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Batch:29

Assessment: 4.5

Task 1: Suppose that you work for a company that receives hundreds of customer emails daily. Management wants to automatically classify mails into categories like "Billing", "Technical Support", "Feedback", and "Others" before assigning them to appropriate departments. Instead of training a new model, your task is to use prompt engineering techniques with an existing LLM to handle the classification.

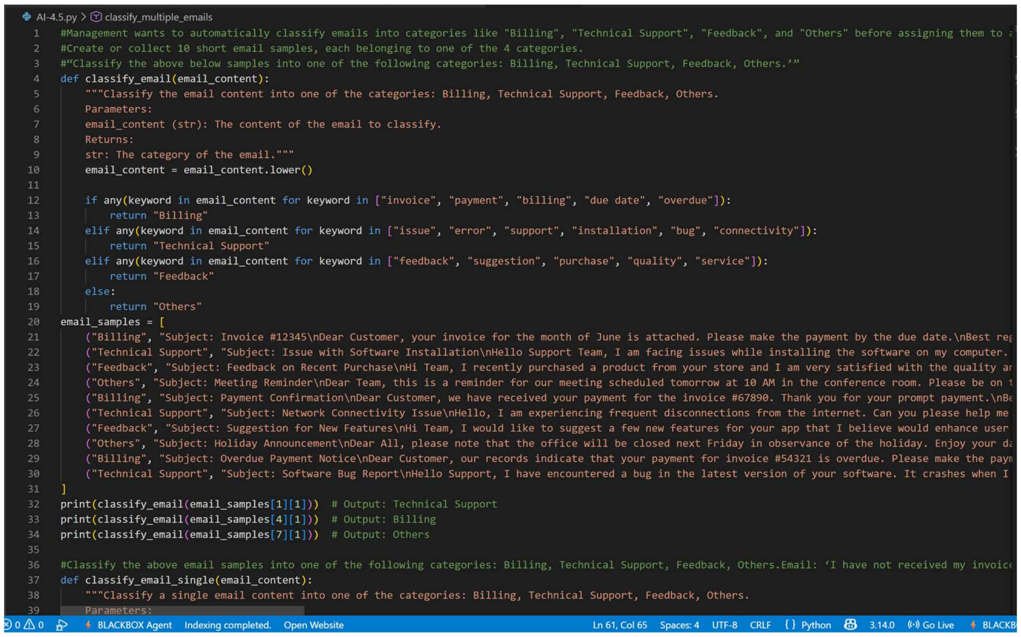
Prompt :

Classify the above below samples into one of the following categories: Billing, Technical Support, Feedback, Others.

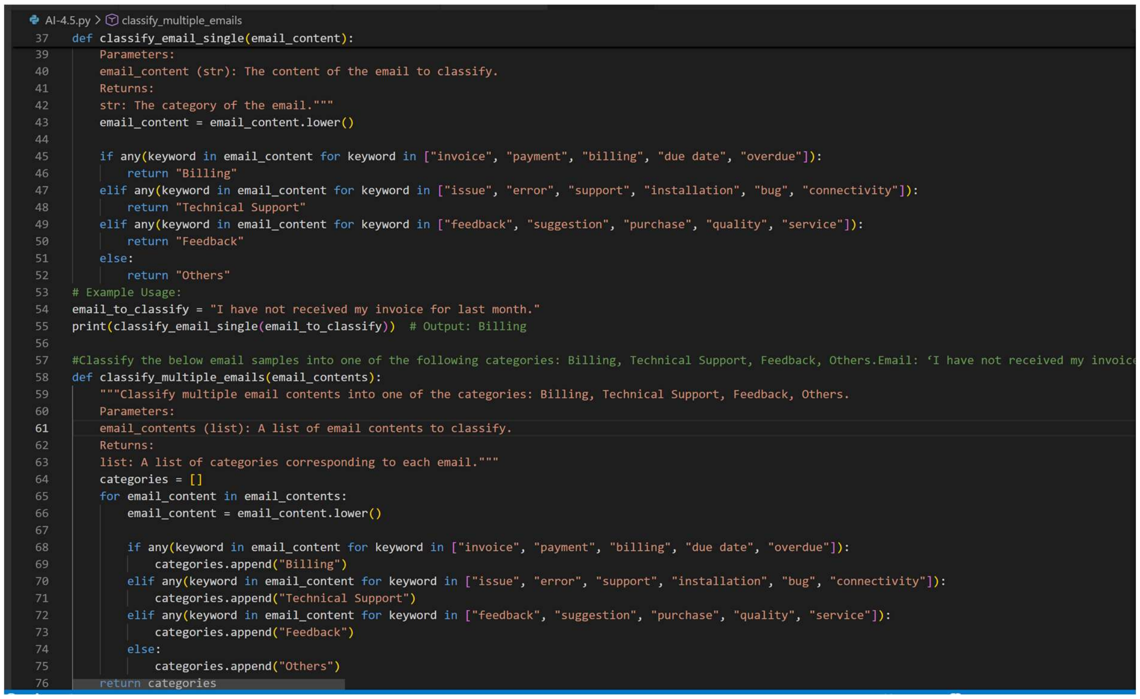
Classify the above email samples into one of the following categories: Billing, Technical Support, Feedback, Others.Email: ‘I have not received my invoice for last month.

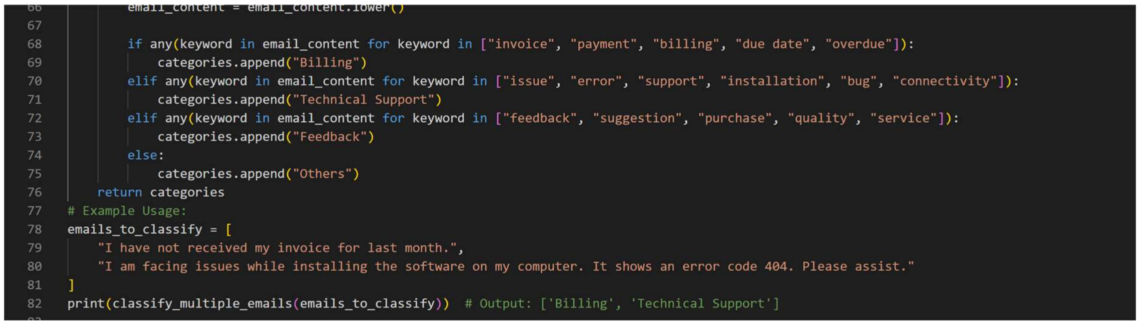
Classify the below email samples into one of the following categories: Billing, Technical Support, Feedback, Others.Email: ‘I have not received my invoice for last month. Billing, "Subject: Invoice #12345 Dear Customer, your invoice for the month of June is attached. Please make the payment by the due date. Best regards, Billing Team","Technical Support", "Subject: Issue with Software Installation Hello Support Team, I am facing issues while installing the software on my computer. It shows an error code 404. Please assist. Thanks, User".

Code :

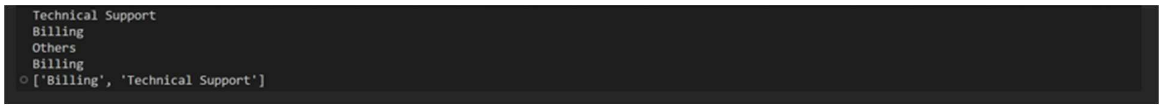


```
AI-4.5.py > classify_multiple_emails
#Management wants to automatically classify emails into categories like "Billing", "Technical Support", "Feedback", and "Others" before assigning them to a
#Create or collect 10 short email samples, each belonging to one of the 4 categories.
#“Classify the above below samples into one of the following categories: Billing, Technical Support, Feedback, Others.’”
def classify_email(email_content):
    """Classify the email content into one of the categories: Billing, Technical Support, Feedback, Others.
    Parameters:
    email_content (str): The content of the email to classify.
    Returns:
    str: The category of the email."""
    email_content = email_content.lower()

    if any(keyword in email_content for keyword in ["invoice", "payment", "billing", "due date", "overdue"]):
        return "Billing"
    elif any(keyword in email_content for keyword in ["issue", "error", "support", "installation", "bug", "connectivity"]):
        return "Technical Support"
    elif any(keyword in email_content for keyword in ["feedback", "suggestion", "purchase", "quality", "service"]):
        return "Feedback"
    else:
        return "Others"
email_samples = [
    ("Billing", "Subject: Invoice #12345\nDear Customer, your invoice for the month of June is attached. Please make the payment by the due date.\nBest reg
    ("Technical Support", "Subject: Issue with Software Installation\nHello Support Team, I am facing issues while installing the software on my computer.
    ("Feedback", "Subject: Feedback on Recent Purchase\nHi Team, I recently purchased a product from your store and I am very satisfied with the quality ar
    ("Others", "Subject: Meeting Reminder\nDear Team, this is a reminder for our meeting scheduled tomorrow at 10 AM in the conference room. Please be on t
    ("Billing", "Subject: Payment Confirmation\nDear Customer, we have received your payment for the invoice #67890. Thank you for your prompt payment.\nBe
    ("Technical Support", "Subject: Network Connectivity Issue\nHello, I am experiencing frequent disconnections from the internet. Can you please help me
    ("Feedback", "Subject: Suggestion for New Features\nHi Team, I would like to suggest a few new features for your app that I believe would enhance user
    ("Others", "Subject: Holiday Announcement\nDear All, please note that the office will be closed next Friday in observance of the holiday. Enjoy your da
    ("Billing", "Subject: Overdue Payment Notice\nDear Customer, our records indicate that your payment for invoice #54321 is overdue. Please make the paym
    ("Technical Support", "Subject: Software Bug Report\nHello Support, I have encountered a bug in the latest version of your software. It crashes when I
]
print(classify_email(email_samples[1][1]))  # Output: Technical Support
print(classify_email(email_samples[4][1]))  # Output: Billing
print(classify_email(email_samples[7][1]))  # Output: Others

#Classify the above email samples into one of the following categories: Billing, Technical Support, Feedback, Others.Email: ‘I have not received my invoice
def classify_email_single(email_content):
    """Classify a single email content into one of the categories: Billing, Technical Support, Feedback, Others.
    Parameters:
```


```
AI-4.5.py > classify_multiple_emails
def classify_email_single(email_content):
    Parameters:
    email_content (str): The content of the email to classify.
    Returns:
    str: The category of the email."""
    email_content = email_content.lower()

    if any(keyword in email_content for keyword in ["invoice", "payment", "billing", "due date", "overdue"]):
        return "Billing"
    elif any(keyword in email_content for keyword in ["issue", "error", "support", "installation", "bug", "connectivity"]):
        return "Technical Support"
    elif any(keyword in email_content for keyword in ["feedback", "suggestion", "purchase", "quality", "service"]):
        return "Feedback"
    else:
        return "Others"
# Example Usage:
email_to_classify = "I have not received my invoice for last month."
print(classify_email_single(email_to_classify))  # Output: Billing

#Classify the below email samples into one of the following categories: Billing, Technical Support, Feedback, Others.Email: ‘I have not received my invoic
def classify_multiple_emails(email_contents):
    """Classify multiple email contents into one of the categories: Billing, Technical Support, Feedback, Others.
    Parameters:
    email_contents (list): A list of email contents to classify.
    Returns:
    list: A list of categories corresponding to each email."""
    categories = []
    for email_content in email_contents:
        email_content = email_content.lower()

        if any(keyword in email_content for keyword in ["invoice", "payment", "billing", "due date", "overdue"]):
            categories.append("Billing")
        elif any(keyword in email_content for keyword in ["issue", "error", "support", "installation", "bug", "connectivity"]):
            categories.append("Technical Support")
        elif any(keyword in email_content for keyword in ["feedback", "suggestion", "purchase", "quality", "service"]):
            categories.append("Feedback")
        else:
            categories.append("Others")
    return categories
```


```
        email_content = email_content.lower()

        if any(keyword in email_content for keyword in ["invoice", "payment", "billing", "due date", "overdue"]):
            categories.append("Billing")
        elif any(keyword in email_content for keyword in ["issue", "error", "support", "installation", "bug", "connectivity"]):
            categories.append("Technical Support")
        elif any(keyword in email_content for keyword in ["feedback", "suggestion", "purchase", "quality", "service"]):
            categories.append("Feedback")
        else:
            categories.append("Others")
    return categories
# Example Usage:
emails_to_classify = [
    "I have not received my invoice for last month.",
    "I am facing issues while installing the software on my computer. It shows an error code 404. Please assist."
]
print(classify_multiple_emails(emails_to_classify))  # Output: ['Billing', 'Technical Support']
```

<u>Output:</u>


```
Technical Support
Billing
Others
Billing
['Billing', 'Technical Support']
```

<u>Justification:</u>

This task demonstrates how **prompt engineering** can automate email sorting without building a custom machine learning model. **Zero-shot prompting** works well for clearly defined emails, but may struggle when categories overlap. **One-shot prompting** improves the model’s understanding by providing a reference example. **Few-shot prompting** achieves higher accuracy by allowing the model to learn category patterns from multiple examples. Overall, this approach reduces manual effort and significantly improves operational efficiency.

Task 2: Travel Query Classification

A travel assistant must classify queries into Flight Booking, Hotel

Booking, Cancellation, or General Travel Info.

Tasks:

a. Prepare labeled travel queries.

b. Apply Zero-shot prompting.

c. Apply One-shot prompting.

d. Apply Few-shot prompting.

e. Compare response consistency.

Prompt :

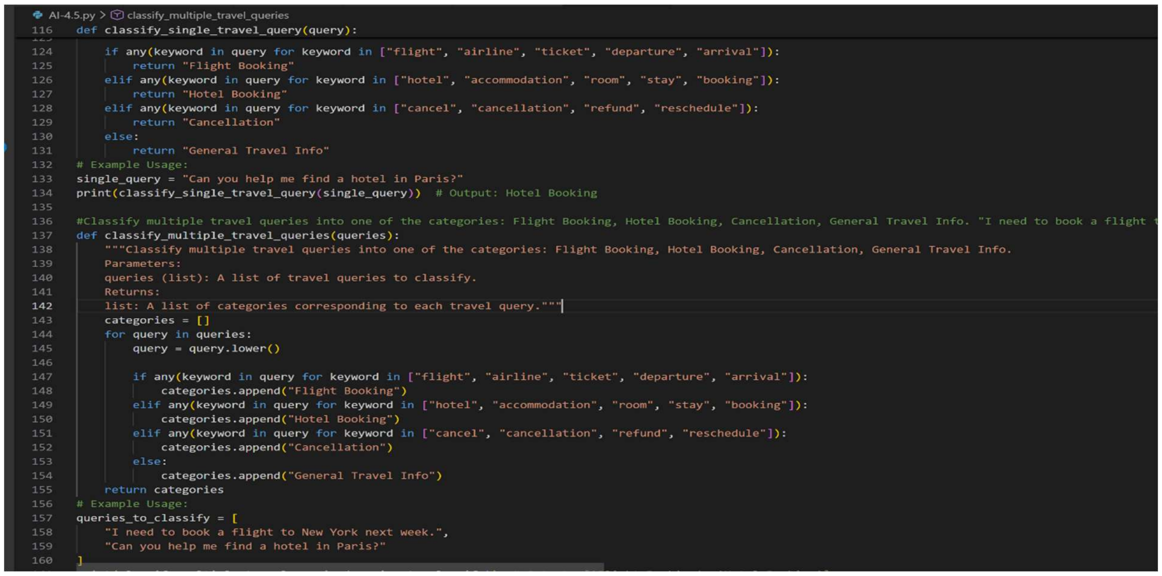
A travel assistant must classify queries into Flight Booking, Hotel Booking, Cancellation, or General Travel Info. Tasks: a. Prepare labeled travel queries.

Classify the travel query into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "I need to book a flight to New York next week.",

Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "I need to book a flight to New York next week.", "Can you help me find a hotel in Paris?"

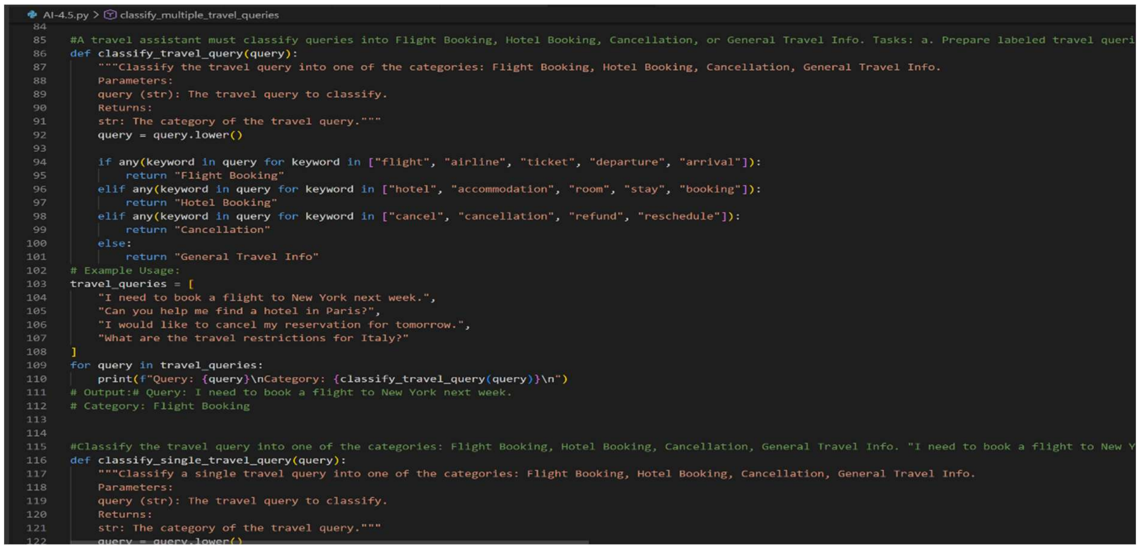
Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "Can you help me find a hotel in Paris?""I would like to cancel my reservation for tomorrow.","What are the travel restrictions for Italy?""

Code:



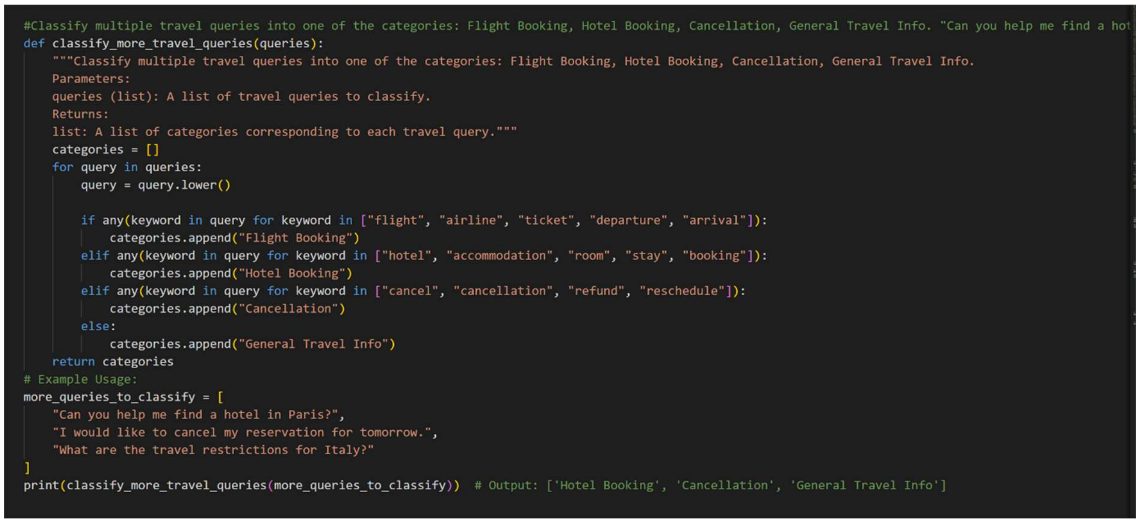
AI-4.5.py > classify_multiple_travel_queries

```python
def classify_single_travel_query(query):
    if any(keyword in query for keyword in ["flight", "airline", "ticket", "departure", "arrival"]):
        return "Flight Booking"
    elif any(keyword in query for keyword in ["hotel", "accommodation", "room", "stay", "booking"]):
        return "Hotel Booking"
    elif any(keyword in query for keyword in ["cancel", "cancellation", "refund", "reschedule"]):
        return "Cancellation"
    else:
        return "General Travel Info"
# Example Usage:
single_query = "Can you help me find a hotel in Paris?"
print(classify_single_travel_query(single_query))  # Output: Hotel Booking

#Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "I need to book a flight
def classify_multiple_travel_queries(queries):
    """Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info.
    Parameters:
    queries (list): A list of travel queries to classify.
    Returns:
    list: A list of categories corresponding to each travel query."""
    categories = []
    for query in queries:
        query = query.lower()

        if any(keyword in query for keyword in ["flight", "airline", "ticket", "departure", "arrival"]):
            categories.append("Flight Booking")
        elif any(keyword in query for keyword in ["hotel", "accommodation", "room", "stay", "booking"]):
            categories.append("Hotel Booking")
        elif any(keyword in query for keyword in ["cancel", "cancellation", "refund", "reschedule"]):
            categories.append("Cancellation")
        else:
            categories.append("General Travel Info")
    return categories
# Example Usage:
queries_to_classify = [
    "I need to book a flight to New York next week.",
    "Can you help me find a hotel in Paris?"
]
```



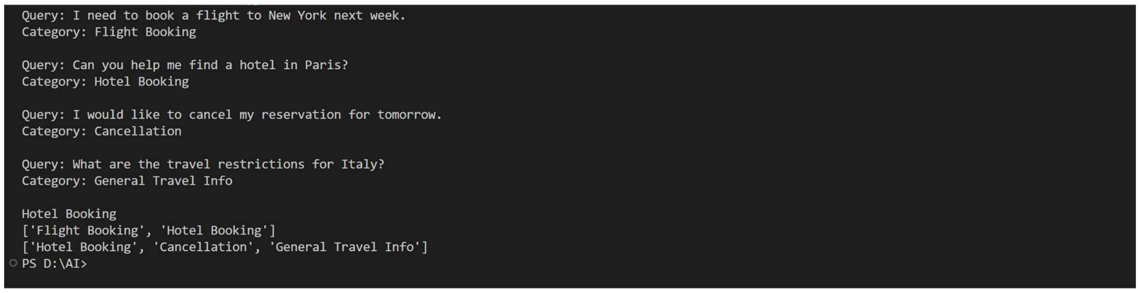
AI-4.5.py > classify_multiple_travel_queries

```python
#A travel assistant must classify queries into Flight Booking, Hotel Booking, Cancellation, or General Travel Info. Tasks: a. Prepare labeled travel queri
def classify_travel_query(query):
    """Classify the travel query into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info.
    Parameters:
    query (str): The travel query to classify.
    Returns:
    str: The category of the travel query."""
    query = query.lower()

    if any(keyword in query for keyword in ["flight", "airline", "ticket", "departure", "arrival"]):
        return "Flight Booking"
    elif any(keyword in query for keyword in ["hotel", "accommodation", "room", "stay", "booking"]):
        return "Hotel Booking"
    elif any(keyword in query for keyword in ["cancel", "cancellation", "refund", "reschedule"]):
        return "Cancellation"
    else:
        return "General Travel Info"
# Example Usage:
travel_queries = [
    "I need to book a flight to New York next week.",
    "Can you help me find a hotel in Paris?",
    "I would like to cancel my reservation for tomorrow.",
    "What are the travel restrictions for Italy?"
]
for query in travel_queries:
    print(f"Query: {query}\nCategory: {classify_travel_query(query)}\n")
# Output:# Query: I need to book a flight to New York next week.
# Category: Flight Booking


#Classify the travel query into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "I need to book a flight to New Y
def classify_single_travel_query(query):
    """Classify a single travel query into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info.
    Parameters:
    query (str): The travel query to classify.
    Returns:
    str: The category of the travel query."""
    query = query.lower()
```



```python
#Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info. "Can you help me find a hot
def classify_more_travel_queries(queries):
    """Classify multiple travel queries into one of the categories: Flight Booking, Hotel Booking, Cancellation, General Travel Info.
    Parameters:
    queries (list): A list of travel queries to classify.
    Returns:
    list: A list of categories corresponding to each travel query."""
    categories = []
    for query in queries:
        query = query.lower()

        if any(keyword in query for keyword in ["flight", "airline", "ticket", "departure", "arrival"]):
            categories.append("Flight Booking")
        elif any(keyword in query for keyword in ["hotel", "accommodation", "room", "stay", "booking"]):
            categories.append("Hotel Booking")
        elif any(keyword in query for keyword in ["cancel", "cancellation", "refund", "reschedule"]):
            categories.append("Cancellation")
        else:
            categories.append("General Travel Info")
    return categories
# Example Usage:
more_queries_to_classify = [
    "Can you help me find a hotel in Paris?",
    "I would like to cancel my reservation for tomorrow.",
    "What are the travel restrictions for Italy?"
]
print(classify_more_travel_queries(more_queries_to_classify))  # Output: ['Hotel Booking', 'Cancellation', 'General Travel Info']
```

Output:



```
Query: I need to book a flight to New York next week.
Category: Flight Booking

Query: Can you help me find a hotel in Paris?
Category: Hotel Booking

Query: I would like to cancel my reservation for tomorrow.
Category: Cancellation

Query: What are the travel restrictions for Italy?
Category: General Travel Info

Hotel Booking
['Flight Booking', 'Hotel Booking']
['Hotel Booking', 'Cancellation', 'General Travel Info']
PS D:\AI>
```

Justification:

Travel-related queries often use similar language to express different user intents. Because zero-shot prompting lacks contextual examples, it may misclassify such queries. One-shot prompting improves intent detection by providing a basic reference example. Few-shot prompting further enhances consistency and accuracy by exposing the model to multiple intent patterns. This task highlights the importance of contextual examples in building effective user-facing assistants.

Task 3 Programming Question Type Identification

Scenario:

A coding help chatbot must classify queries into Syntax Error, Logic

Error, Optimization, or Conceptual Question.

Tasks:

a. Prepare coding-related user queries.

b. Perform Zero-shot classification.

c. Perform One-shot classification.

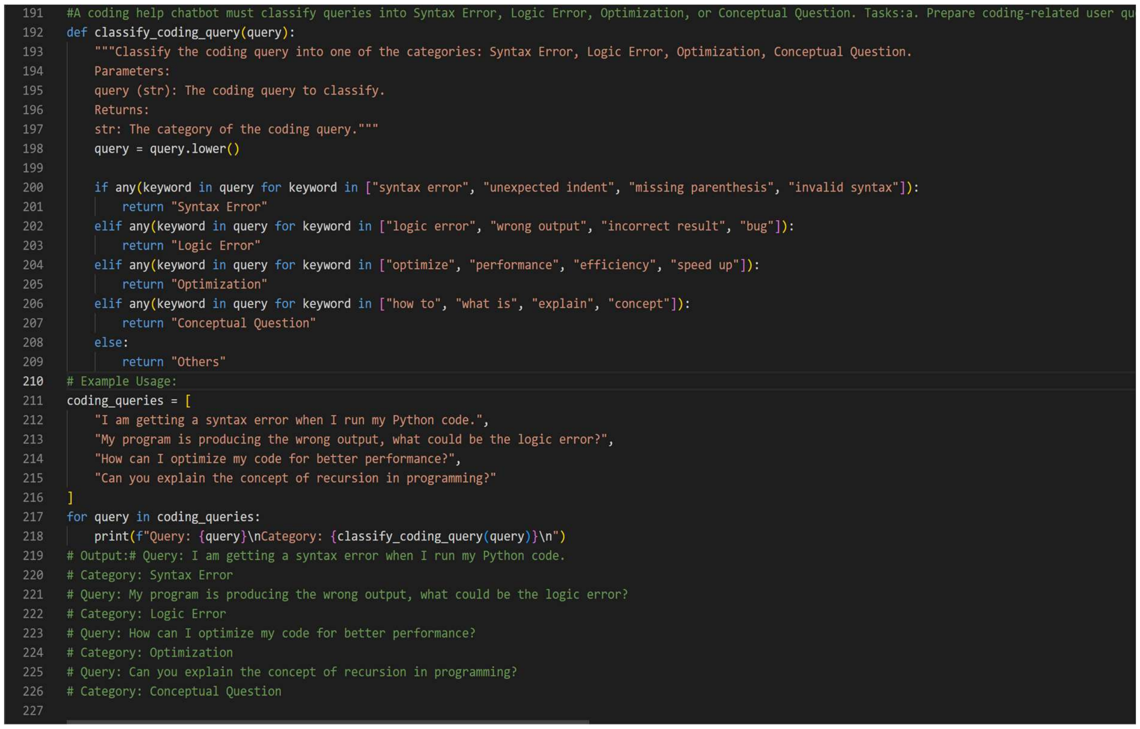
d. Perform Few-shot classification.

e. Analyze improvements in technical accuracy.

Prompt :

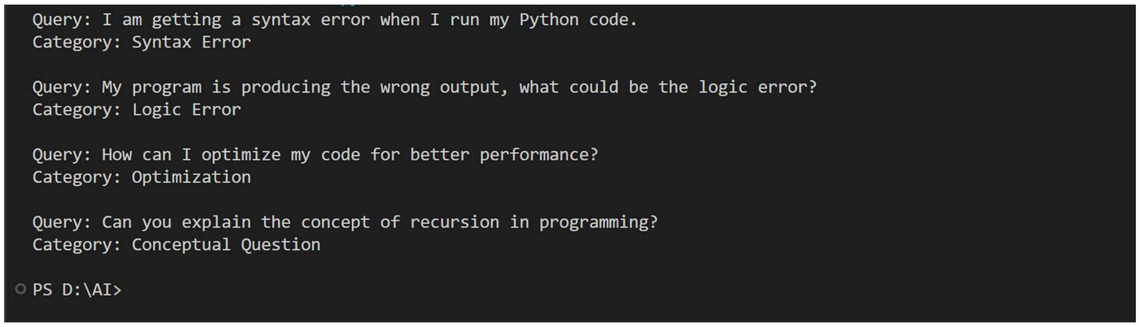
A coding help chatbot must classify queries into Syntax Error, Logic Error, Optimization, or Conceptual Question. Tasks:a. Prepare coding-related user queries.b. Perform Zero-shot classification.c. Perform One-shot classification.d. Perform Few-shot classification.

Code:



```python
#A coding help chatbot must classify queries into Syntax Error, Logic Error, Optimization, or Conceptual Question. Tasks:a. Prepare coding-related user qu
def classify_coding_query(query):
    """Classify the coding query into one of the categories: Syntax Error, Logic Error, Optimization, Conceptual Question.
    Parameters:
    query (str): The coding query to classify.
    Returns:
    str: The category of the coding query."""
    query = query.lower()

    if any(keyword in query for keyword in ["syntax error", "unexpected indent", "missing parenthesis", "invalid syntax"]):
        return "Syntax Error"
    elif any(keyword in query for keyword in ["logic error", "wrong output", "incorrect result", "bug"]):
        return "Logic Error"
    elif any(keyword in query for keyword in ["optimize", "performance", "efficiency", "speed up"]):
        return "Optimization"
    elif any(keyword in query for keyword in ["how to", "what is", "explain", "concept"]):
        return "Conceptual Question"
    else:
        return "Others"
# Example Usage:
coding_queries = [
    "I am getting a syntax error when I run my Python code.",
    "My program is producing the wrong output, what could be the logic error?",
    "How can I optimize my code for better performance?",
    "Can you explain the concept of recursion in programming?"
]
for query in coding_queries:
    print(f"Query: {query}\nCategory: {classify_coding_query(query)}\n")
# Output:# Query: I am getting a syntax error when I run my Python code.
# Category: Syntax Error
# Query: My program is producing the wrong output, what could be the logic error?
# Category: Logic Error
# Query: How can I optimize my code for better performance?
# Category: Optimization
# Query: Can you explain the concept of recursion in programming?
# Category: Conceptual Question
```

Output:



```
Query: I am getting a syntax error when I run my Python code.
Category: Syntax Error

Query: My program is producing the wrong output, what could be the logic error?
Category: Logic Error

Query: How can I optimize my code for better performance?
Category: Optimization

Query: Can you explain the concept of recursion in programming?
Category: Conceptual Question

PS D:\AI>
```

Justification :

Programming-related queries require strong technical and contextual understanding. Zero-shot prompting may confuse syntax-related and logic-related issues due to the absence of examples. One-shot prompting provides initial guidance to the model. Few-shot prompting significantly improves technical accuracy by exposing the model to multiple coding scenarios. This demonstrates how examples enhance domain-specific query classification.

Task 4. Social Media Post Categorization

Scenario:

A social media analytics tool must classify posts into Promotion,

Complaint, Appreciation, or Inquiry.

Tasks:

1. Prepare sample social media posts.

2. Use Zero-shot prompting.

3. Use One-shot prompting.

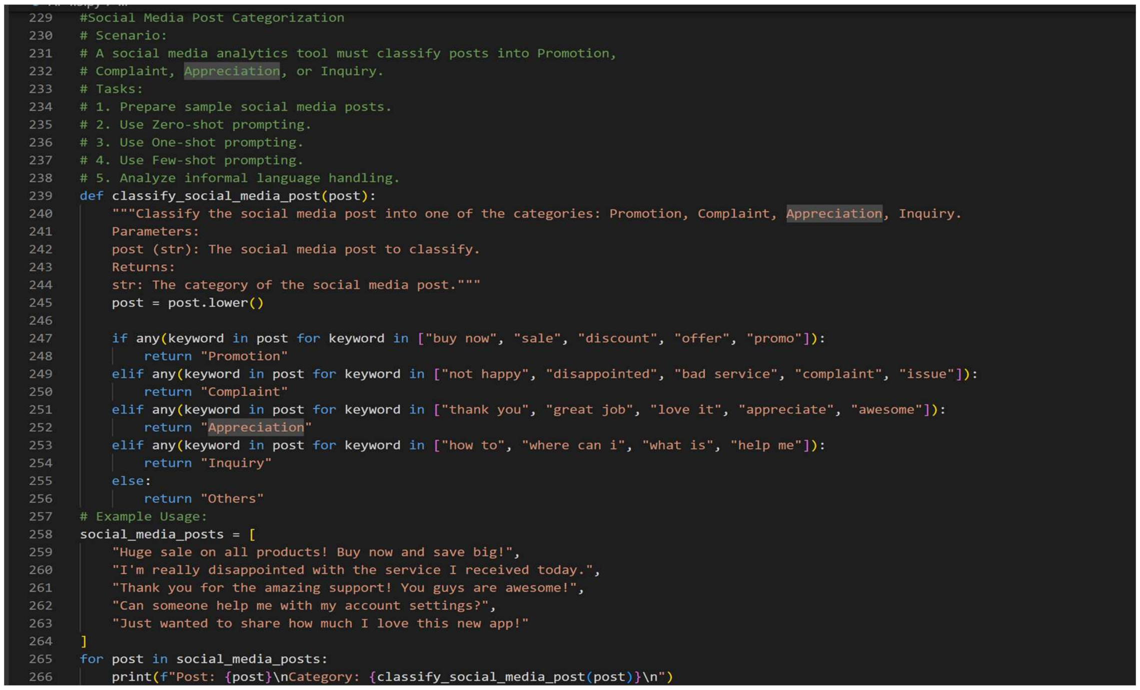
4. Use Few-shot prompting.

5. Analyze informal language handling.

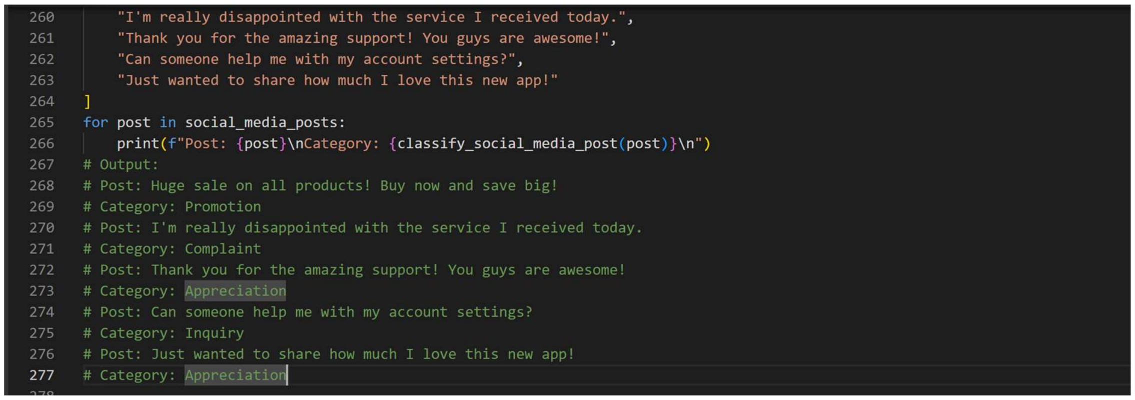
Prompt :

Social Media Post Categorization, A social media analytics tool must classify posts into Promotion, Complaint, Appreciation, or Inquiry. 1. Prepare sample social media posts. 2. Use Zero-shot prompting. 3. Use One-shot prompting. 4. Use Few-shot prompting.5. Analyze informal language handling.

Code:



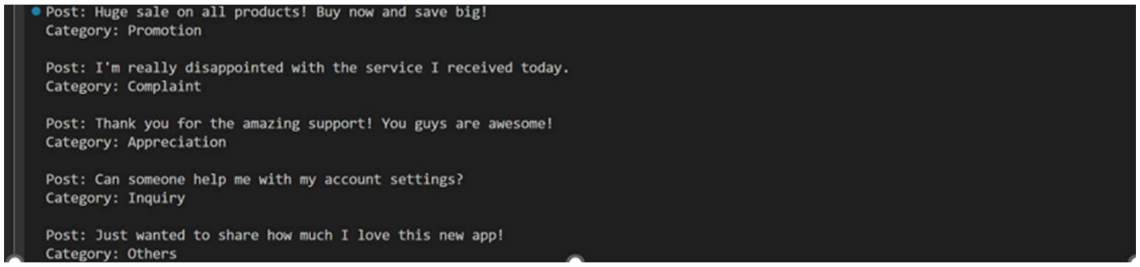
```python
#Social Media Post Categorization
# Scenario:
# A social media analytics tool must classify posts into Promotion,
# Complaint, Appreciation, or Inquiry.
# Tasks:
# 1. Prepare sample social media posts.
# 2. Use Zero-shot prompting.
# 3. Use One-shot prompting.
# 4. Use Few-shot prompting.
# 5. Analyze informal language handling.
def classify_social_media_post(post):
    """Classify the social media post into one of the categories: Promotion, Complaint, Appreciation, Inquiry.
    Parameters:
    post (str): The social media post to classify.
    Returns:
    str: The category of the social media post."""
    post = post.lower()

    if any(keyword in post for keyword in ["buy now", "sale", "discount", "offer", "promo"]):
        return "Promotion"
    elif any(keyword in post for keyword in ["not happy", "disappointed", "bad service", "complaint", "issue"]):
        return "Complaint"
    elif any(keyword in post for keyword in ["thank you", "great job", "love it", "appreciate", "awesome"]):
        return "Appreciation"
    elif any(keyword in post for keyword in ["how to", "where can i", "what is", "help me"]):
        return "Inquiry"
    else:
        return "Others"
# Example Usage:
social_media_posts = [
    "Huge sale on all products! Buy now and save big!",
    "I'm really disappointed with the service I received today.",
    "Thank you for the amazing support! You guys are awesome!",
    "Can someone help me with my account settings?",
    "Just wanted to share how much I love this new app!"
]
for post in social_media_posts:
    print(f"Post: {post}\nCategory: {classify_social_media_post(post)}\n")
```



```python
    "I'm really disappointed with the service I received today.",
    "Thank you for the amazing support! You guys are awesome!",
    "Can someone help me with my account settings?",
    "Just wanted to share how much I love this new app!"
]
for post in social_media_posts:
    print(f"Post: {post}\nCategory: {classify_social_media_post(post)}\n")
```

```python
# Output:
# Post: Huge sale on all products! Buy now and save big!
# Category: Promotion
# Post: I'm really disappointed with the service I received today.
# Category: Complaint
# Post: Thank you for the amazing support! You guys are awesome!
# Category: Appreciation
# Post: Can someone help me with my account settings?
# Category: Inquiry
# Post: Just wanted to share how much I love this new app!
# Category: Appreciation
```

Output:



```
Post: Huge sale on all products! Buy now and save big!
Category: Promotion

Post: I'm really disappointed with the service I received today.
Category: Complaint

Post: Thank you for the amazing support! You guys are awesome!
Category: Appreciation

Post: Can someone help me with my account settings?
Category: Inquiry

Post: Just wanted to share how much I love this new app!
Category: Others
```

Justification:

Social media posts often contain informal language, slang, and emojis, making tone and intent harder to interpret. Zero-shot prompting may struggle to classify such content accurately. One-shot prompting provides limited improvement by offering a basic reference.

Few-shot prompting handles informal and unstructured expressions more effectively. This task demonstrates the importance of examples in understanding unstructured text.