Assignment 4.4 AI ASSISTED CODING

Question 1:Sentiment Classification for Customer Reviews Scenario:

An e-commerce platform wants to analyze customer reviews and automatically classify them as **Positive, Negative, or Neutral**.
This is done using **prompt engineering techniques** with a Large Language Model, without training a separate model.

A): Prepare Customer Reviews with Sentiment Labels

Review No.	Customer Review	Sentiment
R1	"The product quality is excellent and delivery was very fast."	Positive
R2	"I am very happy with the customer support service."	Positive
R3	"The item is average and works as expected."	Neutral
R4	"Not bad, but the packaging could be better."	Neutral
R5	"The product stopped working after two days."	Negative
R6	"Worst experience ever, completely disappointed."	Negative

B): Zero-Shot Prompt Design

```
Classify the sentiment of the following customer review as Positive,
Negative, or Neutral.

Review: "The product quality is excellent and delivery was very fast."
Sentiment:
```

Example Output: Positive

Explanation:

- No examples are given.

- The model relies only on its pre-trained knowledge.
- Works well for **clear and strong sentiments**.
- May struggle with **neutral or mixed reviews**.

C): One-Shot Prompt Design

Classify the sentiment of customer reviews as Positive, Negative, or Neutral.

Example:

Review: "I am unhappy with the service."

Sentiment: Negative

Now classify this review:

Review: "The item is average and works as expected."

Sentiment:

Example Output: Neutral

Explanation

- One labeled example is provided.
- Helps the model understand the expected format.
- Slightly improves accuracy compared to Zero-shot.
- Still limited in handling ambiguous cases.

D): Few-Shot Prompt Design

```
You are a sentiment classification system.
Classify each review as Positive, Negative, or Neutral.

Examples:
```

```
Review: "The product quality is excellent."
Sentiment: Positive

Review: "The item is okay, nothing special."
Sentiment: Neutral

Review: "Very disappointed with the service."
Sentiment: Negative

Now classify this review:
Review: "Not bad, but the packaging could be better." Sentiment:
```

Example Output:Neutral

Explanation

- Multiple labeled examples are provided.
- The model learns distinctions between all sentiment classes.
- Significantly reduces confusion between Neutral and Negative.
- Produces the **most consistent and accurate results**.

E): Comparison of Prompting Techniques

Prompt Type	Examples Given	Accuracy	Handles Neutral Well	Reliability
Zero-Shot	None	Medium	No	Medium
One-Shot	1	Good	Partially	Good
Few-Shot	3 or more	High	Yes	Very High

Conclusion

- **Zero-Shot prompting** is simple but less reliable for ambiguous reviews.
- **One-Shot prompting** improves understanding but is still limited.
- **Few-Shot prompting** provides context through multiple examples, leading to **higher accuracy and better sentiment distinction**.

Task 2: Email Priority Classification:

Scenario:

A company wants to classify incoming emails into **High, Medium, or Low Priority** using prompt engineering.

A): Sample Email Messages

Email	Content	Priority
E1	Server is down and users cannot access the system.	High
E2	Payment failure issue needs immediate help.	High
E3	Share the project progress report by tomorrow.	Medium
E4	Request to reschedule a meeting.	Medium
E5	Thank you for your support.	Low
E6	Subscribing to the company newsletter.	Low

Explanation: Sample emails are manually created to demonstrate priority classification. **B):**

Zero-Shot Prompt:

Classify the following email as High Priority, Medium Priority, or Low Priority.

Email: "Server is down and users cannot access the system."

Priority:

Explanation: Zero-shot prompting classifies emails without using any prior examples.

C): One-Shot Prompt:

Classify emails into High, Medium, or Low Priority.

Example:

Email: "The server is down and needs immediate attention."

Priority: High

Now classify:

Email: "Share the project progress report by tomorrow."

Priority: Medium

Explanation: One-shot prompting uses a single example to guide classification. **D): Few-Shot Prompt:**

You are an AI assistant that classifies email priority.

Examples:

Email: "The server is down and affecting all users."

Priority: High

Email: "Please review the document by tomorrow."

Priority: Medium

Email: "Thank you for your support."

Priority: Low

Now classify:

Email: "Payment failure issue needs urgent help."

Priority:High

Explanation: Few-shot prompting uses multiple examples to improve accuracy and consistency.

E) Comparison of Prompting Techniques:

Prompt Type	**Accuracy**	**Reliability**
Zero-Shot	Medium	Medium
One-Shot	Good	Good
Few-Shot	High	Very High

Explanation: Few-shot prompting performs better due to contextual examples.

Conclusion

Few-shot prompting is the most suitable technique because it provides clear context for all priority levels and produces reliable results.

Question 3: Student Query Routing System

Scenario

A university chatbot must route student queries to the correct department: Admissions, Exams, Academics, or Placements.

A) Prepare Sample Student Queries

Query No.	Student Query	Department
Q1	What is the last date to apply for B.Tech?	Admissions
Q2	How can I apply for hostel admission?	Admissions
Q3	When will the semester exam results be announced?	Exams
Q4	I missed my exam, how can I apply for revaluation?	Exams
Q5	What subjects are included in the AI syllabus?	Academics
Q6	Which companies are visiting for campus placements?	Placements

Explanation: Sample student queries are manually created to demonstrate department routing.

B): Zero-Shot Prompt:

Classify the following student query into one department:

Admissions, Exams, Academics, or Placements.

Query: "When will the semester exam results be announced?" Department:

Output:

Department: Exams

Explanation: Zero-shot prompting classifies the query without providing any examples. **C):**

One-Shot Prompt:

Classify student queries into Admissions, Exams, Academics, or Placements.

Example:

Query: "What is the last date to apply for B.Tech?"

Department: Admissions

Now classify:

Query: "Which companies are visiting for campus placements?"

Department:

Output:

```
Department: Placements
```

Explanation: One-shot prompting uses one example to guide the model’s decision.

D) Few-Shot Prompt:

```
You are a university chatbot that routes student queries.
Examples:
Query: "How do I apply for B.Tech admission?"
Department: Admissions
Query: "When will the exam results be released?"
Department: Exams
Query: "What subjects are taught in Data Structures?"
```

```
Department: Academics
Query: "What companies are coming for campus placements?"
Department: Placements Now classify:
Query: "I missed my exam, how can I apply for revaluation?"
Department: Output
Department: Exams
```

Explanation: Few-shot prompting improves accuracy by providing multiple contextual examples.

E)Comparison of Prompting Techniques:

Prompt Type	Accuracy	Reliability
Zero-Shot	Medium	Medium
One-Shot	Good	Good
Few-Shot	High	Very High

Explanation: Few-shot prompting performs best due to clear examples for each department.

Conclusion:

Few-shot prompting is the most suitable technique because it reduces ambiguity and provides the highest classification accuracy.

Question 4: Chatbot Question Type Detection

Scenario

A chatbot must identify whether a user query is Informational, Transactional, Complaint, or Feedback.

A)Prepare Sample Chatbot Queries:

Query No.	User Query	Question Type
Q1	What are your customer support working hours?	Informational
Q2	How can I reset my account password?	Informational
Q3	I want to cancel my subscription.	Transactional
Q4	Please update my delivery address.	Transactional

Q5	Your service is very slow and disappointing.	Complaint
Q6	The app interface is very user-friendly and helpful.	Feedback

Explanation: Sample queries are created to demonstrate different chatbot question types.

B) Zero-Shot Prompt

```
Classify the following query as Informational, Transactional,
Complaint, or Feedback.
Query: "Your service is very slow and disappointing."
Type:
```

Output

```
Type: Complaint
```

Explanation: Zero-shot prompting classifies the query without providing any examples. **c)**

One-Shot Prompt:

```
Classify chatbot queries into Informational, Transactional, Complaint,
or Feedback.
Example:
Query: "What are your working hours?"
Type: Informational Now classify:
Query: "I want to cancel my subscription." Type:
```

Output

`Type: Transactional` **Explanation:** One-shot prompting uses a single example to guide classification.

D)Few-Shot Prompt:

```
You are a chatbot that identifies the type of user queries.
Examples:
Query: "What are your customer support hours?"
Type: Informational
Query: "Please update my delivery address."
Type: Transactional
Query: "Your service is very slow."
Type: Complaint
```

```
Query: "The app is very easy to use."
Type: Feedback Now classify:
Query: "How can I reset my account password?" Type:
```

Output

```
Type: Informational
```

Explanation: Few-shot prompting improves accuracy by providing examples for all query types.

E) Testing on Unseen Query:

Query

`"I am unhappy with the recent update of your application."` **Output:**

```
Type: Complaint
```

Explanation: Few-shot prompting handles ambiguous queries more accurately.

F) Comparison of Prompting Techniques:

Prompt Type	Accuracy	Ambiguity Handling
Zero-Shot	Medium	Low
One-Shot	Good	Medium
Few-Shot	High	Very High

Explanation: Few-shot prompting reduces ambiguity by using multiple contextual examples.

Conclusion:

Few-shot prompting is the most suitable technique because it provides better clarity, accuracy, and ambiguity handling.