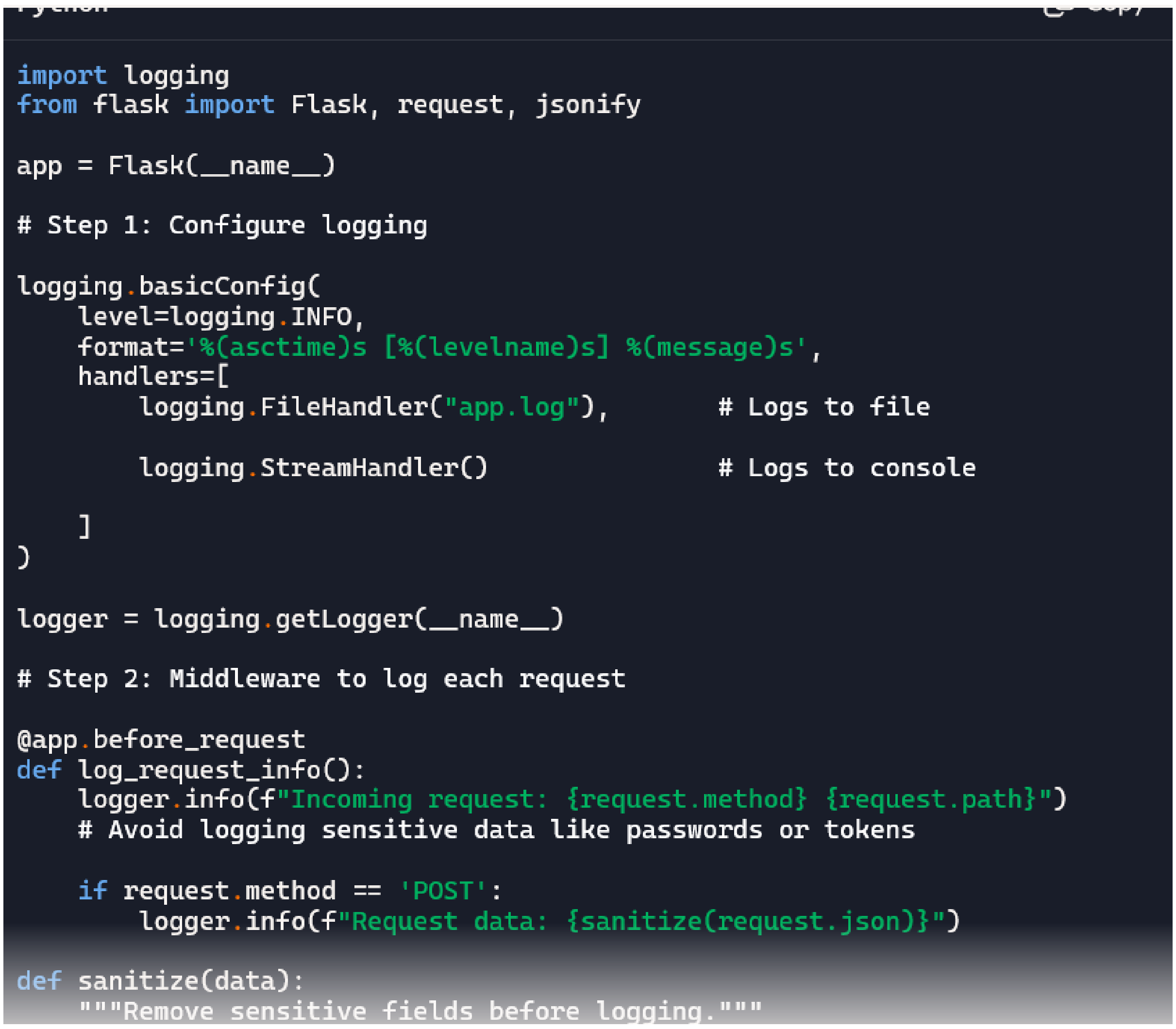
```
def collect_feedback():
    print("💬 Did you like these recommendations? (yes/no)")
    feedback = input().strip().lower()
    if feedback == 'no':
        print("🔄 We'll adjust future suggestions. You can also specify what
    else:
        print("✅ Great! We'll keep improving your experience.")

collect_feedback()
```

TASK-4:

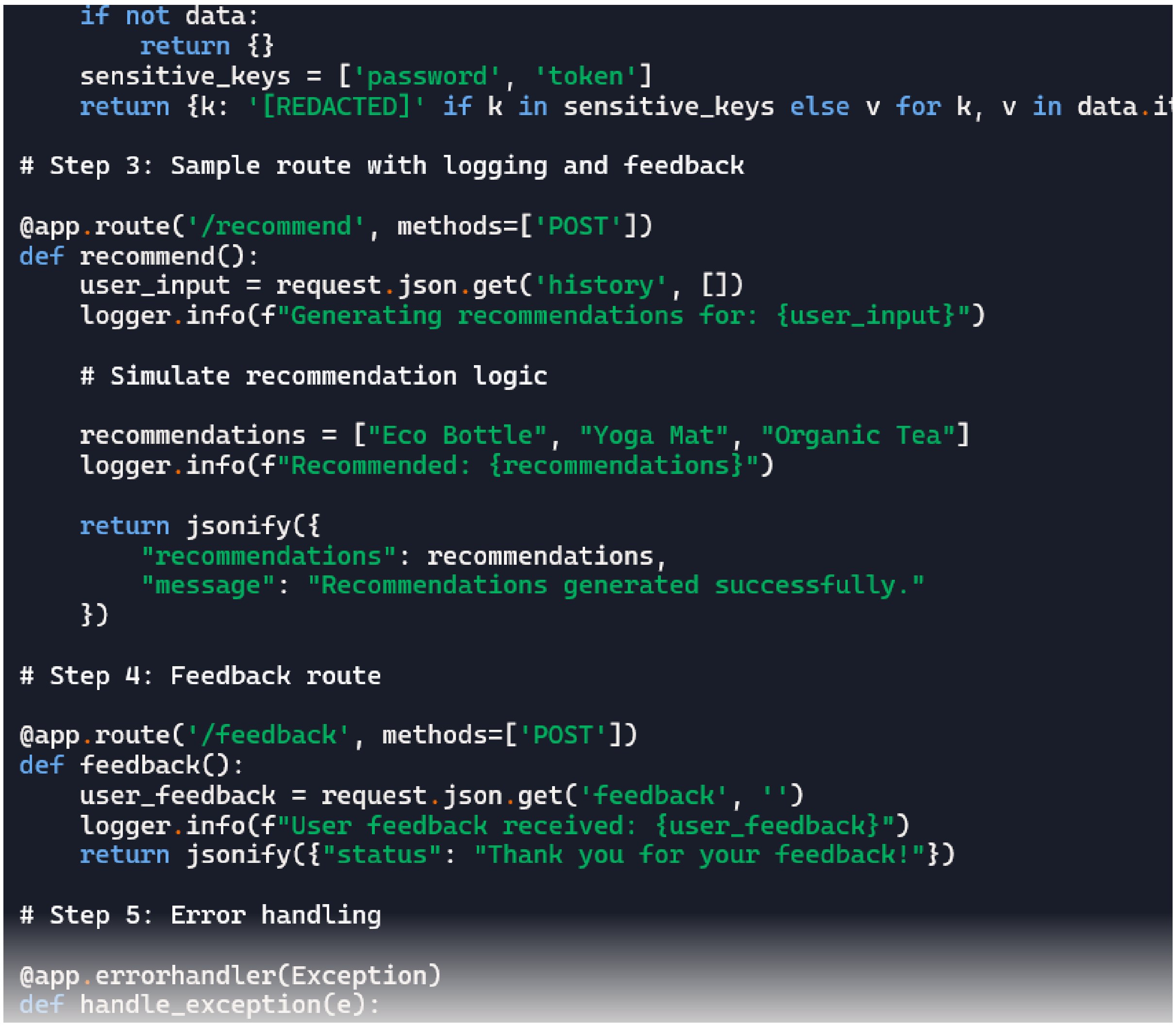
Prompt:

generate logging functionality in a Python web application.

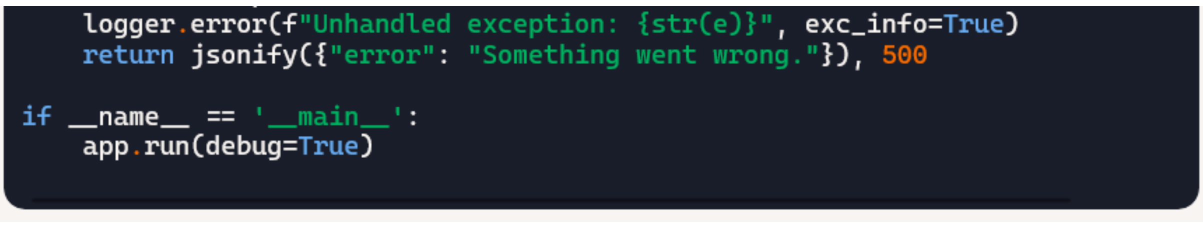
Code:



```python
import logging
from flask import Flask, request, jsonify

app = Flask(__name__)

# Step 1: Configure logging

logging.basicConfig(
    level=logging.INFO,
    format='%(asctime)s [%(levelname)s] %(message)s',
    handlers=[
        logging.FileHandler("app.log"),       # Logs to file

        logging.StreamHandler()               # Logs to console

    ]
)

logger = logging.getLogger(__name__)

# Step 2: Middleware to log each request

@app.before_request
def log_request_info():
    logger.info(f"Incoming request: {request.method} {request.path}")
    # Avoid logging sensitive data like passwords or tokens

    if request.method == 'POST':
        logger.info(f"Request data: {sanitize(request.json)}")

def sanitize(data):
    """Remove sensitive fields before logging."""
```



```
    if not data:
        return {}
    sensitive_keys = ['password', 'token']
    return {k: '[REDACTED]' if k in sensitive_keys else v for k, v in data.i

# Step 3: Sample route with logging and feedback

@app.route('/recommend', methods=['POST'])
def recommend():
    user_input = request.json.get('history', [])
    logger.info(f"Generating recommendations for: {user_input}")

    # Simulate recommendation logic

    recommendations = ["Eco Bottle", "Yoga Mat", "Organic Tea"]
    logger.info(f"Recommended: {recommendations}")

    return jsonify({
        "recommendations": recommendations,
        "message": "Recommendations generated successfully."
    })

# Step 4: Feedback route

@app.route('/feedback', methods=['POST'])
def feedback():
    user_feedback = request.json.get('feedback', '')
    logger.info(f"User feedback received: {user_feedback}")
    return jsonify({"status": "Thank you for your feedback!"})

# Step 5: Error handling

@app.errorhandler(Exception)
def handle_exception(e):
```

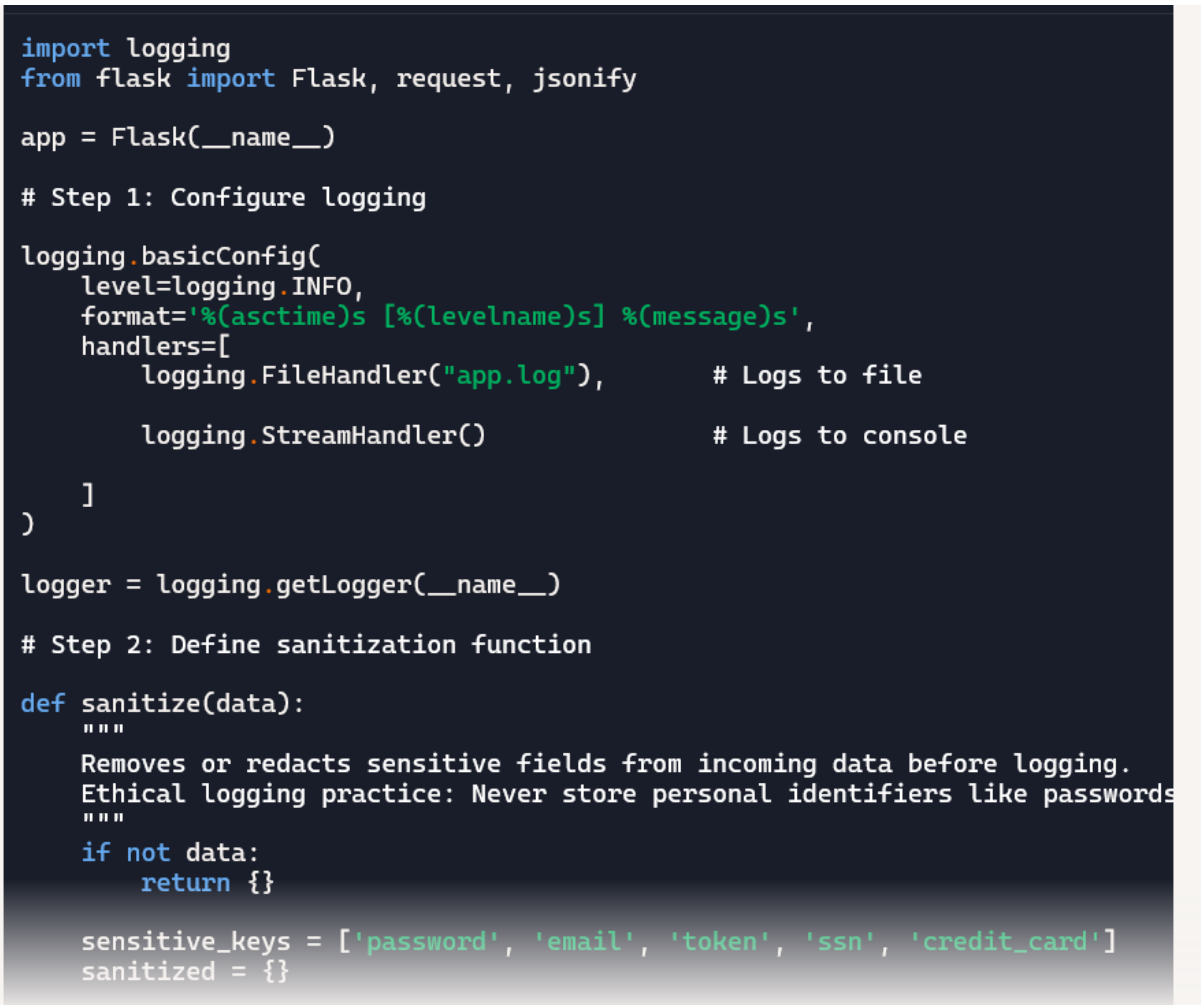


```
    logger.error(f"Unhandled exception: {str(e)}", exc_info=True)
    return jsonify({"error": "Something went wrong."}), 500

if __name__ == '__main__':
    app.run(debug=True)
```

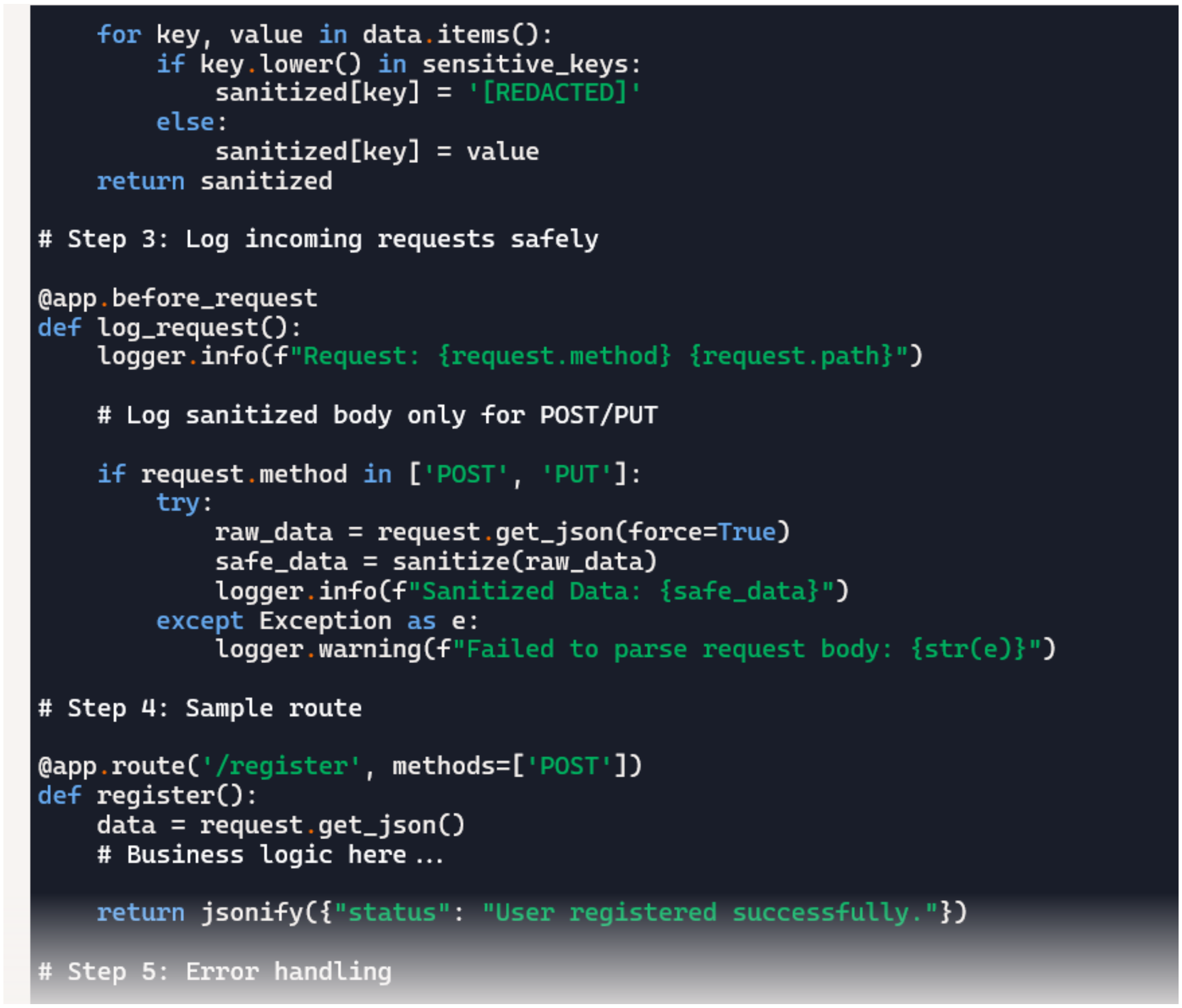
Prompt:

ensure the logs do not record sensitive information like Logging code that avoids saving personal identifiers (e.g., passwords, emails), and includes comments about ethical logging practices.

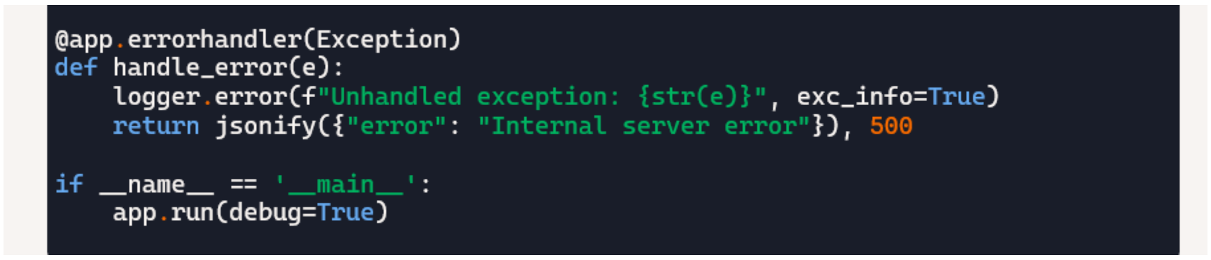
Code:



```python
import logging
from flask import Flask, request, jsonify

app = Flask(__name__)

# Step 1: Configure logging

logging.basicConfig(
    level=logging.INFO,
    format='%(asctime)s [%(levelname)s] %(message)s',
    handlers=[
        logging.FileHandler("app.log"),       # Logs to file

        logging.StreamHandler()               # Logs to console

    ]
)

logger = logging.getLogger(__name__)

# Step 2: Define sanitization function

def sanitize(data):
    """
    Removes or redacts sensitive fields from incoming data before logging.
    Ethical logging practice: Never store personal identifiers like passwords
    """
    if not data:
        return {}

    sensitive_keys = ['password', 'email', 'token', 'ssn', 'credit_card']
    sanitized = {}
```



```python
    for key, value in data.items():
        if key.lower() in sensitive_keys:
            sanitized[key] = '[REDACTED]'
        else:
            sanitized[key] = value
    return sanitized

# Step 3: Log incoming requests safely

@app.before_request
def log_request():
    logger.info(f"Request: {request.method} {request.path}")

    # Log sanitized body only for POST/PUT

    if request.method in ['POST', 'PUT']:
        try:
            raw_data = request.get_json(force=True)
            safe_data = sanitize(raw_data)
            logger.info(f"Sanitized Data: {safe_data}")
        except Exception as e:
            logger.warning(f"Failed to parse request body: {str(e)}")

# Step 4: Sample route

@app.route('/register', methods=['POST'])
def register():
    data = request.get_json()
    # Business logic here ...

    return jsonify({"status": "User registered successfully."})

# Step 5: Error handling
```



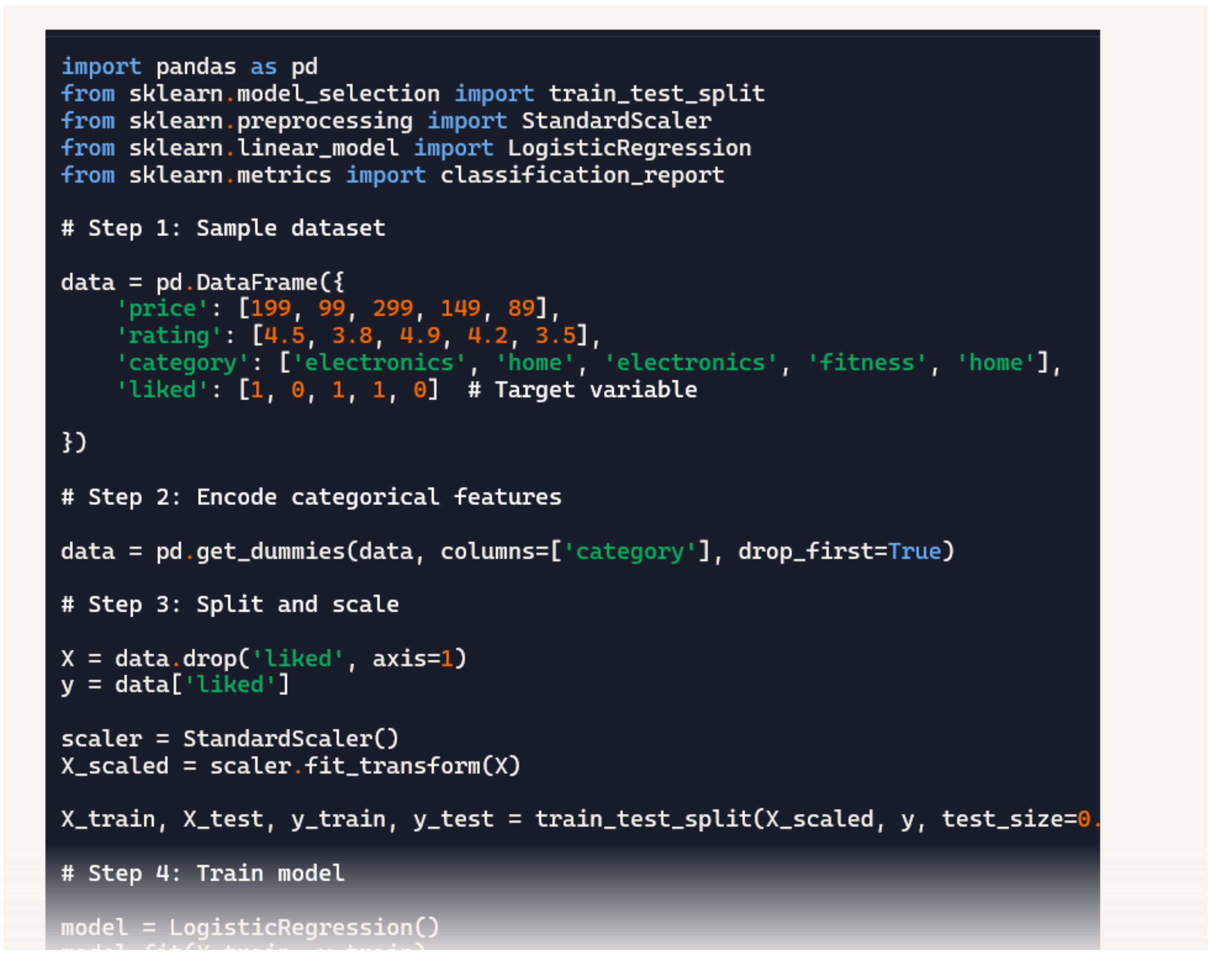
```python
@app.errorhandler(Exception)
def handle_error(e):
    logger.error(f"Unhandled exception: {str(e)}", exc_info=True)
    return jsonify({"error": "Internal server error"}), 500

if __name__ == '__main__':
    app.run(debug=True)
```

Task-5:

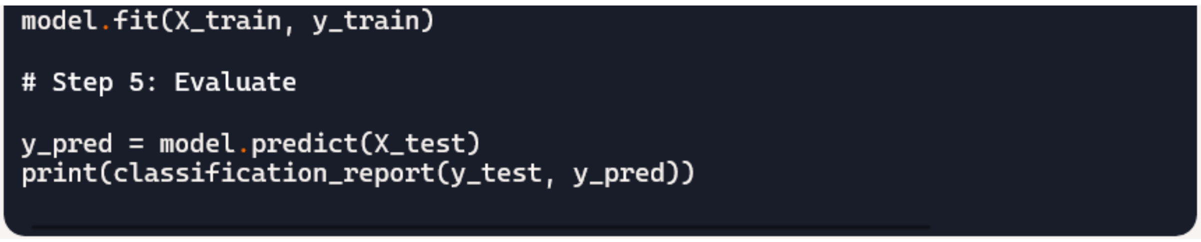
Prompt:

generate a machine learning model.

Code:



```python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import classification_report

# Step 1: Sample dataset

data = pd.DataFrame({
    'price': [199, 99, 299, 149, 89],
    'rating': [4.5, 3.8, 4.9, 4.2, 3.5],
    'category': ['electronics', 'home', 'electronics', 'fitness', 'home'],
    'liked': [1, 0, 1, 1, 0]  # Target variable

})

# Step 2: Encode categorical features

data = pd.get_dummies(data, columns=['category'], drop_first=True)

# Step 3: Split and scale

X = data.drop('liked', axis=1)
y = data['liked']

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.

# Step 4: Train model

model = LogisticRegression()
```

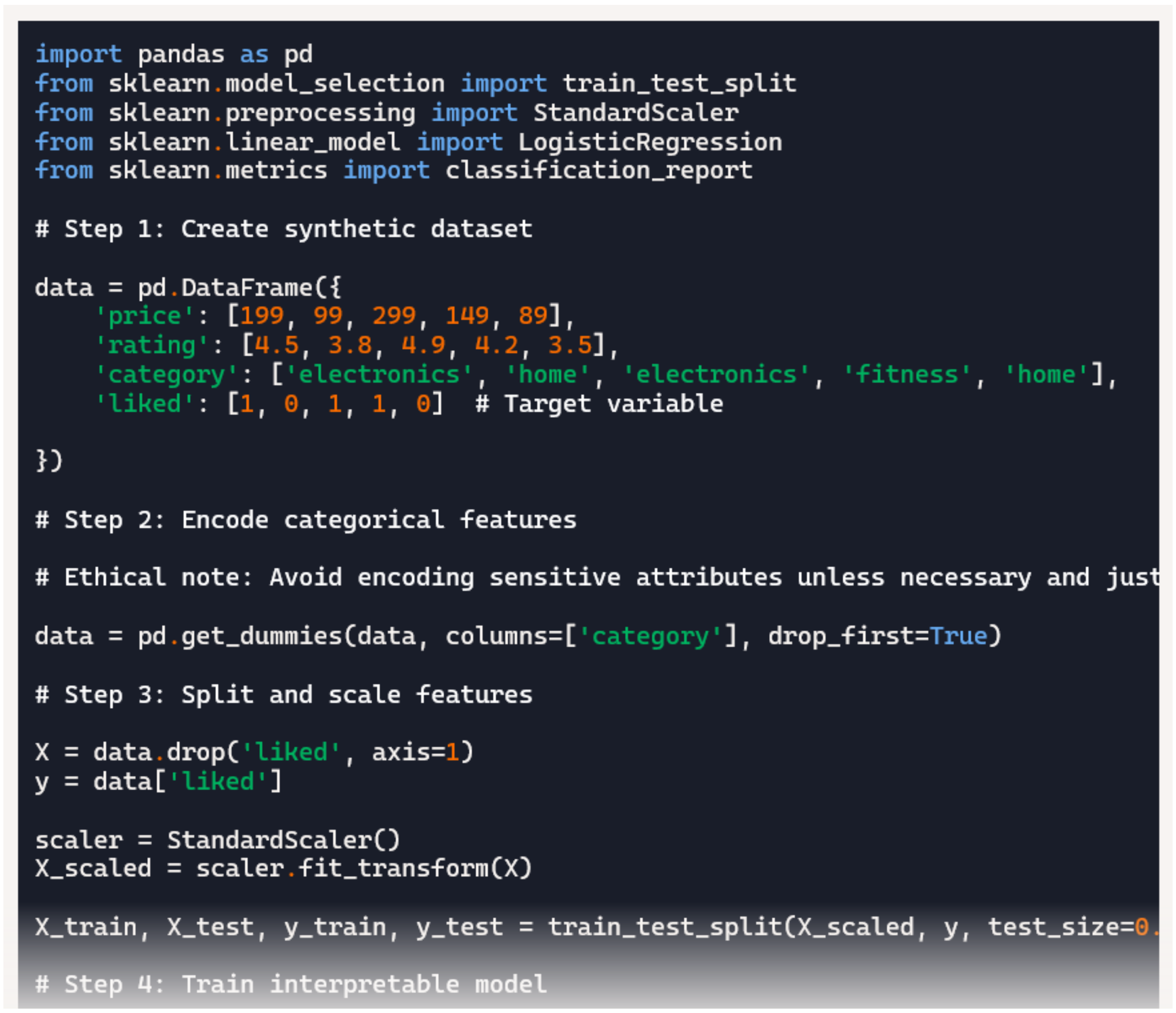


```python
model.fit(X_train, y_train)

# Step 5: Evaluate

y_pred = model.predict(X_test)
print(classification_report(y_test, y_pred))
```

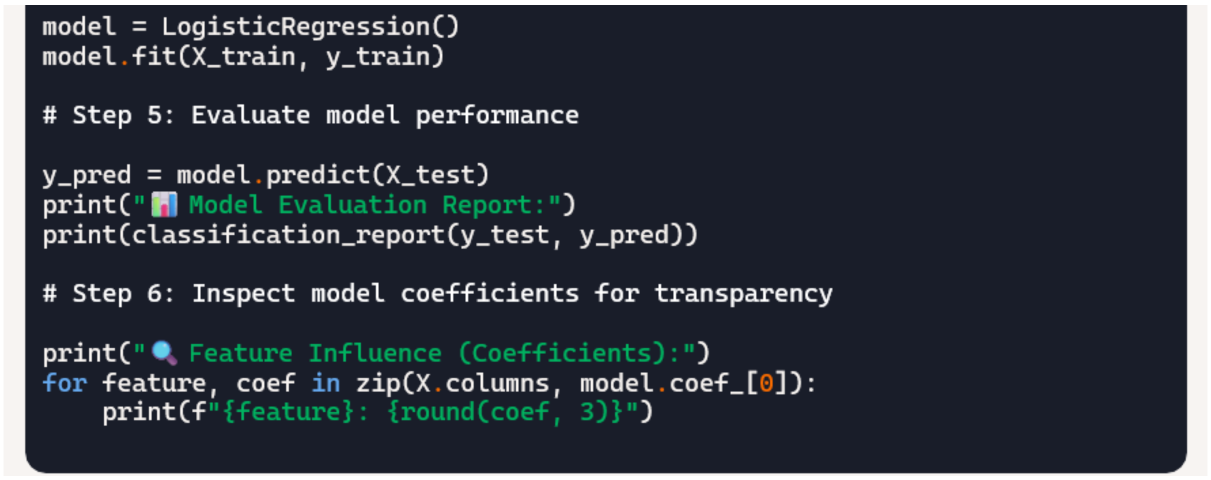
Prompt:

add documentation on how to use the model responsibly (e.g., explainability, accuracy limits) like code with a README or inline documentation suggesting responsible usage, limitations, and fairness considerations

Code:



```python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import classification_report

# Step 1: Create synthetic dataset

data = pd.DataFrame({
    'price': [199, 99, 299, 149, 89],
    'rating': [4.5, 3.8, 4.9, 4.2, 3.5],
    'category': ['electronics', 'home', 'electronics', 'fitness', 'home'],
    'liked': [1, 0, 1, 1, 0]  # Target variable

})

# Step 2: Encode categorical features

# Ethical note: Avoid encoding sensitive attributes unless necessary and just

data = pd.get_dummies(data, columns=['category'], drop_first=True)

# Step 3: Split and scale features

X = data.drop('liked', axis=1)
y = data['liked']

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.

# Step 4: Train interpretable model
```



```python
model = LogisticRegression()
model.fit(X_train, y_train)

# Step 5: Evaluate model performance

y_pred = model.predict(X_test)
print("📊 Model Evaluation Report:")
print(classification_report(y_test, y_pred))

# Step 6: Inspect model coefficients for transparency

print("🔍 Feature Influence (Coefficients):")
for feature, coef in zip(X.columns, model.coef_[0]):
    print(f"{feature}: {round(coef, 3)}")
```