

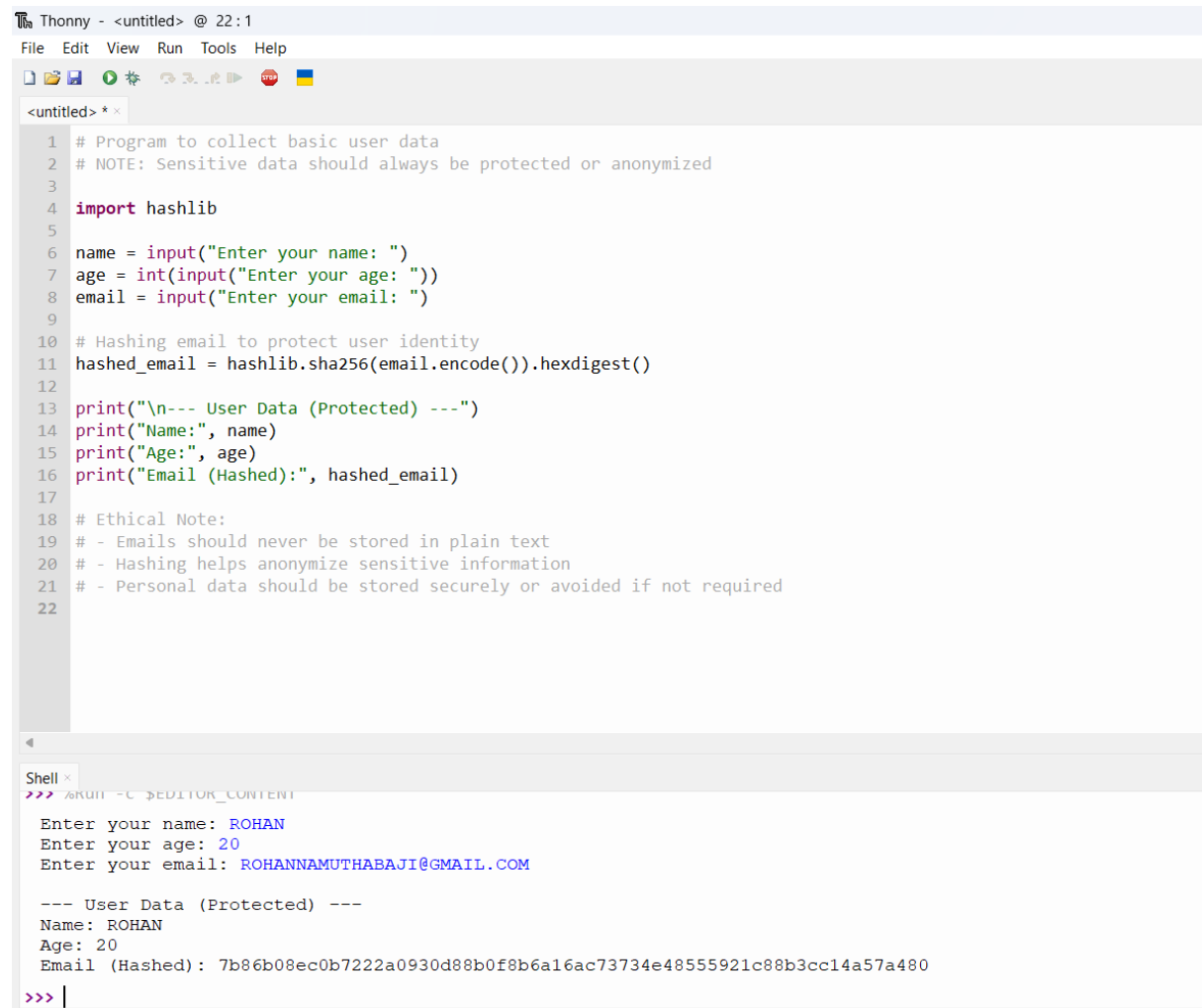
## ASSIGNMENT-5.4

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### Task 1: Ethical Handling of User Data (Privacy & Anonymization)



```
Thonny - <untitled> @ 22:1
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<untitled> * x
1 # Program to collect basic user data
2 # NOTE: Sensitive data should always be protected or anonymized
3
4 import hashlib
5
6 name = input("Enter your name: ")
7 age = int(input("Enter your age: "))
8 email = input("Enter your email: ")
9
10 # Hashing email to protect user identity
11 hashed_email = hashlib.sha256(email.encode()).hexdigest()
12
13 print("\n--- User Data (Protected) ---")
14 print("Name:", name)
15 print("Age:", age)
16 print("Email (Hashed):", hashed_email)
17
18 # Ethical Note:
19 # - Emails should never be stored in plain text
20 # - Hashing helps anonymize sensitive information
21 # - Personal data should be stored securely or avoided if not required
22

Shell x
>>> %RUN -C $EDITOR_CONTENT
Enter your name: ROHAN
Enter your age: 20
Enter your email: ROHANNAMUTHABAJI@GMAIL.COM

--- User Data (Protected) ---
Name: ROHAN
Age: 20
Email (Hashed): 7b86b08ec0b7222a0930d88b0f8b6a16ac73734e48555921c88b3cc14a57a480
>>> |
```

### Task 2: Sentiment Analysis with Bias Awareness

```
Thonny - <untitled> @ 26:1
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<untitled> * x
1 # Simple sentiment analysis with bias awareness
2
3 def analyze_sentiment(text):
4     positive_words = ["good", "happy", "excellent", "great"]
5     negative_words = ["bad", "sad", "terrible", "poor"]
6
7     score = 0
8     words = text.lower().split()
9
10    for word in words:
11        if word in positive_words:
12            score += 1
13        elif word in negative_words:
14            score -= 1
15
16    return "Positive" if score > 0 else "Negative" if score < 0 else "Neutral"
17
18
19 # Ethical considerations:
20 # - Avoid biased or offensive words in training data
21 # - Use balanced datasets
22 # - Regularly audit sentiment outputs for fairness
23
24 print(analyze_sentiment("This product is excellent and good"))
25 print(analyze_sentiment("This service is bad and terrible"))
26

Shell x
>>> %Run -c $EDITOR_CONTENT
Positive
Negative
>>>
```

### Task 3: Ethical Product Recommendation System

```
Thonny - <untitled> @ 31:1
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<untitled> * x
5
6     for product in products:
7         # Avoid favoritism by recommending based on relevance only
8         if product["category"] in user_history:
9             recommendations.append(product["name"])
10
11     return recommendations
12
13
14 # Example data
15 user_history = ["electronics", "books"]
16
17 products = [
18     {"name": "Laptop", "category": "electronics"},
19     {"name": "Novel", "category": "books"},
20     {"name": "Shoes", "category": "fashion"}
21 ]
22
23 recommended = recommend_products(user_history, products)
24
25 print("Recommended Products:", recommended)
26
27 # Ethical Notes:
28 # - Recommendations should be transparent
29 # - Avoid unfair bias toward sponsored or preferred products
30 # - Allow user feedback to improve fairness
31

Shell x
>>> %Run -c $EDITOR_CONTENT
Recommended Products: ['Laptop', 'Novel']
>>>
```

#### Task 4: Ethical Logging (Avoiding Sensitive Data)

Thonny - <untitled> @ 23:1

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<untitled> \* x

```
1 # Logging functionality with ethical considerations
2
3 import logging
4
5 logging.basicConfig(
6     filename="app.log",
7     level=logging.INFO,
8     format="%(asctime)s - %(levelname)s - %(message)s"
9 )
10
11 def login_user(username):
12     # Do NOT log passwords or sensitive personal data
13     logging.info(f"User login attempt: {username}")
14     print("Login successful")
15
16
17 login_user("student_user")
18
19 # Ethical Logging Guidelines:
20 # - Never log passwords or emails
21 # - Logs should be minimal and purpose-driven
22 # - Protect log files from unauthorized access
23 |
```

Shell x

```
>>> %Run -c $EDITOR_CONTENT
Login successful
>>>
```

## Task 5: Responsible Machine Learning Model Usage

Thonny - <untitled> @ 25:1

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<untitled> \* x

```
1 # Simple ML model example with responsible usage documentation
2
3 from sklearn.linear_model import LinearRegression
4 import numpy as np
5
6 # Sample training data
7 X = np.array([[1], [2], [3], [4], [5]])
8 y = np.array([2, 4, 6, 8, 10])
9
10 model = LinearRegression()
11 model.fit(X, y)
12
13 # Prediction
14 prediction = model.predict([[6]])
15 print("Predicted value:", prediction)
16
17 """
18 Responsible Usage Notes:
19 - This model is trained on a very small dataset
20 - Predictions may not generalize to real-world data
21 - Always validate accuracy using proper test data
22 - Ensure training data is unbiased and representative
23 - Provide transparency when deploying ML models
24 """
25 |
```