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**LENDI INSTITUTE OF
ENGINEERING & TECHNOLOGY**

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III B.TECH – I SEM | R23 REGULATION

PROMPT ENGINEERING

LABORATORY MANUAL

Design Better Prompts. Build Smarter AI Solutions.

PROMPT

- Role
- Task
- Context
- Constraints
- Format

RESPONSE

- ✓ Accurate
- ✓ Relevant
- ✓ Structured
- ✓ Contextual
- ✓ Useful

Text
Generation

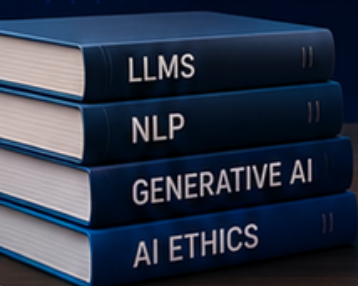
Summarization

Code
Generation

Translation

Data
Analysis

Chat &
Dialogue



Prepared by
**DEPARTMENT OF
COMPUTER SCIENCE & SYSTEMS ENGINEERING**

ACADEMIC YEAR 2026-2027



LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY

An Autonomous Institution

Approved by AICTE & Permanently Affiliated to JNTUGV, Vizianagaram

Accredited by NAAC with "A" Grade and NBA

Jonnada (Village), Denkada (Mandal), Vizianagaram Dist – 535005

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LAB MANUAL

III B.TECH – I SEM – R23 REGULATION

Prompt Engineering Lab Manual



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INSTITUTE VISION

- Producing globally competent and quality technocrats with human values for the holistic needs of industry and society.

INSTITUTE MISSION

- Creating an outstanding infrastructure and platform for enhancement of skills, knowledge and behaviour of students towards employment and higher studies.
- Providing a healthy environment for research, development and entrepreneurship, to meet the expectations of industry and society.
- Transforming the graduates to contribute to the socio-economic development and welfare of the society through value based education.

DEPARTMENT VISION

- To be a Centre of Excellence to impart the High Quality Education with productive Research and Consultancy in the field of Computer Science and Systems Engineering to globally competent ,highly competitive Professional with Ethical and Human values to serve the society.

DEPARTMENT MISSION

- To impart high quality education with strong foundation of Computer Science and Systems Engineering principles that enables them to meet the challenges in profession/ career.
- To nurture research activities to get patents amongst faculty and students by providing necessary facilities and environment.
- To train the students into effective intrapersonal and communication skills and to develop team spirit, leadership capabilities, integrity and social responsibility with professional ethics and human values.
- To promote internships to students and consultancy works among faculty by enhancing Industry-Institute Interaction.



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PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Ability to grasp the knowledge and expertise to solve all the contemporary issues.

PSO 2: To acquire the knowledge on modern tools to solve hardware and software solutions.

PSO 3: Qualify in national and international competitive examinations for successful higher studies and employment.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1 : Graduates will acquire the knowledge to analyze ,design and developing the new software and hardware products and acquire the skills to grasp the latest tools and techniques.

PEO 2 : Graduates will penetrate to interdisciplinary activities, with professional attitude and ethics, communication ,to work under team and to ability to solve social issues through their Employment, Higher Studies and Research.

PEO 3: Graduates will expose to learn life skills and Intrapersonal development activities to face the dynamically changing technology.



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DEPARTMENT OF COMPUTER SCIENCE & SYSTEMS ENGINEERING

PROGRAM OUTCOMES (POs)

- PO 1 : Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
- PO 2 : Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
- PO 3 : Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
- PO 4 : Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
- PO 5 : Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
- PO 6 : The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
- PO 7 : Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
- PO 8 : Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
- PO 9 : Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
- PO 10 : Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
- PO 11 : Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)



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DEPARTMENT OF COMPUTER SCIENCE & SYSTEMS ENGINEERING

COURSE OUTCOMES

- CO1:** Understand how different prompt formats affect LLM responses.
- CO2:** Design and test prompts using zero-shot, few-shot, and chain-of-thought strategies.
- CO3:** Apply prompts in multiple domains like education, business, healthcare, and software development.
- CO4:** Evaluate prompt responses based on clarity, coherence, and relevance.
- CO5:** Build prompt-based mini tools (e.g., quiz generators, email writers, code assistants).

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Exp. No	Experiment Name	CO Mapped	CO PO Mapping	SDG Mapping
1	Create and compare zero-shot vs. few-shot prompts for a text classification task.	CO 1	PO1, PO2, PO5, PO11, PSO1, PSO2	SDG 4
2	Design a prompt to generate summaries of news articles and optimize it for length and tone.	CO 2	PO2, PO5, PO9, PO11, PSO1, PSO2	SDG 4
3	Create a Q&A chatbot prompt that acts like a history tutor and test it across different grade levels.	CO 2, CO 3	PO2, PO5, PO8, PO9, PSO1, PSO2	SDG 4
4	Build a role-based prompt where the AI acts as a doctor, teacher, or customer service agent.	CO 3	PO5, PO6, PO7, PO9, PSO1, PSO2	SDG 3, SDG 4, SDG 16
5	Write a chain-of-thought prompt to solve a math word problem step-by-step	CO 2	PO1, PO2, PO4, PO5, PSO1, PSO2	SDG 4
6	Create a creative writing assistant prompt for story generation based on user input.	CO 3	PO3, PO5, PO9, PO11, PSO1	SDG 4
7	Develop a prompt to translate informal text to formal or professional email content	CO 3	PO5, PO7, PO9, PSO2	SDG 4, SDG 8
8	Generate Python code from natural language instructions using prompt optimization	CO 5	PO1, PO3, PO5, PO10, PO11, PSO1, PSO2	SDG 4, SDG 9
9	Refine a prompt for safe and bias-free content generation using red-teaming principles.	CO 4	PO2, PO6, PO7, PO9, PSO1	SDG 10, SDG 16
10	Compare responses from ChatGPT and Gemini for the same prompt and analyze differences.	CO 4	PO2, PO4, PO5, PO11, PSO1, PSO2	SDG 4
11	Create a prompt template that can be reused dynamically with user inputs (parameterized prompts).	CO 5	PO3, PO5, PO10, PO11, PSO1, PSO2	SDG 8, SDG 9
12	Mini Project: Build a prompt-based micro-tool such as a quiz maker, resume helper, or report generator.	CO 5	PO3, PO5, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3	SDG 4, SDG 8, SDG 9

CO – PO – PSO MAPPING

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	3	2	-	-	3	-	-	-	-	-	2	3	3	-
CO 2	3	3	-	2	3	-	-	-	-	-	2	3	3	-
CO 3	-	-	3	-	3	2	2	-	3	-	2	3	3	-
CO 4	-	3	-	3	2	2	3	-	2	-	2	3	2	-
CO 5	2	2	3	2	3	-	-	3	2	3	3	3	3	3



CO/PO	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 16
CO 1	-	-	-	3	-	-	-	-	2	-	-	-	-	-	-	-	-
CO 2	-	-	-	3	-	-	-	-	3	-	-	-	-	-	-	-	-
CO 3	-	-	2	3	-	-	-	2	2	-	-	-	-	-	-	-	2
CO 4	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	-	3
CO 5	-	-	-	3	-	-	-	3	3	-	-	-	-	-	-	-	-

For a **Prompt Engineering Laboratory**, it is best to limit the mapping to the most relevant SDGs:

- **SDG 3** – Students develop role-based AI assistants such as healthcare chatbots that promote responsible dissemination of health-related information and improve accessibility to healthcare support.
- **SDG 4** – The course enhances AI literacy by enabling students to design educational prompts, intelligent tutoring systems, quiz generators, summarization tools, and personalized learning assistants, thereby improving the quality of digital education.
- **SDG 8** – Students build AI-powered productivity tools such as resume builders, professional email generators, and workplace assistants that improve employability, workplace efficiency, and digital skills relevant to modern industries.
- **SDG 9** – Students build AI-powered productivity tools such as resume builders, professional email generators, and workplace assistants that improve employability, workplace efficiency, and digital skills relevant to modern industries
- **SDG 10** – Students learn to design fair, inclusive, and bias-aware prompts using responsible AI and red-teaming techniques, encouraging equitable access to AI technologies for diverse user communities.
- **SDG 16** - The course emphasizes ethical AI practices, trustworthy content generation, responsible prompt design, bias mitigation, transparency, and adherence to professional standards for secure and accountable AI systems.

These SDGs are the strongest and most widely accepted mappings for Prompt Engineering laboratory course.

ETHICS OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) has become an integral part of modern society, influencing education, healthcare, finance, transportation, cybersecurity, business, and scientific research. While AI offers significant benefits by improving productivity, automating repetitive tasks, and supporting intelligent decision-making, it also raises important ethical concerns regarding fairness, privacy, transparency, accountability, and responsible use.

As future engineers and AI practitioners, students must understand that developing and using AI systems is not only a technical responsibility but also an ethical one. Ethical AI promotes trust, protects individuals from harm, ensures equal opportunities, and encourages the responsible deployment of AI technologies for the benefit of society.

Prompt Engineering plays a crucial role in ethical AI because the quality and intent of prompts directly influence the responses generated by Large Language Models (LLMs). Well-designed prompts help produce accurate, fair, respectful, and reliable outputs while reducing the risk of harmful, biased, or misleading content.

Ethical Guidelines for Using AI

Students should follow these guidelines while working with AI tools:

- Use AI only for educational, research, and professional purposes.
- Verify AI-generated information before using it in assignments, reports, or projects.
- Do not use AI to generate plagiarized or copied work.
- Respect intellectual property and copyright laws.
- Protect personal and confidential information.
- Avoid generating harmful, offensive, or misleading content.
- Clearly acknowledge AI assistance whenever required by institutional policies.
- Follow professional ethics while designing prompts and using AI-generated outputs.
- Use AI to enhance learning rather than replace critical thinking.
- Continuously improve prompts to obtain accurate and responsible responses.

Responsible Prompt Engineering

A responsible prompt should:

- Clearly define the intended task.
- Use respectful and professional language.
- Avoid discriminatory or biased instructions.
- Request factual and evidence-based information whenever possible.
- Specify appropriate output formats.
- Encourage balanced and objective responses.
- Respect privacy and confidentiality.
- Avoid requests that could cause harm or spread misinformation.

Do's and Don'ts of AI Usage

Do's	Don'ts
Use AI responsibly for learning and research.	Do not submit AI-generated work without review or acknowledgment when required.
Verify important facts using reliable sources.	Do not rely blindly on AI responses.
Write clear and ethical prompts.	Do not create prompts that encourage harmful or illegal activities.
Respect privacy and confidentiality.	Do not share sensitive personal or organizational data.
Use inclusive and respectful language.	Do not generate hateful, abusive, or discriminatory content.
Follow institutional academic integrity policies.	Do not use AI for plagiarism or academic misconduct.

Ethical Use of AI in Education

Artificial Intelligence can support personalized learning, intelligent tutoring, content generation, programming assistance, language translation, and research. However, students should use AI as a learning assistant rather than a replacement for independent thinking. AI-generated solutions should be carefully reviewed, understood, and validated before submission. Responsible use of AI enhances creativity, improves productivity, and develops problem-solving skills while maintaining academic integrity.

Code of Conduct for Prompt Engineering Laboratory

Before using any AI tool in this laboratory, every student should agree to the following principles:

1. I will use AI responsibly and ethically.
2. I will verify AI-generated information before using it.
3. I will respect privacy, confidentiality, and intellectual property.
4. I will not use AI for plagiarism, cheating, or harmful activities.
5. I will design prompts that promote fairness, inclusiveness, and safety.
6. I will use AI as a learning aid while applying my own critical thinking and judgment.
7. I will follow my institution's academic integrity and professional ethics guidelines.

"Artificial Intelligence is most powerful when it complements human intelligence with responsibility, fairness, and ethical decision-making."

EXPERIMENT – 1

LAB : Create and compare zero-shot vs. few-shot prompts for a text classification task.

AIM: To understand the effect of **Zero-Shot** and **Few-Shot Prompting** on the performance of a Large Language Model (LLM) by designing prompts for text classification and comparing their responses based on accuracy, consistency, and reasoning.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand the concept of prompt engineering.
- Differentiate between Zero-Shot and Few-Shot prompting.
- Design effective prompts for text classification.
- Analyze how examples improve LLM performance.
- Compare outputs using evaluation metrics.

SOFTWARE REQUIREMENTS

- ChatGPT / Gemini / Claude / Microsoft Copilot
- Web Browser
- Internet Connection
- Lab Observation Sheet

Introduction to Artificial Intelligence (AI)

Artificial Intelligence (AI) is a branch of computer science that enables machines to perform tasks that normally require human intelligence. These tasks include understanding language, recognizing images, solving problems, making decisions, and learning from data.

Examples of AI applications include:

- Voice assistants (Google Assistant, Siri, Alexa)
- Chatbots (ChatGPT, Gemini)
- Recommendation systems (Netflix, YouTube)
- Self-driving vehicles
- Language translation systems

AI has become an essential technology in education, healthcare, finance, business, cybersecurity, and software development.

What is Generative AI?

Generative AI is a type of Artificial Intelligence capable of creating new content instead of simply analyzing existing information.

It can generate:

- Text
- Images
- Computer programs
- Music
- Videos
- Presentations
- Reports

Unlike traditional AI systems that classify or predict, Generative AI produces original content based on user instructions.

Examples include:

- ChatGPT
- Google Gemini
- Claude AI
- Microsoft Copilot

What is a Large Language Model (LLM)?

A Large Language Model (LLM) is an AI model trained on enormous amounts of text collected from books, articles, websites, research papers, and other publicly available sources.

The model learns:

- Grammar
- Vocabulary
- Writing styles

- Logical reasoning
- Programming languages
- Question answering
- Summarization
- Translation

Instead of searching the internet for every question, an LLM predicts the most appropriate next words based on patterns learned during training.

Popular LLMs include:

- GPT (OpenAI)
- Gemini (Google)
- Claude (Anthropic)
- Llama (Meta)

What is a Prompt?

A **Prompt** is the instruction, question, or command given to an AI model to perform a task.

It acts as communication between the user and the AI system.

Examples

Prompt

`Explain what Machine Learning is.`

Prompt

`Write a Python program to calculate the factorial of a number.`

Prompt

`Summarize the following paragraph in three sentences.`

The quality of the AI response depends greatly on how the prompt is written.

What is Prompt Engineering?

Prompt Engineering is the process of designing, refining, and optimizing prompts so that a Large Language Model produces accurate, relevant, and useful responses.

Instead of asking vague questions, prompt engineering focuses on writing precise instructions that clearly specify:

- What the AI should do
- How the response should be generated
- Desired output format
- Required level of detail
- Role or context

Prompt engineering improves:

- Accuracy
- Consistency
- Relevance
- Creativity
- Reliability

Why is Prompt Engineering Important?

A well-designed prompt enables the AI model to better understand the user's intention.

Benefits include:

- Produces more accurate responses.
- Reduces ambiguity.
- Saves time.
- Improves productivity.
- Generates structured outputs.
- Helps automate repetitive tasks.
- Increases software development efficiency.
- Supports research and learning.

Poorly written prompts often lead to incomplete, incorrect, or irrelevant answers.

Components of an Effective Prompt

An effective prompt generally contains the following components:

a) Task

Specifies what the AI should perform.

Example:

Summarize the article.

b) Context

Provides background information.

Example:

Assume you are a software engineer.

c) Input

The actual data provided to the AI.

Example:

Article:
...

d) Constraints

Specifies limitations.

Example:

- Maximum 100 words
- Use simple English
- Return only the answer

e) Output Format

Defines how the answer should appear.

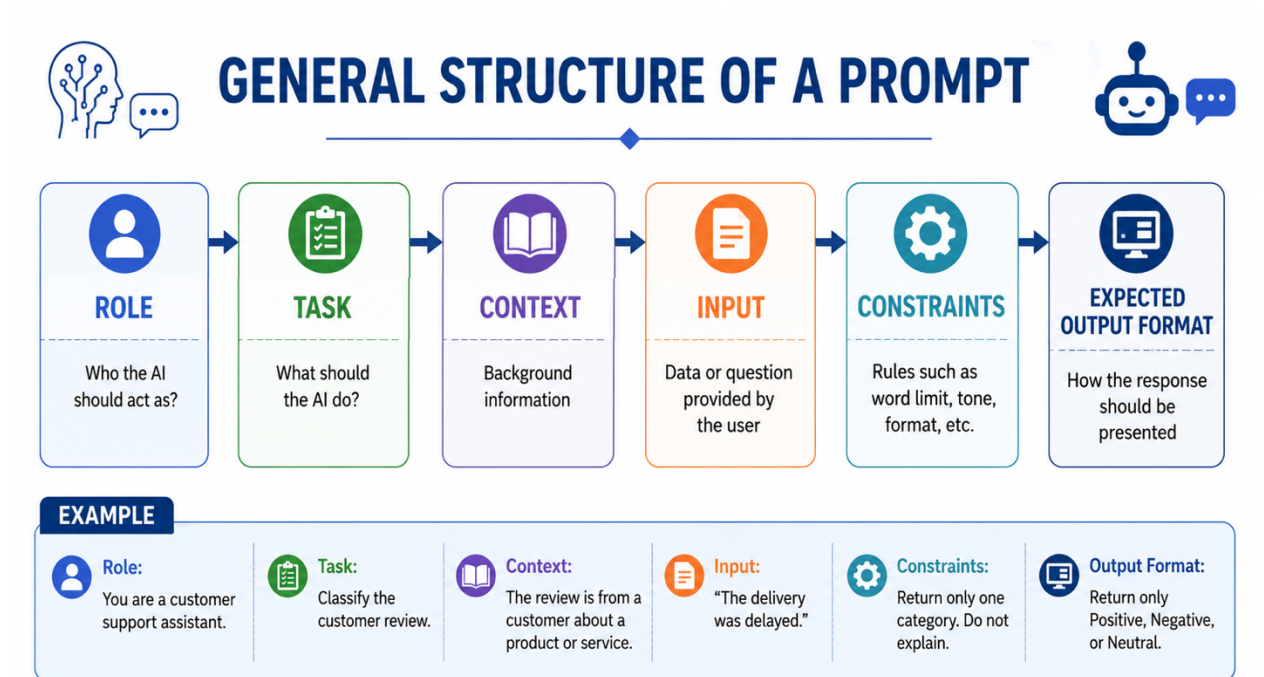
Example:

Return the output in JSON format.

or

Return only the category.

General Structure of a Prompt



Applications of Prompt Engineering

Prompt engineering is widely used in many domains.

Education

- Personalized tutoring
- Quiz generation
- Lesson planning
- Assignment evaluation

Healthcare

- Medical information assistants
- Report summarization
- Clinical documentation

Business

- Email generation
- Customer support
- Market analysis

Software Development

- Code generation
- Debugging
- Documentation
- Test case generation

Research

- Literature review
- Paper summarization
- Data analysis assistance

Prompting Techniques

Different prompting techniques are used depending on the complexity of the task.

Zero-Shot Prompting

The AI receives only the instruction.

No examples are provided.

Example:

`Classify the review as Positive, Negative, or Neutral.`

`Review:`

`"The product is excellent."`

`Return only the category.`

Few-Shot Prompting

The AI receives several examples before solving the task.

Examples help the model understand the expected output.

`Example 1`

`Review:`

`"I love this product."`

`Category:`

`Positive`

Example 2

Review:

"The product stopped working."

Category:

Negative

Now classify:

"The battery lasts only one hour."

Chain-of-Thought Prompting

The AI is instructed to reason through the problem step-by-step before giving the final answer.

Example:

Solve the following problem.

Show each calculation step before giving the final answer.

Text Classification

Text classification is the process of assigning predefined categories to a piece of text.

Common applications include:

- Spam detection
- Sentiment analysis
- News categorization
- Topic classification
- Email filtering
- Customer feedback analysis

Example:

Text	Category
Excellent service	Positive
Delivery was delayed	Negative
Meeting starts tomorrow	Neutral

Zero-Shot vs. Few-Shot Prompting

Feature	Zero-Shot	Few-Shot
Examples Provided	No	Yes
Prompt Length	Short	Longer
Ease of Design	Easy	Moderate
Accuracy	Moderate	High
Consistency	Moderate	High
Suitable For	Simple Tasks	Complex Tasks

Advantages of Prompt Engineering

- Improves AI response quality.
- Produces consistent outputs.
- Reduces manual effort.
- Enables task automation.
- Supports rapid software development.
- Enhances decision-making.
- Increases productivity.
- Makes AI systems easier to use.

Limitations

- Results depend on prompt quality.
- Ambiguous prompts may produce incorrect outputs.
- Different AI models may respond differently.
- Very long prompts may increase processing time.
- Responses may occasionally contain factual inaccuracies and should be verified for critical applications.

Summary

Prompt Engineering is a fundamental skill for interacting effectively with Large Language Models. By designing clear, structured, and context-aware prompts, users can significantly improve the quality, accuracy, and usefulness of AI-generated responses. Understanding prompting techniques such as Zero-Shot and Few-Shot prompting provides the foundation for building advanced AI applications in education, healthcare, business, and software engineering.

VIVA QUESTIONS

1. What is Prompt Engineering?
2. Define Zero-Shot Prompting.
3. What is Few-Shot Prompting?
4. What is text classification?
5. Why does Few-Shot prompting generally outperform Zero-Shot prompting?
6. Name two real-world applications of text classification.
7. Which prompting technique requires labeled examples?
8. What is an LLM?
9. What factors influence prompt quality?
10. Mention two advantages of Prompt Engineering.

EXPERIMENT – 2

LAB : Design a prompt to generate summaries of news articles and optimize it for length and tone.

AIM :

To design an effective prompt that generates concise summaries of news articles and optimize the prompt for desired length and tone.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand prompt engineering principles.
- Design prompts for text summarization.
- Control summary length using prompt instructions.
- Modify the writing tone according to user requirements.
- Compare outputs generated using different prompts.

Problem Statement

Given a news article, generate a summary that captures the most important information while controlling:

- Summary Length
- Writing Tone
- Target Audience

Step 1: Understand the Task

Input

A news article.

Output

A concise summary containing the key information.

Step 2: Create a Basic Prompt

Prompt

Summarize the following news article.

City launches electric buses to improve public transport

The municipal government of Hyderabad introduced a new fleet of 150 electric buses on Monday as part of its sustainable transportation initiative. Officials stated that the buses will operate on major city routes and are expected to reduce fuel consumption and air pollution.

The project was launched in partnership with a public transport corporation and a renewable energy company. According to city authorities, the buses are equipped with modern safety features, GPS tracking, and charging systems designed for efficient daily operation.

Transportation experts noted that the initiative could encourage more residents to use public transport instead of private vehicles. The government also announced plans to expand the electric bus fleet over the next two years if the initial phase is successful.

Residents welcomed the move, although some commuters expressed concerns about route coverage and charging infrastructure. City officials said additional charging stations would be installed to support the expansion.

Observation

The AI generates a general summary but:

- Length is uncontrolled
- Tone is generic
- Important points may vary

Step 3: Improve the Prompt

Specify the summary length.

Prompt

Summarize the following news article in approximately 100 words.

Article:

The Hyderabad municipal government has introduced 150 electric buses to promote sustainable and eco-friendly public transportation. The initiative aims to reduce fuel consumption, lower air pollution, and encourage citizens to shift from private vehicles to public transport. The buses are equipped with advanced safety features, GPS tracking, and fast-charging technology to improve operational efficiency and passenger convenience. The project was developed in collaboration with a public transport corporation and a renewable energy company. Officials plan to expand the fleet over the next two years based

on its success. While residents have welcomed the initiative, concerns remain regarding charging infrastructure and route coverage.

Improvement

- Better control over summary size.
- More concise output.

Step 4: Optimize the Tone

Specify the desired writing style.

Prompt

Summarize the following news article in about 100 words.

Use a formal and neutral tone.

Highlight only the important facts.

Article:

The Hyderabad municipal government has launched a fleet of 150 electric buses to strengthen sustainable public transportation and reduce fuel consumption and air pollution. The buses will operate on major city routes and are equipped with GPS tracking, modern safety systems, and fast-charging technology. The initiative was implemented in partnership with a public transport corporation and a renewable energy company. According to officials, the project aims to increase public transport usage and decrease reliance on private vehicles. The government intends to expand the fleet over the next two years based on the success of the initial phase, while addressing concerns related to charging infrastructure and route coverage.

Result

- Professional writing
- Objective summary
- No unnecessary opinions

Step 5: Optimize for Target Audience

Prompt

Summarize the following news article in 80–100 words.

Use simple language suitable for high school students.

Maintain a neutral tone.

Focus on the key facts.

Article:

The Hyderabad government has introduced 150 electric buses to improve public transportation and reduce air pollution. The buses will operate on major routes and use rechargeable batteries instead of diesel, making them more environmentally friendly. They are equipped with GPS tracking, safety features, and fast-charging technology. The project was developed with support from a public transport corporation and a renewable energy company. Officials hope the buses will encourage more people to use public transport and reduce traffic. If successful, the government plans to expand the fleet over the next two years. Residents have generally welcomed the initiative.

Result :

- Easier to understand
- Reader-friendly
- Clear language

Step 6: Add Formatting Instructions**Prompt**

Summarize the following news article.

Requirements:

- Maximum 100 words
- Neutral tone
- Mention the main event
- Mention the people or organizations involved
- Mention the impact
- Write in one paragraph

Article:**Sample News Article****Government launches National Digital Education Initiative**

The Ministry of Education has launched the National Digital Education Initiative to improve access to quality learning resources for students across the country. The program introduces free online courses, interactive digital textbooks, and AI-powered learning tools for schools and colleges. The initiative is being implemented in collaboration with the National Informatics Centre (NIC) and leading educational technology partners. Officials stated that the project aims to enhance digital literacy, support teachers with modern

teaching resources, and reduce educational disparities between urban and rural areas. The first phase will benefit over one million students, with nationwide expansion planned over the next three years.

Expected Output

*The **Ministry of Education** has launched the **National Digital Education Initiative** to improve access to quality education through free online courses, digital textbooks, and AI-powered learning tools. The program is being implemented in collaboration with the **National Informatics Centre (NIC)** and educational technology partners. The initiative aims to enhance digital literacy, provide modern teaching resources, and reduce the education gap between urban and rural areas. The first phase is expected to benefit more than one million students, with plans to expand the program nationwide over the next three years.*

Result

- Structured summaries
- Consistent outputs
- Better readability

Step 7: Final Optimized Prompt

You are an expert news editor.

Summarize the following news article using these guidelines:

- Length: 80–100 words
- Tone: Formal, objective, and neutral
- Include:
 - Main event
 - Key people or organizations
 - Important facts
 - Outcome or impact
- Avoid unnecessary details and repetition.
- Write the summary in one well-structured paragraph.

Article:

Sample Input

Government Launches National Digital Education Initiative

The Ministry of Education has introduced the National Digital Education Initiative to improve access to quality education through digital technology. The program provides free online courses, interactive e-books, virtual laboratories, and AI-powered learning tools for students and teachers. The initiative is being implemented in collaboration with the National Informatics Centre (NIC), state education departments, and leading educational technology companies. During the launch event, the Education Minister stated that the project aims to strengthen digital literacy, improve teaching quality, and provide equal learning opportunities for students in both urban and rural areas. The first phase will cover approximately one million students from government schools and colleges. Authorities also announced plans to expand the program nationwide over the next three years while continuously upgrading the digital learning platform based on user feedback.

Sample Output

Government Launches National Digital Education Initiative

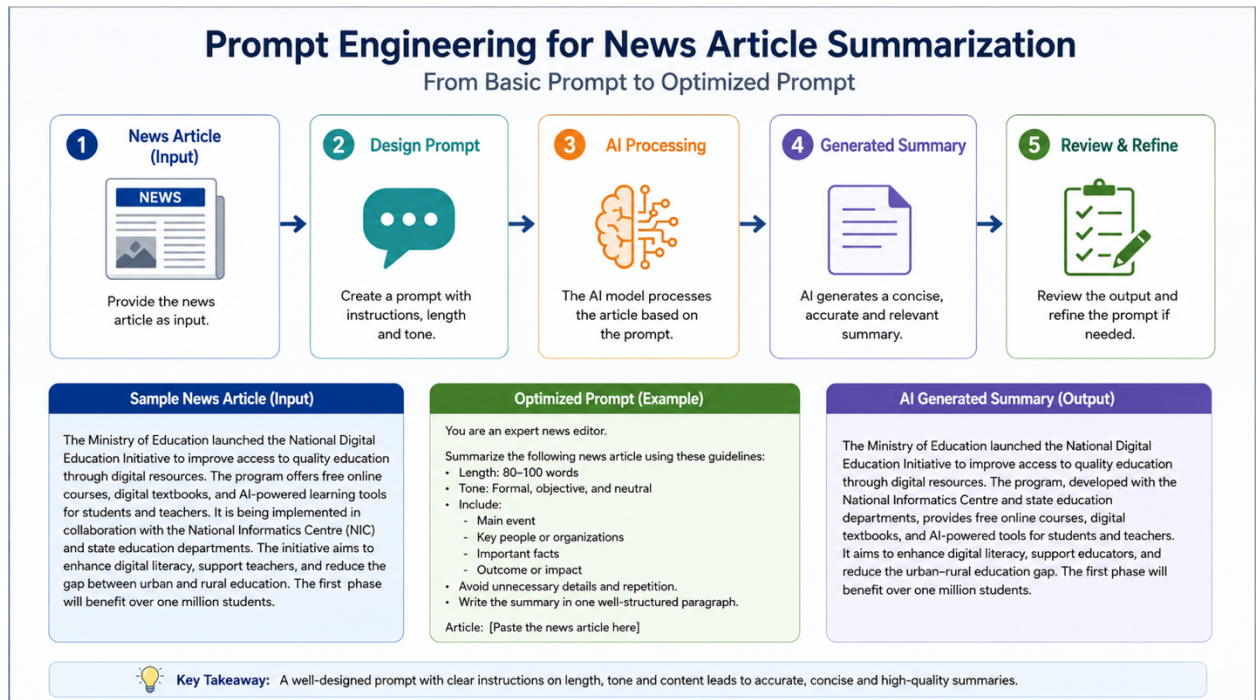
*The **Ministry of Education** has launched the **National Digital Education Initiative** to improve access to quality education through digital learning resources. Implemented in collaboration with the **National Informatics Centre (NIC)**, state education departments, and educational technology partners, the program offers free online courses, interactive e-books, virtual laboratories, and AI-powered learning tools. The initiative aims to strengthen digital literacy, enhance teaching quality, and provide equal educational opportunities across urban and rural regions. Its first phase will benefit approximately one million students, with nationwide expansion planned over the next three years, supporting broader access to technology-enabled education.*

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic summarization	General summary
V2	Word limit	Controlled length
V3	Tone specification	Professional writing
V4	Audience specification	Improved readability
V5	Formatting rules	Consistent structure
V6	Optimized prompt	High-quality, concise, and structured summaries

Result

An optimized prompt was successfully designed to generate concise, structured, and neutral summaries of news articles while controlling both the summary length and writing tone.



Learning Outcomes

Students will be able to:

1. Design prompts for text summarization.
2. Optimize prompts for summary length.
3. Control the tone of AI-generated content.
4. Improve output quality through iterative prompt refinement.
5. Apply prompt engineering techniques to real-world news summarization tasks.

EXPERIMENT – 3

LAB : Create a Q&A chatbot prompt that acts like a history tutor and test it across different grade levels.

AIM :

To design a prompt that enables an AI chatbot to function as a history tutor and evaluate its responses for different educational grade levels.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Design effective prompts for educational chatbots.
- Create AI prompts tailored to different learning levels.
- Modify chatbot responses based on the learner's grade.
- Compare chatbot outputs across multiple educational levels.
- Evaluate the effectiveness of prompt engineering in educational applications.

Step 1: Understand the Task

Input

- History question
- Grade level (Elementary, Middle School, High School)

Output

- Age-appropriate history explanation.

Step 2: Create a Basic Prompt

Prompt

Answer the following history question.

Question:

Who was Ashoka?

Expected Output

Ashoka was one of the greatest rulers of the Maurya Empire in ancient India. After the Kalinga War, he adopted Buddhism and promoted peace, non-violence, and welfare for his people.

Observation

- Correct answer
- Same explanation for everyone
- No adjustment for learner's age

Step 3: Improve the Prompt

Specify the chatbot's role.

Prompt

You are a history tutor.

Answer the following question clearly.

Question:

Who was Ashoka?

Expected Output

Ashoka was a famous emperor of the Maurya Empire who ruled much of India around 250 BCE. After witnessing the suffering caused by the Kalinga War, he embraced Buddhism and encouraged peace, kindness, and good governance.

Improvement

- More educational response
- Better explanation
- Tutor-like interaction

Step 4: Add Grade Level

Prompt

You are a history tutor.

Answer the question for a Grade 5 student.

Use simple words and short sentences.

Question:

Who was Ashoka?

Expected Output (Grade 5)

Ashoka was a king who ruled a large part of India a long time ago. After a big war called the Kalinga War, he realized that fighting caused great suffering. He decided to follow the teachings of Buddha and encouraged people to live peacefully and help others.

Step 5: Test for Different Grade Levels

Prompt

You are a history tutor.

Answer the following question based on the student's grade level.

Question:

Who was Ashoka?

Grade Level: High School

Expected Output (High School)

Ashoka was one of the most influential rulers of the Maurya Empire during the 3rd century BCE. His victory in the Kalinga War led to a profound transformation in his leadership. He adopted Buddhism and promoted the principles of Dharma, non-violence, religious tolerance, and public welfare. His policies significantly influenced Indian history and the spread of Buddhism across Asia.

Step 6: Compare Responses

Grade Level	Response Style	Complexity
Grade 5	Simple words	Basic
Grade 8	Moderate explanation	Intermediate
High School	Detailed explanation	Advanced

Step 7: Final Optimized Prompt

Sample History Question

Question: *Who was Ashoka, and why is he remembered in Indian history?*

Final Optimized Prompt

You are an expert history tutor.

Answer the following history question using these guidelines:

- *Adapt the explanation to the student's grade level.*
- *Use age-appropriate language.*
- *Explain important historical events clearly.*
- *Include significant people, places, and dates where appropriate.*
- *Keep the answer factual, engaging, and easy to understand.*
- *Avoid unnecessary technical terms for lower grades.*
- *End with one interesting historical fact.*

Student Grade: Grade 8

Question: Who was Ashoka, and why is he remembered in Indian history?

Expected Output

*Ashoka was one of the greatest rulers of the Maurya Empire in ancient India. He is remembered because, after the Kalinga War around 261 BCE, he realized the suffering caused by war and chose the path of peace. He became a follower of Buddhism and encouraged kindness, religious tolerance, and good governance throughout his empire. Ashoka built pillars and monuments with messages promoting moral values and public welfare. **Interesting Fact:** The Lion Capital of Ashoka is the National Emblem of India.*

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic Q&A	General answer
V2	Assign tutor role	Educational explanation
V3	Add grade level	Age-appropriate response
V4	Improve clarity	Better learning experience
V5	Optimized prompt	Personalized and engaging tutor

Result

A prompt was successfully designed and optimized to create an AI-based history tutor capable of answering questions according to different grade levels. The optimized prompt produced clear, accurate, and age-appropriate responses, demonstrating how prompt engineering can personalize educational content for diverse learners.

Learning Outcomes

Students will be able to:

1. Design prompts for AI-powered educational chatbots.
2. Customize AI responses for different grade levels.
3. Apply role-based prompt engineering techniques.
4. Evaluate chatbot responses based on clarity and educational suitability.
5. Understand how prompt refinement improves the quality and personalization of AI-generated educational content.

EXPERIMENT – 4

LAB : Build a role-based prompt where the AI acts as a doctor, teacher, or customer service agent.

AIM :

To design and optimize role-based prompts that enable an AI chatbot to respond as a doctor, teacher, or customer service agent according to the assigned role.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand the concept of role-based prompting.
- Design prompts by assigning professional roles to an AI model.
- Compare responses generated for different roles.
- Improve prompt quality using role-specific instructions.
- Evaluate how prompt engineering influences AI behavior.

Step 1: Understand the Task

Input

- User query
- Assigned professional role

Output

- AI response appropriate to the assigned role.

Step 2: Create a Basic Prompt

Prompt

Answer the following question.

Question:

I have a fever and a sore throat. What should I do?

Expected Output

You should drink plenty of fluids, get enough rest, and consult a healthcare professional if your symptoms worsen or continue for several days.

Observation

- General response
- No professional role assigned
- Lacks role-specific communication

Step 3: Assign the AI a Role

Prompt

You are a doctor.

Answer the following question.

Question:

I have a fever and a sore throat. What should I do?

Expected Output

A fever and sore throat may be caused by a viral or bacterial infection. Drink plenty of water, get adequate rest, and take appropriate over-the-counter medication if suitable. If the fever persists for more than two days, becomes severe, or you experience difficulty breathing, consult a healthcare professional immediately for proper diagnosis and treatment.

Improvement

- Professional medical advice
- Appropriate tone
- Role-specific response

Step 4: Test Different Roles

Role 1: Doctor

Prompt

You are a doctor.

Question: I have a fever and a sore throat. What should I do?

Expected Output

Drink plenty of fluids, rest well, and monitor your symptoms. If your fever remains high, lasts more than two days, or you develop difficulty breathing, seek medical attention immediately. A doctor can determine whether further treatment or testing is needed.

Role 2: Teacher

Prompt

You are a teacher.

Question: What is the importance of the water cycle?

Expected Output

The water cycle explains how water moves continuously between the Earth's surface and the atmosphere through evaporation, condensation, precipitation, and collection. It helps maintain fresh water supplies, supports agriculture, and sustains all living organisms.

Role 3: Customer Service Agent

Prompt

You are a customer service agent.

Question: My order has not been delivered yet. Can you help me?

Expected Output

We're sorry for the delay with your order. Please provide your order number so I can check its current status. If the delivery has been delayed beyond the expected date, we will assist you with the appropriate resolution, including a replacement or refund if applicable.

Step 5: Compare Responses

Role	Response Style	Characteristics
Doctor	Professional and informative	Health guidance with safety advice
Teacher	Educational and explanatory	Clear and structured explanation
Customer Service Agent	Polite and solution-oriented	Customer assistance and support

Step 6: Improve the Prompt

Prompt

You are an experienced customer service agent.

Respond politely and professionally.

Show empathy toward the customer's concern.

Clearly explain the next steps.

Question: My order has not been delivered yet. Can you help me?

Expected Output

I'm sorry to hear that your order has not arrived. Please share your order number so I can check the delivery status. If there has been an unexpected delay, we will work to resolve the issue as quickly as possible by arranging a replacement, refund, or updated delivery schedule. Thank you for your patience.

Step 7: Final Optimized Prompt

Sample Query

Customer Query: I received a damaged laptop. How can I get a replacement?

Final Optimized Prompt

You are an expert customer service agent.

Respond to the customer's query using the following guidelines:

- *Be polite, professional, and empathetic.*
- *Clearly understand the customer's issue.*
- *Explain the steps to resolve the problem.*
- *Suggest the appropriate solution.*
- *Keep the response concise and easy to understand.*
- *End with a courteous closing statement.*

Customer Query: I received a damaged laptop. How can I get a replacement?

Expected Output

We sincerely apologize that you received a damaged laptop. Please provide your order number and upload clear photographs of the damaged product. Once we verify the details, we will arrange a replacement or process a refund according to our return policy. Our support team will keep you informed throughout the process. Thank you for your patience, and we appreciate the opportunity to resolve this issue promptly.

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic prompt	General response
V2	Assign professional role	Role-specific response
V3	Test multiple roles	Different communication styles
V4	Add behavioral instructions	More natural interaction
V5	Optimized prompt	Professional, accurate, and user-focused responses

Result

Role-based prompts were successfully designed and tested by assigning the AI the roles of a doctor, teacher, and customer service agent. The optimized prompts generated responses that matched each role's expertise, tone, and communication style, demonstrating the effectiveness of role-based prompt engineering.

Learning Outcomes

Students will be able to:

1. Understand the concept of role-based prompting.
2. Design prompts for different professional roles.
3. Compare AI responses across multiple roles.
4. Optimize prompts to improve response quality.
5. Apply role-based prompt engineering to real-world applications.

EXPERIMENT – 5

LAB : Write a chain-of-thought prompt to solve a math word problem step-by-step.

AIM :

To design and optimize a prompt that enables an AI model to solve mathematical word problems by providing clear step-by-step calculations and the final answer.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand prompt engineering for mathematical problem solving.
- Design prompts for solving math word problems.
- Improve prompts to generate structured solutions.
- Compare responses from basic and optimized prompts.
- Evaluate the effectiveness of prompt refinement.

Step 1: Understand the Task

Input

- Mathematical word problem

Output

- Step-by-step calculations
- Final answer

Step 2: Create a Basic Prompt

Prompt

Solve the following math problem.

Problem:

A train travels 60 km in 1 hour. How far will it travel in 5 hours?

Expected Output

The train travels 60 km every hour.

Distance = Speed $\times$ Time

Distance = 60 $\times$ 5 = 300 km

Answer: 300 km

Observation

- Correct answer
- Limited explanation
- Minimal structure

Step 3: Improve the Prompt

Prompt

Solve the following math problem.

Show all calculations clearly.

Problem:

A train travels 60 km in 1 hour. How far will it travel in 5 hours?

Expected Output

Given:

- Speed = 60 km/hour
- Time = 5 hours

Calculation:

Distance = Speed $\times$ Time

Distance = 60 $\times$ 5

Distance = 300 km

Final Answer: The train travels **300 km**.

Improvement

- Clear calculations
- Better organization
- Easier to understand

Step 4: Add Explanation

Prompt

Solve the following math problem.

Explain each calculation briefly.

Show the final answer separately.

Problem:

A train travels 60 km in 1 hour. How far will it travel in 5 hours?

Expected Output

The train covers 60 km every hour.

Multiply the speed by the total time.

Distance = $60 \times 5 = 300$ km

***Final Answer:** 300 km*

Step 5: Test Another Problem

Prompt

Solve the following problem.

Show calculations step by step.

Problem:

A shopkeeper sells 15 notebooks at ₹40 each.

Find the total amount received.

Expected Output

Given:

- Number of notebooks = 15

- Price per notebook = ₹40

Calculation:

$$\text{Total Amount} = 15 \times 40$$

$$\text{Total Amount} = ₹600$$

Final Answer: ₹600

Step 6: Improve the Prompt Further

Prompt

You are an expert mathematics tutor.

Solve the following problem.

Requirements:

- Identify the given information.
- Show each calculation clearly.
- Briefly explain each step.
- Display the final answer separately.
- Use simple language.

Problem:

A shopkeeper sells 15 notebooks at ₹40 each.

Find the total amount received.

Expected Output

Given:

- Number of notebooks = 15
- Price of each notebook = ₹40

Calculation:

$$\text{Total Amount} = \text{Number} \times \text{Price}$$

$$\text{Total Amount} = 15 \times 40$$

$$\text{Total Amount} = ₹600$$

Therefore, the shopkeeper receives ₹600.

Step 7: Final Optimized Prompt

Sample Problem

Problem: A farmer has 24 baskets with 18 apples in each basket. How many apples does the farmer have altogether?

Final Optimized Prompt

You are an expert mathematics tutor.

Solve the following word problem using these guidelines:

- Identify the given information.
- Choose the appropriate mathematical operation.
- Show all calculations clearly.
- Briefly explain each calculation.
- Present the final answer separately.
- Use simple and easy-to-understand language.

Problem:

A farmer has 24 baskets with 18 apples in each basket. How many apples does the farmer have altogether?

Expected Output

Given:

- Number of baskets = 24
- Apples in each basket = 18

Calculation:

Total Apples = Number of baskets $\times$ Apples per basket

Total Apples = 24×18

Total Apples = 432

Final Answer: The farmer has **432 apples** altogether.

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic prompt	General solution
V2	Show calculations	Better clarity
V3	Explain calculations	Easier understanding
V4	Structured format	Organized solution
V5	Optimized prompt	Clear, accurate, and educational output

Result

A prompt was successfully designed and optimized to solve mathematical word problems by presenting clear calculations, brief explanations, and the final answer. The optimized prompt produced well-structured and easy-to-follow solutions without requesting the AI's internal reasoning process.

Learning Outcomes

Students will be able to:

1. Design prompts for solving mathematical word problems.
2. Generate structured, step-by-step solutions.
3. Improve prompt quality through iterative refinement.
4. Evaluate AI-generated mathematical solutions.
5. Apply prompt engineering techniques to educational problem-solving tasks.

EXPERIMENT – 6

LAB : Create a creative writing assistant prompt for story generation based on user input.

AIM :

To design and optimize a prompt that enables an AI model to generate creative stories based on user-provided inputs such as theme, genre, characters, and setting.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand prompt engineering for creative writing.
- Design prompts for AI-based story generation.
- Customize stories using user inputs.
- Improve prompts to generate engaging and coherent narratives.
- Evaluate the quality of AI-generated stories.

Step 1: Understand the Task

Input

- Story theme
- Main character
- Genre
- Setting

Output

- A creative story based on the given inputs.

Step 2: Create a Basic Prompt

Prompt

Write a story about a brave young girl.

Expected Output

A story describing the adventures of a brave young girl who overcomes challenges through courage and determination.

Observation

- Creative story generated
- Limited details
- No customization

Step 3: Add User Inputs

Prompt

Write a story using the following details.

Character:

A brave young girl

Setting:

An enchanted forest

Genre:

Adventure

Expected Output

A story about a brave girl exploring an enchanted forest, facing magical creatures, solving challenges, and discovering hidden treasures.

Improvement

- More personalized story
- Better structure
- Richer content

Step 4: Specify Story Structure

Prompt

Write a creative story using the following details.

Character:

A brave young girl

Setting:

An enchanted forest

Genre:

Adventure

Include:

- Beginning
- Conflict
- Climax
- Ending

Expected Output

A well-structured adventure story with a clear introduction, an exciting conflict, a dramatic climax, and a satisfying conclusion.

Step 5: Test with Different User Inputs

Prompt

Write a story using the following information.

Theme:
Friendship

Main Character:
A talking dolphin

Setting:
The deep ocean

Genre:
Fantasy

Expected Output

A fantasy story about a talking dolphin who helps sea creatures overcome challenges, highlighting the value of friendship and teamwork.

Step 6: Improve the Prompt

Prompt

You are a creative writing assistant.

Generate an original story using the details provided.

Requirements:

- Create an interesting title.
- Introduce the main character.
- Build an engaging plot.
- Include meaningful dialogue.
- End the story with a moral.
- Use simple and descriptive language.

Story Details:

Theme:
Friendship

Main Character:
A talking dolphin

Setting:
The deep ocean

Genre:
Fantasy

Expected Output

A creative fantasy story with an engaging title, descriptive scenes, natural dialogue, and a meaningful moral about friendship and kindness.

Step 7: Final Optimized Prompt

Sample User Input

- **Theme:** Courage
- **Main Character:** A young astronaut
- **Setting:** Mars
- **Genre:** Science Fiction

Final Optimized Prompt

You are an expert creative writing assistant.

Generate an original story using the following guidelines:

- Create a catchy title.
- Write a story of approximately 400–500 words.
- Use the user's theme, characters, genre, and setting.
- Include a clear beginning, conflict, climax, and ending.
- Add realistic dialogue where appropriate.
- Use descriptive and engaging language.
- Conclude with a meaningful moral or lesson.

User Input:

Theme:
Courage

Main Character:
A young astronaut

Setting:
Mars

Genre:
Science Fiction

Expected Output

Title: *The Courage to Reach Mars*

A young astronaut named Arjun embarks on his first mission to Mars. When a powerful dust storm damages the communication system, he must rely on his training, intelligence, and courage to survive. With determination, he repairs the equipment, restores contact with Earth, and successfully completes the mission. His bravery inspires future generations to pursue space exploration despite challenges.

Moral: *True courage is not the absence of fear but the determination to overcome it.*

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic story prompt	General story generation
V2	User inputs	Personalized content
V3	Story structure	Well-organized narrative
V4	Additional requirements	Richer storytelling
V5	Optimized prompt	Creative, engaging, and coherent story generation

Result

A prompt was successfully designed and optimized to generate creative stories based on user inputs. The optimized prompt produced engaging, well-structured, and personalized stories by incorporating the specified theme, characters, setting, and genre.

Learning Outcomes

Students will be able to:

1. Design prompts for AI-based creative writing.
2. Generate personalized stories using user inputs.
3. Improve story quality through prompt optimization.
4. Evaluate AI-generated creative content.
5. Apply prompt engineering techniques to storytelling and content generation.

EXPERIMENT – 7

LAB : Develop a prompt to translate informal text to formal or professional email content.

AIM :

To design and optimize a prompt that converts informal text into a clear, professional, and well-structured email.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand prompt engineering for text transformation.
- Design prompts for converting informal text into professional emails.
- Improve prompts by specifying tone, structure, and purpose.
- Compare outputs generated using different prompts.
- Evaluate the effectiveness of prompt optimization in professional communication.

Step 1: Understand the Task

Input

- Informal text or message

Output

- Formal and professional email

Step 2: Create a Basic Prompt

Prompt

Convert the following informal message into a formal email.

Message:

Hi Sir,

I can't come tomorrow because I am sick.

Expected Output

Dear Sir,

I am writing to inform you that I am unable to attend tomorrow due to illness. I apologize for any inconvenience this may cause.

Thank you for your understanding.

Sincerely,

[Your Name]

Observation

- Formal language
- Basic email structure
- Limited detail

Step 3: Improve the Prompt

Prompt

Convert the following informal message into a professional email.

Use a polite and respectful tone.

Message:

Hi Sir,

I can't come tomorrow because I am sick.

Expected Output

Dear Sir,

I hope you are doing well. I would like to inform you that I am unable to attend tomorrow due to illness. I sincerely apologize for the inconvenience and request your understanding. I will resume my responsibilities as soon as I recover.

Thank you for your consideration.

Kind regards,

[Your Name]

Improvement

- Polite tone
- Better professionalism
- Improved readability

Step 4: Add Email Structure

Prompt

Convert the following informal message into a professional email.

Requirements:

- Add an appropriate subject.
- Use a formal greeting.
- Write a clear email body.
- Maintain a polite tone.
- Include a professional closing.

Message:

Hi Sir,

I can't come tomorrow because I am sick.

Expected Output

Subject: Leave Request Due to Illness

Dear Sir,

I hope this email finds you well. I would like to inform you that I am unable to attend work tomorrow due to illness. I apologize for the inconvenience and kindly request your approval for leave. I will return to work once I have recovered.

Thank you for your understanding.

Sincerely,
[Your Name]

Step 5: Test Another Example

Prompt

Convert the following message into a professional email.

Message:

Hey,

Can you send me the project report today? I need it urgently.

Expected Output

Subject: Request for Project Report

Dear Team,

I hope you are doing well. Could you please share the latest version of the project report at your earliest convenience? I require it urgently for review and submission.

Thank you for your prompt assistance.

Kind regards,
[Your Name]

Step 6: Improve the Prompt

Prompt

You are an expert business communication assistant.

Convert the following informal text into a professional email.

Requirements:

- Add a suitable subject line.
- Use formal language.
- Maintain a polite and professional tone.
- Organize the email into greeting, body, and closing.
- Correct any grammatical errors.
- Keep the email concise.

Message:

Hey,

Can you send me the project report today? I need it urgently.

Expected Output

Subject: Request for Submission of Project Report

Dear Team,

I hope this email finds you well. I kindly request you to share the latest version of the project report at your earliest convenience, as it is required for an urgent review and submission. Your prompt assistance would be greatly appreciated.

Thank you for your support.

Kind regards,
[Your Name]

Step 7: Final Optimized Prompt

Sample Informal Message

Message: *Hi Professor, I missed today's class because I had a medical appointment. Can you please share today's notes? Thanks.*

Final Optimized Prompt

You are an expert business communication assistant.

Convert the following informal message into a professional email using these guidelines:

- Add an appropriate subject line.
- Use a formal greeting.
- Rewrite the message using professional language.
- Maintain a polite and respectful tone.
- Correct grammar and sentence structure.
- Organize the content into greeting, body, and closing.
- Keep the email concise and clear.

Message:

Hi Professor, I missed today's class because I had a medical appointment. Can you please share today's notes? Thanks.

Expected Output

Subject: Request for Class Notes

Dear Professor,

I hope you are doing well. I was unable to attend today's class due to a scheduled medical appointment. I would be grateful if you could kindly share the class notes or any important materials covered during the session so that I can stay up to date with the coursework.

Thank you for your time and support.

Kind regards,
[Your Name]

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic conversion	General formal email
V2	Professional tone	Polite and respectful language
V3	Email structure	Complete email format
V4	Grammar correction	Improved clarity and accuracy
V5	Optimized prompt	Professional, concise, and well-structured email

Result

A prompt was successfully designed and optimized to convert informal text into formal and professional email content. The optimized prompt generated emails with appropriate subject lines, formal greetings, clear body text, and professional closings, making them suitable for academic and workplace communication.

Learning Outcomes

Students will be able to:

1. Design prompts for text transformation tasks.
2. Convert informal messages into professional emails.
3. Apply prompt engineering techniques to improve tone and structure.
4. Evaluate AI-generated professional communication.
5. Use AI effectively for workplace and academic writing assistance.

EXPERIMENT – 8

LAB : Generate Python code from natural language instructions using prompt optimization.

AIM :

To design and optimize a prompt that enables an AI model to generate accurate and efficient Python code from natural language instructions.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand prompt engineering for code generation.
- Design prompts that convert natural language into Python code.
- Improve prompts by specifying coding requirements.
- Compare outputs generated using different prompts.
- Evaluate the effectiveness of prompt optimization for programming tasks.

Step 1: Understand the Task

Input

- Natural language programming instruction

Output

- Python code that fulfills the given instruction

Step 2: Create a Basic Prompt

Prompt

Write Python code to calculate the factorial of a number.

Expected Output

```
num = int(input("Enter a number: "))
fact = 1

for i in range(1, num + 1):
    fact *= i

print("Factorial =", fact)
```

Observation

- Correct Python code generated.
- Limited explanation.
- No comments or input validation.

Step 3: Improve the Prompt

Prompt

Write a Python program to calculate the factorial of a number.

Include comments explaining each step.

Expected Output

```
# Read a number from the user
num = int(input("Enter a number: "))

# Initialize factorial
fact = 1

# Calculate factorial
for i in range(1, num + 1):
    fact *= i

# Display the result
print("Factorial =", fact)
```

Improvement

- Well-commented code.
- Easier to understand.
- Better readability.

Step 4: Add Coding Requirements

Prompt

Generate a Python program using the following requirements:

- Accept user input.
- Validate the input.
- Include comments.
- Display meaningful output.

Task:

Calculate the factorial of a number.

Expected Output

```
# Accept user input
num = int(input("Enter a positive integer: "))

# Validate input
if num < 0:
    print("Factorial is not defined for negative numbers.")
else:
    fact = 1
    for i in range(1, num + 1):
        fact *= i

    print("Factorial =", fact)
```

Step 5: Test Another Example

Prompt

Write a Python program to find the largest number in a list entered by the user.

Expected Output

```
numbers = list(map(int, input("Enter numbers separated by spaces:").split()))

largest = max(numbers)

print("Largest number:", largest)
```

Step 6: Improve the Prompt

Prompt

You are an expert Python programmer.

Generate Python code using the following guidelines:

- Write clean and readable code.
- Add comments explaining important steps.
- Validate user input where necessary.
- Follow Python coding standards.
- Display meaningful output.

Task:

Find the largest number in a user-entered list.

Expected Output

```
# Read a list of integers from the user
numbers = list(map(int, input("Enter numbers separated by spaces:").split()))

# Check if the list is empty
if len(numbers) == 0:
    print("No numbers entered.")
else:
    # Find the largest number
    largest = max(numbers)

    # Display the result
    print("Largest number:", largest)
```

Step 7: Final Optimized Prompt

Sample Task

Task: Write a Python program to check whether a number is prime.

Final Optimized Prompt

You are an expert Python programmer.

Generate Python code using the following guidelines:

- Write clean, efficient, and well-formatted code.
- Include comments explaining important steps.
- Accept input from the user.
- Validate the input where appropriate.
- Follow Python best coding practices (PEP 8).
- Display clear and meaningful output.
- Ensure the program handles invalid input gracefully.

Task:

Write a Python program to check whether a number is prime.

Expected Output

```
# Read input from the user
num = int(input("Enter a positive integer: "))

# Validate input
if num <= 1:
    print("The number is not prime.")
else:
    is_prime = True

    # Check divisibility
    for i in range(2, int(num ** 0.5) + 1):
        if num % i == 0:
            is_prime = False
            break

# Display the result
if is_prime:
    print(f"{num} is a prime number.")
else:
    print(f"{num} is not a prime number.")
```

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic coding prompt	Generates working code
V2	Add comments	Improved readability
V3	Input validation	More robust program
V4	Coding standards	Better code quality
V5	Optimized prompt	Clean, efficient, and user-friendly code

Result

A prompt was successfully designed and optimized to generate Python code from natural language instructions. The optimized prompt produced clean, well-documented, and efficient Python programs with appropriate input validation and meaningful output, demonstrating the effectiveness of prompt engineering for code generation.

Learning Outcomes

Students will be able to:

1. Design prompts for AI-assisted Python code generation.
2. Convert natural language instructions into executable Python code.
3. Improve code quality through prompt optimization.
4. Evaluate AI-generated code for correctness and readability.
5. Apply prompt engineering techniques to automate programming tasks.

EXPERIMENT – 9

LAB : Refine a prompt for safe and bias-free content generation using red-teaming principles.

AIM :

To design and optimize a prompt that generates safe, fair, and unbiased content by applying red-teaming principles to identify and reduce harmful, biased, or misleading outputs.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand the concept of AI safety and red teaming.
- Design prompts that encourage safe and unbiased responses.
- Identify potential risks such as bias, stereotypes, and misinformation.
- Refine prompts to improve fairness and reliability.
- Evaluate AI-generated content for safety and neutrality.

Step 1: Understand the Task

Input

- A content generation request

Output

- Safe, balanced, and bias-free content.

Step 2: Create a Basic Prompt

Prompt

Write an article about the importance of teamwork in the workplace.

Expected Output

A general article explaining how teamwork improves communication, productivity, and problem-solving in the workplace.

Observation

- Generates relevant content.
- No explicit guidance for fairness or inclusivity.
- May overlook balanced perspectives.

Step 3: Improve the Prompt

Prompt

Write an article about the importance of teamwork in the workplace.

Use respectful and inclusive language.

Avoid stereotypes and biased statements.

Expected Output

An article highlighting teamwork, collaboration, and mutual respect while using inclusive language and avoiding stereotypes.

Improvement

- More balanced content.
- Inclusive language.
- Reduced risk of biased wording.

Step 4: Apply Red-Teaming Principles

Prompt

Generate an article about teamwork.

Requirements:

- Use neutral and respectful language.
- Avoid stereotypes and discriminatory remarks.
- Present balanced viewpoints where appropriate.
- Do not include misleading or unsupported claims.
- Ensure the content is suitable for a diverse audience.

Expected Output

A well-balanced article that emphasizes collaboration, respect, and diversity while avoiding biased or unsupported statements.

Step 5: Test Another Scenario

Prompt

Write an article about the benefits of technology in education.

Requirements:

- Use factual and balanced information.
- Avoid biased opinions.
- Present both advantages and challenges.
- Maintain a neutral tone.

Expected Output

An informative article discussing how technology enhances learning while also mentioning challenges such as digital access, privacy, and responsible use.

Step 6: Improve the Prompt

Prompt

You are an AI content assistant.

Generate content using the following guidelines:

- Use respectful and inclusive language.
- Avoid stereotypes, bias, and discriminatory remarks.
- Present balanced and evidence-based information.
- Distinguish facts from opinions.
- Avoid unsupported claims.
- Maintain a neutral and professional tone.
- Ensure the content is appropriate for a diverse audience.

Topic:

The importance of teamwork in modern organizations.

Expected Output

A professional article that discusses teamwork objectively, includes balanced perspectives, and uses respectful language suitable for all audiences.

Step 7: Final Optimized Prompt

Sample Topic

Topic: *The Role of Artificial Intelligence in Healthcare*

Final Optimized Prompt

You are an expert AI content assistant.

Generate content using the following guidelines:

- Use clear, respectful, and inclusive language.
- Present accurate and balanced information.
- Avoid stereotypes, bias, and discriminatory statements.
- Distinguish factual information from opinions.
- Avoid misleading or unsupported claims.
- Acknowledge different perspectives when appropriate.
- Maintain a formal and neutral tone.
- Ensure the content is suitable for a diverse audience.

Topic:

The Role of Artificial Intelligence in Healthcare.

Expected Output

Artificial Intelligence (AI) is transforming healthcare by supporting disease diagnosis, medical imaging, personalized treatment planning, and administrative efficiency. AI can improve healthcare delivery by assisting medical professionals with data analysis and decision-making. However, successful adoption also requires attention to data privacy, transparency, fairness, and ethical use. Healthcare organizations should ensure that AI systems are developed and evaluated using diverse, high-quality data to reduce bias and improve reliability. When implemented responsibly, AI has the potential to enhance patient care while complementing the expertise of healthcare professionals.

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic prompt	General content generation
V2	Inclusive language	Reduced biased wording
V3	Red-teaming guidelines	Safer and more balanced responses
V4	Evidence-based instructions	Improved factual accuracy
V5	Optimized prompt	Safe, fair, and reliable content generation

Result

A prompt was successfully designed and refined to generate safe, balanced, and bias-aware content by incorporating red-teaming principles. The optimized prompt encouraged respectful language, reduced the likelihood of biased or misleading statements, and produced content suitable for diverse audiences.

Learning Outcomes

Students will be able to:

1. Understand the role of red teaming in AI safety.
2. Design prompts that promote safe and unbiased content generation.
3. Identify and reduce bias in AI-generated responses.
4. Evaluate AI outputs for fairness, accuracy, and inclusiveness.
5. Apply prompt engineering techniques to develop responsible and trustworthy AI applications.

EXPERIMENT – 10

LAB : Compare responses from ChatGPT and Gemini for the same prompt and analyze differences.

AIM :

To compare the responses generated by ChatGPT and Gemini for the same prompt and analyze their differences in terms of accuracy, clarity, completeness, and response style.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand how different Large Language Models (LLMs) respond to the same prompt.
- Compare AI-generated responses based on quality and relevance.
- Analyze differences in language, structure, and completeness.
- Evaluate the strengths and limitations of different AI models.
- Develop skills in prompt evaluation and comparative analysis.

Step 1: Understand the Task

Input

- A common prompt provided to both ChatGPT and Gemini.

Output

- Responses generated by each model.
- Comparative analysis of the responses.

Step 2: Create a Basic Prompt

Prompt

Explain the importance of renewable energy.

Expected Output

Both ChatGPT and Gemini generate explanations describing renewable energy, its environmental benefits, and its contribution to sustainable development.

Observation

- Both models answer the question correctly.
- Response style and level of detail may vary.
- Organization and examples may differ.

Step 3: Test the Same Prompt

Prompt

Explain the importance of renewable energy in about 150 words.

Use simple language suitable for college students.

Include examples.

Sample Response (ChatGPT)

Renewable energy comes from natural sources such as sunlight, wind, water, and biomass. Unlike fossil fuels, these sources can be replenished naturally and produce fewer greenhouse gas emissions. Renewable energy helps reduce air pollution, combat climate change, and improve energy security. Examples include solar panels that generate electricity from sunlight and wind turbines that convert wind into electrical power. Increased use of renewable energy also creates jobs and supports sustainable economic development.

Sample Response (Gemini)

Renewable energy is energy obtained from natural resources that are continuously replenished, including solar, wind, hydroelectric, and geothermal sources. It helps reduce dependence on fossil fuels, lowers carbon emissions, and promotes environmental sustainability. Renewable energy technologies improve energy efficiency, create employment opportunities, and support long-term economic growth. For example, solar farms and wind parks provide clean electricity while minimizing environmental impact.

Improvement

- Both responses are informative.
- Differences exist in wording, organization, and emphasis.

Step 4: Compare Response Characteristics

Evaluation Criteria	ChatGPT	Gemini
Accuracy	High	High
Clarity	Excellent	Excellent
Readability	Very Good	Very Good
Level of Detail	Moderate to High	Moderate
Examples	Practical	Informative
Organization	Well-structured	Concise

Step 5: Test Another Prompt

Prompt

Write a professional email requesting leave for two days due to illness.

Observation

- ChatGPT generally provides a structured email with a subject, greeting, body, and closing.
- Gemini typically produces a concise and professional email with a similar structure.
- Both models generate grammatically correct and appropriate responses, though wording and formatting may differ.

Step 6: Analyze the Differences

Analysis Parameters

- **Accuracy:** Is the information correct?
- **Completeness:** Does the response cover all requested points?
- **Clarity:** Is the explanation easy to understand?
- **Tone:** Is the language appropriate for the task?
- **Creativity:** Does the response provide engaging examples or unique phrasing?
- **Formatting:** Is the response well organized?

Observation

Both ChatGPT and Gemini provide high-quality responses for most prompts. ChatGPT often produces more detailed explanations with richer examples and smoother transitions, while Gemini tends to generate concise, direct, and well-organized responses. The quality of the output depends on the prompt design and the specific task.

Step 7: Final Optimized Prompt

Sample Prompt

Topic: *Explain Artificial Intelligence and its applications.*

Final Optimized Prompt

Explain Artificial Intelligence and its applications using the following guidelines:

- Length: 150–200 words
- Tone: Formal and informative
- Use simple language suitable for undergraduate students.
- Define Artificial Intelligence.
- Explain at least four real-world applications.
- Include the advantages of AI.
- Conclude with a brief summary.

Comparative Analysis

Feature	ChatGPT	Gemini
Definition	Clear and detailed	Clear and concise
Applications	Multiple practical examples	Well-organized examples
Language	Easy to understand	Simple and direct
Conclusion	Comprehensive	Brief and effective
Overall Response	Detailed and explanatory	Concise and informative

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Basic prompt	General response
V2	Specify length and audience	Better focus
V3	Add formatting instructions	Improved organization
V4	Include evaluation criteria	Easier comparison
V5	Optimized prompt	Comprehensive and consistent responses

Result

The responses generated by ChatGPT and Gemini were compared using the same prompt. Both models produced accurate and relevant outputs, but they differed in writing style, level of detail, organization, and presentation. The comparison demonstrated that prompt quality significantly influences the effectiveness of AI-generated responses and that different LLMs may emphasize different aspects of the same task.

Learning Outcomes

Students will be able to:

1. Compare responses generated by different Large Language Models (LLMs).
2. Evaluate AI outputs using objective quality criteria.
3. Analyze differences in accuracy, clarity, completeness, and response style.
4. Understand the impact of prompt design on AI-generated content.
5. Apply prompt engineering techniques to improve the quality and consistency of AI responses.

EXPERIMENT – 11

LAB : Create a prompt template that can be reused dynamically with user inputs (parameterized prompts).

AIM :

To design and optimize a reusable prompt template that accepts dynamic user inputs (parameters) to generate customized AI responses for different tasks.

LEARNING OBJECTIVES

After completing this experiment, the student will be able to:

- Understand the concept of parameterized prompts.
- Design reusable prompt templates with placeholders.
- Customize AI responses using dynamic user inputs.
- Improve prompt flexibility and reusability.
- Evaluate the effectiveness of parameterized prompt engineering.

Step 1: Understand the Task

Input

- User-defined parameters (e.g., topic, audience, tone, length)

Output

- Customized AI-generated content based on the provided parameters.

Step 2: Create a Basic Prompt

Prompt

Write an article about Artificial Intelligence.

Expected Output

A general article describing Artificial Intelligence, its features, and applications.

Observation

- Generates relevant content.
- Cannot be easily reused for different topics.
- Requires manual editing each time.

Step 3: Create a Parameterized Prompt

Prompt

Write an article about <Topic>.

Sample Input

- Topic: Cyber Security

Expected Output

An article explaining Cyber Security, its importance, threats, and protective measures.

Improvement

- Reusable template.
- Easy to customize.
- Saves time.

Step 4: Add Multiple Parameters

Prompt

Write an article using the following details:

Topic: <Topic>

Audience: <Audience>

Tone: <Tone>

Length: <Length>

Sample Input

- Topic: Cloud Computing
- Audience: Undergraduate Students
- Tone: Formal
- Length: 200 words

Expected Output

A 200-word formal article on Cloud Computing written for undergraduate students.

Step 5: Test with Different Inputs

Prompt

Generate content using the following parameters:

Topic: <Topic>

Audience: <Audience>

Tone: <Tone>

Length: <Length>

Sample Input 1

- Topic: Renewable Energy
- Audience: High School Students
- Tone: Simple
- Length: 150 words

Expected Output

A simple and easy-to-understand article about renewable energy suitable for high school students.

Sample Input 2

- Topic: Machine Learning
- Audience: Researchers
- Tone: Technical
- Length: 300 words

Expected Output

A detailed technical explanation of Machine Learning intended for researchers.

Step 6: Improve the Prompt

Prompt

You are an expert content writer.

Generate content using the following parameters:

- Topic: <Topic>
- Audience: <Audience>
- Tone: <Tone>
- Length: <Length>

Requirements:

- Use appropriate vocabulary for the audience.
- Organize the content with a clear introduction, body, and conclusion.
- Maintain the requested tone.
- Ensure factual accuracy.
- Avoid unnecessary repetition.

Expected Output

A well-structured article tailored to the specified topic, audience, tone, and length.

Step 7: Final Optimized Prompt

Sample Parameters

- **Topic:** Internet of Things (IoT)
- **Audience:** Engineering Students
- **Tone:** Professional
- **Length:** 250 words

Final Optimized Prompt

You are an expert content writer.

Generate content using the following user-defined parameters:

Topic: <Topic>

Audience: <Audience>

Tone: <Tone>

Length: <Length>

Follow these guidelines:

- Write according to the specified audience.
- Maintain the requested tone throughout.
- Include an introduction, main content, and conclusion.
- Provide accurate and relevant information.
- Use clear and well-structured paragraphs.
- Avoid unnecessary repetition.
- Ensure the response matches the specified length.

Expected Output

A professional 250-word article on the **Internet of Things (IoT)** for engineering students, featuring a clear introduction, detailed explanation of IoT concepts and applications, and a concise conclusion written in a professional tone.

Prompt Evolution

Version	Prompt Feature	Improvement
V1	Fixed prompt	Single-use prompt
V2	Topic parameter	Reusable for multiple topics
V3	Multiple parameters	Greater customization
V4	Structured requirements	Better quality and consistency
V5	Optimized parameterized prompt	Flexible, reusable, and scalable

Result

A reusable parameterized prompt template was successfully designed and optimized to generate customized AI responses based on user-defined inputs. The optimized template improved flexibility, consistency, and efficiency by allowing different topics, audiences, tones, and lengths to be specified without modifying the prompt structure.

Learning Outcomes

Students will be able to:

1. Understand the concept of parameterized prompts.
2. Design reusable prompt templates with dynamic inputs.
3. Customize AI-generated content using user-defined parameters.
4. Improve response quality through prompt optimization.
5. Apply parameterized prompt engineering techniques to diverse real-world applications.

**AI Mini Projects Aligned with
Sustainable Development Goals (SDGs)**

S.No	SDG Mapped	Project Name	About Project
1	SDG 4 – Quality Education	AI Academic Learning Assistant	Develop an AI-powered learning platform that acts as a virtual tutor for engineering students. The application should explain concepts, answer doubts, generate quizzes, prepare assignments, create study notes, recommend learning resources, and personalize learning based on the student's academic level using prompt engineering techniques.
2	SDG 4 – Quality Education	AI Placement Preparation Assistant	Design an intelligent placement preparation system that generates aptitude questions, technical interview questions, HR interview scenarios, coding challenges, mock interviews, and resume improvement suggestions. The application should help students prepare effectively for campus recruitment and competitive examinations.
3	SDG 9 – Industry, Innovation & Infrastructure	AI Research & Publication Assistant	Build an AI research assistant capable of generating research titles, identifying research gaps, preparing literature reviews, summarizing journal papers, generating abstracts, formatting citations, and recommending suitable journals for publication.
4	SDG 3 – Good Health & Well- being	AI Smart Healthcare Assistant	Develop a healthcare information assistant that provides educational information about diseases, symptoms, preventive measures, healthy lifestyle recommendations, diet suggestions, medical report explanations, and healthcare awareness while encouraging consultation with medical professionals.
5	SDG 9 – Industry, Innovation & Infrastructure	AI Software Development Assistant	Create an AI-powered programming assistant capable of generating source code, debugging programs, explaining algorithms, generating UML descriptions, preparing test cases, reviewing code quality, and producing software documentation for multiple programming languages.
6	SDG 4 – Quality Education	AI Prompt Engineering Studio	Build an interactive platform where users can design, optimize, compare, evaluate, and benchmark Zero-Shot, Few-Shot, Chain-of-Thought, Role-Based, and Parameterized prompts across different Large Language Models such as ChatGPT and Gemini.
7	SDG 4 – Quality Education	AI Smart College Assistant	Design a virtual assistant that answers student queries regarding admissions, attendance, examinations, timetables, faculty information, placements, internships, scholarships, regulations, and campus facilities using conversational AI.
8	SDG 4 – Quality Education	AI Faculty Productivity Assistant	Develop an AI assistant that automates lesson plan preparation, laboratory manuals, assignments, question papers, Bloom's Taxonomy mapping, CO-PO mapping, SDG mapping, rubrics, and accreditation documentation for faculty members.

9	SDG 8 – Decent Work & Economic Growth	AI Career Guidance Platform	Create a career recommendation system that analyzes students' academic performance, certifications, technical skills, interests, and career goals to recommend suitable career paths, internships, certifications, and higher education opportunities.
10	SDG 8 – Decent Work & Economic Growth	AI Resume & Portfolio Builder	Build an AI application that generates ATS-friendly resumes, LinkedIn profiles, GitHub portfolio descriptions, project summaries, cover letters, and professional biographies customized for different industries and job roles.
11	SDG 8 – Decent Work & Economic Growth	AI Business Startup Advisor	Design a startup consulting assistant that generates innovative business ideas, business models, market analysis, SWOT analysis, investment plans, financial projections, and startup pitch presentations for aspiring entrepreneurs.
12	SDG 9 – Industry, Innovation & Infrastructure	AI Office Automation Suite	Develop a productivity assistant capable of generating emails, meeting agendas, meeting minutes, reports, proposals, reminders, schedules, official letters, and office documentation to automate routine administrative tasks.
13	SDG 16 – Peace, Justice & Strong Institutions	AI Legal Documentation Assistant	Create an AI system that generates legal templates such as rental agreements, employment contracts, affidavits, leave applications, legal notices, privacy policies, and terms & conditions while simplifying legal terminology.
14	SDG 1 – No Poverty	AI Financial Planning Assistant	Develop a personal finance management assistant that prepares monthly budgets, savings plans, investment suggestions, EMI calculations, expense analysis, and financial goal tracking to improve financial literacy and planning.
15	SDG 8 – Decent Work & Economic Growth	AI Digital Marketing Studio	Build a content creation platform that generates blogs, SEO articles, social media posts, YouTube scripts, advertisements, email campaigns, product descriptions, and marketing strategies using prompt engineering.
16	SDG 9 – Industry, Innovation & Infrastructure	AI Customer Relationship Management Assistant	Design a CRM assistant that manages customer queries, complaint handling, FAQ generation, customer feedback analysis, support ticket summarization, and personalized customer communication using conversational AI.
17	SDG 11 – Sustainable Cities & Communities	AI Smart Travel Planner	Create an intelligent travel planning application that generates customized itineraries, hotel recommendations, transportation plans, tourist attractions, travel budgets, weather suggestions, and travel checklists based on user preferences.
18	SDG 16 – Peace, Justice & Strong Institutions	AI Cybersecurity Awareness Platform	Develop an AI-based cybersecurity awareness application that educates users about phishing attacks, ransomware, malware, password security, cyber hygiene, digital privacy, and secure online practices through interactive conversations and quizzes.
19	SDG 9 – Industry,	AI Intelligent Document Analyzer	Build a document intelligence platform capable of summarizing PDFs, extracting key information, answering questions from uploaded documents,

	Innovation & Infrastructure		comparing reports, generating executive summaries, and highlighting important concepts.
20	SDG 9 – Industry, Innovation & Infrastructure	AI Multi-Purpose Productivity Assistant	Develop an integrated AI platform that combines email writing, report generation, document summarization, translation, scheduling, coding assistance, prompt optimization, and productivity tools into a single application.
21	SDG 4 – Quality Education	AI Smart Education Content Generator	Create an educational content generation system that automatically prepares lecture notes, PowerPoint outlines, practical exercises, laboratory manuals, viva questions, assignments, and course materials for different academic subjects.
22	SDG 4 – Quality Education	AI Student Performance Analyzer	Design an AI application that analyzes students' academic performance, attendance, assessment scores, and learning behavior to identify strengths, weaknesses, and personalized improvement strategies.
23	SDG 4 – Quality Education	AI Personalized Learning Recommendation System	Develop an intelligent learning recommendation platform that suggests courses, books, online tutorials, certifications, projects, and practice problems based on a student's interests, learning progress, and career objectives.
24	SDG 4 – Quality Education	AI Question Paper & Evaluation System	Develop an AI-powered examination system that generates question papers based on syllabus units, Bloom's Taxonomy, Course Outcomes (COs), and difficulty levels. The system should also generate answer keys, evaluation rubrics, and marking schemes for faculty members.
25	SDG 3 – Good Health & Well-being	AI Medical Report Simplifier	Create an AI application that translates complex medical reports into simple, easy-to-understand language. The system should explain medical terms, laboratory values, prescriptions, and provide general health education while encouraging consultation with healthcare professionals.
26	SDG 3 – Good Health & Well-being	AI Nutrition & Meal Planning Assistant	Design a personalized nutrition assistant that recommends healthy meal plans, calorie intake, nutritional information, hydration schedules, and dietary suggestions based on age, lifestyle, and fitness goals.
27	SDG 3 – Good Health & Well-being	AI Mental Wellness Companion	Develop an AI companion that promotes mental well-being by providing motivational messages, stress management techniques, mindfulness exercises, productivity advice, and emotional wellness resources through conversational interactions.
28	SDG 3 – Good Health & Well-being	AI Fitness Coaching Assistant	Build an intelligent fitness coach that generates personalized workout routines, exercise schedules, BMI analysis, calorie estimation, and fitness progress tracking according to user preferences and health goals.
29	SDG 3 – Good Health & Well-being	AI Hospital Management Assistant	Create a conversational AI assistant for hospitals that manages appointment scheduling, patient FAQs, department guidance, doctor availability, and hospital information to improve patient services and administrative efficiency.

30	SDG 3 – Good Health & Well-being	AI Pharmacy Information Assistant	Develop an AI assistant that provides educational information about medicines, dosage instructions, storage guidelines, drug interactions, and precautionary measures using reliable prompt-based knowledge.
31	SDG 8 – Decent Work & Economic Growth	AI Banking Customer Support Assistant	Design a banking chatbot that answers customer queries related to account services, loans, deposits, internet banking, credit cards, EMI calculations, and banking procedures while ensuring secure and professional communication.
32	SDG 1 – No Poverty	AI Personal Expense Manager	Build an AI-based expense management system that categorizes daily expenses, analyzes spending patterns, prepares monthly reports, and suggests budgeting strategies to improve personal financial planning.
33	SDG 4 – Quality Education	AI Investment Learning Assistant	Develop an educational AI assistant that explains investment concepts such as stocks, mutual funds, SIPs, bonds, risk management, and portfolio diversification to improve financial literacy among students and beginners.
34	SDG 3 – Good Health & Well-being	AI Insurance Advisor	Create an AI application that explains different insurance policies, compares coverage options, answers policy-related questions, and recommends suitable insurance plans based on user requirements.
35	SDG 12 – Responsible Consumption & Production	AI Smart Shopping Assistant	Design an intelligent shopping assistant that compares products, summarizes customer reviews, recommends alternatives, analyzes features, and assists users in making informed purchasing decisions.
36	SDG 8 – Decent Work & Economic Growth	AI E-Commerce Product Content Generator	Develop an AI platform that automatically generates product descriptions, feature highlights, technical specifications, SEO keywords, promotional content, and customer FAQs for online shopping websites.
37	SDG 9 – Industry, Innovation & Infrastructure	AI Inventory Management Assistant	Build an AI assistant that supports inventory tracking, stock analysis, reorder recommendations, supplier communication, and warehouse documentation for retail and manufacturing businesses.
38	SDG 8 – Decent Work & Economic Growth	AI Human Resource Management Assistant	Create an HR assistant capable of generating job descriptions, interview questions, onboarding documents, employee performance feedback, training materials, and company policy documents.
39	SDG 8 – Decent Work & Economic Growth	AI Recruitment & Candidate Screening System	Develop an AI-powered recruitment platform that analyzes resumes, matches candidate skills with job descriptions, prepares interview questions, and ranks applicants based on predefined criteria.
40	SDG 9 – Industry, Innovation & Infrastructure	AI Meeting & Project Management Assistant	Design an AI project assistant that prepares project plans, meeting agendas, progress reports, task assignments, timelines, risk analysis, and project documentation for teams and organizations.
41	SDG 9 – Industry,	AI Business Analytics	Build an AI application that summarizes sales reports, customer feedback, financial statements,

	Innovation & Infrastructure	Dashboard Assistant	and operational data into executive dashboards with meaningful business insights and recommendations.
42	SDG 2 – Zero Hunger	AI Smart Agriculture Advisor	Develop an agricultural advisory system that provides crop recommendations, irrigation planning, fertilizer suggestions, weather-based farming advice, pest management tips, and sustainable farming practices.
43	SDG 13 – Climate Action	AI Environmental Sustainability Assistant	Create an AI platform that educates users about climate change, renewable energy, waste management, carbon footprint reduction, water conservation, and environmentally sustainable practices aligned with SDGs.
44	SDG 11 – Sustainable Cities & Communities	AI Disaster Management Information System	Design an AI-based emergency response assistant that provides disaster preparedness guidelines, evacuation procedures, emergency contact information, first-aid instructions, and disaster awareness content for various natural hazards.
45	SDG 11 – Sustainable Cities & Communities	AI Smart City Citizen Assistant	Build a smart city assistant that helps citizens access information about public services, transportation, waste management, electricity, water supply, emergency contacts, and government welfare schemes using conversational AI.
46	SDG 11 – Sustainable Cities & Communities	AI Tourism & Cultural Heritage Guide	Develop a virtual tourism guide that recommends tourist destinations, historical landmarks, cultural events, travel itineraries, local cuisines, accommodation, transportation, and travel safety information for domestic and international travelers.
47	SDG 7 – Affordable & Clean Energy	AI Smart Home Assistant	Develop an AI-powered virtual assistant that helps users manage smart home devices through natural language prompts. The application should assist with appliance control, energy conservation tips, home security reminders, and personalized daily schedules.
48	SDG 9 – Industry, Innovation & Infrastructure	AI IoT Device Monitoring Assistant	Design an AI system that analyzes IoT sensor data and generates alerts, maintenance recommendations, fault analysis, and performance summaries for smart devices used in homes, industries, or agriculture.
49	SDG 4 – Quality Education	AI Data Analysis & Visualization Assistant	Create an intelligent assistant capable of analyzing datasets, generating statistical summaries, identifying trends, recommending suitable charts, and explaining data insights in simple language for decision-making.
50	SDG 9 – Industry, Innovation & Infrastructure	AI Business Intelligence Assistant	Develop a business intelligence platform that transforms organizational reports into meaningful insights by generating dashboards, executive summaries, trend analysis, KPI reports, and strategic recommendations using prompt engineering.
51	SDG 9 – Industry, Innovation & Infrastructure	AI Predictive Maintenance Advisor	Build an AI assistant that helps industries monitor machine health, identify possible equipment failures, recommend maintenance schedules, and generate maintenance reports based on operational data and historical records.

52	SDG 12 – Responsible Consumption & Production	AI Supply Chain Management Assistant	Design an intelligent supply chain assistant that optimizes inventory planning, supplier communication, logistics tracking, procurement documentation, and delivery scheduling for manufacturing and retail industries.
53	SDG 4 – Quality Education	AI Cloud Computing Learning Assistant	Develop a virtual tutor that explains cloud computing concepts, deployment models, service models, cloud security practices, architecture diagrams, and cloud certification preparation through interactive conversations.
54	SDG 9 – Industry, Innovation & Infrastructure	AI DevOps Documentation Assistant	Create an AI application that generates CI/CD pipeline documentation, deployment guides, Docker and Kubernetes explanations, infrastructure documentation, and troubleshooting guides for software development teams.
55	SDG 9 – Industry, Innovation & Infrastructure	AI Database Design Assistant	Build an AI system that assists students and developers in designing ER diagrams, relational schemas, normalization steps, SQL scripts, and database documentation based on application requirements.
56	SDG 9 – Industry, Innovation & Infrastructure	AI API Development Assistant	Develop an AI-powered tool that generates REST API documentation, endpoint descriptions, JSON request and response formats, API testing scenarios, and integration guidelines from software requirements.
57	SDG 16 – Peace, Justice & Strong Institutions	AI Secure Coding Advisor	Create an AI assistant that reviews programming code to identify security vulnerabilities, insecure coding practices, SQL injection risks, cross-site scripting issues, authentication weaknesses, and recommends secure coding improvements.
58	SDG 16 – Peace, Justice & Strong Institutions	AI Digital Forensics Assistant	Design an AI application that explains digital forensic investigation procedures, evidence collection methods, cybercrime case documentation, log analysis techniques, and report preparation for cybersecurity professionals.
59	SDG 16 – Peace, Justice & Strong Institutions	AI Phishing Detection & Awareness Platform	Develop a prompt-based application that identifies phishing emails, fake websites, suspicious messages, and social engineering attacks while educating users about safe online practices through simulated scenarios.
60	SDG 9 – Industry, Innovation & Infrastructure	AI Smart Contract Documentation Assistant	Create an AI tool that explains blockchain concepts, smart contracts, decentralized applications, cryptocurrency terminology, and automatically generates documentation for blockchain-based software projects.
61	SDG 17 – Partnerships for the Goals	AI Sustainable Development Advisor	Develop an intelligent platform that recommends engineering solutions aligned with the United Nations Sustainable Development Goals (SDGs). The application should suggest sustainable project ideas, environmental impact analysis, and implementation strategies.
62	SDG 9 – Industry, Innovation & Infrastructure	AI Innovation & Patent Writing Assistant	Build an AI assistant that helps innovators generate novel product ideas, prepare patent abstracts, draft patent descriptions, identify innovation opportunities, and organize invention

			documentation for intellectual property submissions.
63	SDG 8 – Decent Work & Economic Growth	AI Entrepreneurship & Startup Incubation Assistant	Design an AI platform that guides aspiring entrepreneurs in developing startup ideas, preparing business models, identifying funding opportunities, creating investor pitch decks, and planning product commercialization strategies.
64	SDG 10 – Reduced Inequalities	AI Government Services Information Assistant	Develop a conversational AI system that provides information about government schemes, public welfare programs, digital services, online applications, eligibility criteria, and citizen support services in a user-friendly manner.
65	SDG 11 – Sustainable Cities & Communities	AI Smart Campus Management Assistant	Create a comprehensive campus assistant that manages academic schedules, laboratory bookings, event notifications, placement activities, examination information, student support services, and campus navigation through natural language interaction.
66	SDG 10 – Reduced Inequalities	AI Multilingual Communication Assistant	Develop an AI-powered language assistant capable of translating documents, simplifying technical content, generating multilingual communication, correcting grammar, and supporting cross-language collaboration for global users.
67	SDG 4 – Quality Education	AI Prompt Marketplace & Template Repository	Build a centralized platform where users can create, organize, categorize, evaluate, share, and reuse prompt templates for education, healthcare, software development, business, cybersecurity, and research applications. The system should support prompt versioning, ratings, and collaborative prompt improvement.
68	SDG 9 – Industry, Innovation & Infrastructure	Enterprise AI Productivity Platform using Prompt Engineering <i>(Capstone Project)</i>	Design and develop a comprehensive enterprise AI platform integrating multiple prompt-based services such as intelligent document generation, email drafting, report writing, meeting summarization, coding assistance, project management, research support, chatbot services, translation, data analysis, and workflow automation. The platform should demonstrate advanced prompt engineering techniques including Zero-Shot, Few-Shot, Chain-of-Thought, Role-Based Prompting, Prompt Chaining, Structured Prompting, Prompt Optimization, and Responsible AI principles to deliver a unified AI productivity solution suitable for educational institutions, industries, and business organizations.

Lab Viva Questions

Fundamentals of Prompt Engineering

1. What is Prompt Engineering?
2. What is a prompt?
3. What is Generative AI?
4. What is a Large Language Model (LLM)?
5. Name four popular LLMs.
6. Why is prompt engineering important?
7. What are the components of an effective prompt?
8. What is context in a prompt?
9. What are prompt constraints?
10. How does output format influence AI responses?

Zero-Shot, Few-Shot and Chain-of-Thought Prompting

11. What is Zero-Shot Prompting?
12. What is Few-Shot Prompting?
13. What is Chain-of-Thought Prompting?
14. Compare Zero-Shot and Few-Shot prompting.
15. Which prompting technique generally provides higher accuracy?
16. Give two applications of text classification.
17. Why do examples improve Few-Shot prompting?
18. What is sentiment analysis?
19. What is text classification?
20. When would you prefer Zero-Shot prompting?

Summarization and Prompt Optimization

21. What is text summarization?
22. How can prompt length affect the summary?
23. What is tone in prompt engineering?
24. Why should prompts specify the target audience?
25. How do formatting instructions improve summaries?

Educational Chatbots and Role-Based Prompting

- 26. What is role-based prompting?
- 27. Why should AI responses change based on student grade level?
- 28. How can AI act as a history tutor?
- 29. What is persona prompting?
- 30. Mention three professional roles commonly used in prompting.
- 31. How does role assignment affect AI responses?
- 32. Why is empathy important in customer service prompts?

Mathematical Reasoning and Creative Writing

- 33. Why should mathematical prompts include clear instructions?
- 34. What is the purpose of identifying given information before solving a problem?
- 35. Why should creative writing prompts include theme, genre, and setting?
- 36. What is the importance of dialogue in story generation?
- 37. Why should stories include a moral?

Professional Email Generation

- 38. What are the main parts of a professional email?
- 39. Why should prompts specify tone while generating emails?
- 40. What is the purpose of adding a subject line?
- 41. How can AI improve business communication?

Python Code Generation

- 42. Why should prompts specify coding standards?
- 43. What is input validation?
- 44. Why are comments important in generated Python code?
- 45. What is PEP 8?
- 46. How can prompt optimization improve generated code?

AI Safety, Red Teaming and Model Comparison

- 47. What is AI red teaming?
- 48. What is bias in AI-generated content?
- 49. Name four criteria used to compare ChatGPT and Gemini responses.
- 50. What are parameterized prompts, and why are they useful?

Prompt Engineering – Interview Questions

(Basic Level)

1. What is Prompt Engineering?
2. What is a prompt? Explain with an example.
3. What is Generative AI?
4. What is a Large Language Model (LLM)?
5. Name some popular LLMs used today.
6. What is the difference between AI, Machine Learning, Deep Learning, and Generative AI?
7. Why is prompt engineering important for AI applications?
8. What are the essential components of an effective prompt?
9. What is context in prompt engineering?
10. How does prompt quality affect AI-generated responses?

(Intermediate Level)

11. Explain Zero-Shot Prompting with an example.
12. Explain Few-Shot Prompting with an example.
13. What is One-Shot Prompting?
14. What is Role-Based Prompting?
15. What is Chain-of-Thought Prompting, and when should it be used?
16. What are parameterized prompts? Why are they useful?
17. How do constraints improve prompt quality?
18. What is prompt optimization? Explain the process.
19. What is prompt iteration, and why is it necessary?
20. How would you evaluate whether a prompt is effective?

(Advanced Level)

21. What are AI hallucinations, and how can prompt engineering help reduce them?
22. What is AI bias? How can prompts be designed to generate fair and unbiased responses?
23. What is red teaming in AI, and why is it important?
24. What is the difference between Prompt Engineering and Fine-Tuning?
25. What is Retrieval-Augmented Generation (RAG)? How does it improve AI responses?
26. What is an AI Agent? How is it different from a chatbot?
27. Explain the meaning of Temperature and Top-p in language models.
28. How would you compare the responses generated by ChatGPT and Gemini for the same prompt? Which evaluation criteria would you use?
29. What ethical considerations should be followed while designing prompts for AI systems?
30. Design a prompt that generates a professional email from an informal message. Explain why your prompt is effective.

(HR + Technical Questions)

1. What motivated you to learn Prompt Engineering?
2. Which AI tool do you prefer and why?
3. Describe a mini project you developed using Prompt Engineering.
4. How can Prompt Engineering improve productivity in software development?
5. What are the future career opportunities in Prompt Engineering?
6. Can Prompt Engineering replace programming? Justify your answer.
7. How would you use Prompt Engineering in your final-year project?
8. What challenges have you faced while writing prompts?
9. How would you improve an AI response that is vague or inaccurate?
10. Where do you see Generative AI being used in the next five years?

Glossary of AI & Prompt Engineering Terms

A

1. Artificial Intelligence (AI)

The simulation of human intelligence by machines to perform tasks such as learning, reasoning, and problem-solving.

2. AI Agent

An AI system that can perceive its environment, make decisions, and perform tasks autonomously.

3. AI Ethics

Principles that guide the responsible development and use of artificial intelligence.

4. Algorithm

A step-by-step procedure used to solve a problem or perform a computation.

5. API (Application Programming Interface)

A set of rules that allows software applications to communicate with each other.

B

6. Backpropagation

A learning algorithm used to train neural networks by updating weights based on prediction errors.

7. Bias

A systematic error or unfair tendency in AI outputs due to biased training data or design.

8. Benchmark

A standard test used to evaluate the performance of AI models.

9. Big Data

Extremely large datasets used for training and improving AI systems.

10. Batch Processing

Processing multiple inputs together rather than one at a time.

C

11. Chain-of-Thought (CoT) Prompting

A prompting technique that encourages structured reasoning before reaching an answer.

12. Chatbot

An AI system designed to simulate conversations with users.

13. Classification

Assigning predefined categories to data.

14. Claude

A Large Language Model developed by Anthropic.

15. Context

Background information provided to help an AI understand a task.

16. Context Window

The maximum amount of text an AI model can process at one time.

17. Copilot

Microsoft's AI assistant for productivity and programming tasks.

18. Corpus

A large collection of text used for training language models.

D**19. Dataset**

A structured collection of data used for training or testing AI models.

20. Deep Learning

A branch of machine learning based on multi-layer neural networks.

21. Decoder

The component of a transformer model that generates output text.

22. Diffusion Model

A generative AI model commonly used for creating images.

23. Domain Knowledge

Specialized knowledge related to a particular subject area.

E**24. Embedding**

A numerical representation of text, images, or other data in vector form.

25. Encoder

The component of a transformer model that processes input.

26. Evaluation Metric

A measure used to assess model performance.

27. Explainable AI (XAI)

Techniques that make AI decisions understandable to humans.

28. Expert System

An AI program that mimics human decision-making in a specific domain.

F

29. Few-Shot Prompting

Providing several examples before asking the AI to perform a task.

30. Fine-Tuning

Further training a pre-trained AI model on domain-specific data.

31. Foundation Model

A large pre-trained AI model that can be adapted to many tasks.

32. Function Calling

An LLM capability that enables structured interaction with external tools or APIs.

G

33. Gemini

Google's family of Large Language Models.

34. Generative AI

AI capable of creating text, images, audio, video, or code.

35. GPT (Generative Pre-trained Transformer)

A transformer-based language model developed by OpenAI.

36. GPU (Graphics Processing Unit)

Hardware widely used to train and run AI models efficiently.

H

37. Hallucination

An AI response that is incorrect, fabricated, or unsupported by evidence.

38. Hyperparameter

A setting configured before training an AI model.

39. Human-in-the-Loop (HITL)

A process where humans review or guide AI decisions.

I

40. Inference

The process of generating predictions using a trained AI model.

41. Input Prompt

The instruction or question provided to an AI model.

42. Instruction Tuning

Training AI models to follow natural language instructions effectively.

J

43. JSON

A structured format commonly used for exchanging data.

44. Jupyter Notebook

An interactive environment for writing and executing Python code.

K

45. Knowledge Base

A collection of organized information used by AI systems.

46. Keyword

An important word or phrase that helps define a task or search.

L

47. Large Language Model (LLM)

An AI model trained on vast amounts of text to understand and generate language.

48. Latency

The time taken for an AI system to respond.

49. Learning Rate

A parameter controlling how quickly a model updates during training.

50. Llama

A family of Large Language Models developed by Meta.

M

51. Machine Learning (ML)

A branch of AI that enables systems to learn from data.

52. Markdown

A lightweight markup language used for formatting text.

53. Model

A trained AI system that performs predictions or generates outputs.

54. Multimodal AI

AI capable of processing multiple data types such as text, images, audio, and video.

55. Memory

Information retained across interactions or sessions, depending on the system.

N

56. Natural Language Processing (NLP)

The field of AI focused on understanding and generating human language.

57. Neural Network

A computational model inspired by the human brain.

58. Normalization

Scaling data to improve model performance.

O

59. One-Shot Prompting

Providing one example before requesting a task.

60. Optimization

Improving prompts or models to achieve better performance.

61. Output Token

A token generated by the AI in response.

P

62. Parameter

A value learned by an AI model during training.

63. Parameterized Prompt

A reusable prompt template containing placeholders.

64. PEP 8

Python's official style guide.

65. Persona Prompting

Assigning the AI a specific role or identity.

66. Prediction

The output produced by an AI model.

67. Pre-trained Model

A model trained on large datasets before task-specific adaptation.

68. Prompt

An instruction given to an AI system.

69. Prompt Chaining

Connecting multiple prompts to solve complex tasks.

70. Prompt Engineering

The practice of designing effective prompts for AI models.

71. Prompt Optimization

Refining prompts to improve response quality.

72. Prompt Template

A reusable structure for creating prompts.

73. Prompt Token

A token that forms part of the input prompt.

Q

74. Query

A request submitted to an AI system.

75. Question Answering (QA)

An AI task where the model answers user questions.

R

76. RAG (Retrieval-Augmented Generation)

A technique that combines information retrieval with language generation.

77. Reasoning

The AI's ability to connect information logically to produce useful outputs.

78. Red Teaming

Testing AI systems to identify weaknesses, risks, and safety issues.

79. Reinforcement Learning (RL)

Learning through rewards and penalties.

80. Responsible AI

Developing AI systems that are fair, transparent, safe, and ethical.

S

81. Safety Alignment

Training AI systems to follow safety guidelines.

82. Sampling

Selecting probable outputs during text generation.

83. Self-Consistency

A reasoning strategy that compares multiple solution paths.

84. Semantic Search

Searching based on meaning rather than exact keywords.

85. Sentiment Analysis

Identifying positive, negative, or neutral opinions.

86. Structured Output

AI output formatted as JSON, XML, tables, or other predefined structures.

87. Supervised Learning

Learning from labeled examples.

88. System Prompt

High-level instructions that guide the AI's behavior.

T**89. Temperature**

A parameter controlling the randomness of AI-generated responses.

90. Token

A unit of text processed by an AI model.

91. Tokenization

Breaking text into tokens for processing.

92. Top-p Sampling

A decoding strategy that selects from the most probable tokens.

93. Transformer

The neural network architecture used by modern LLMs.

94. Training Data

Data used to train AI models.

U**95. Unsupervised Learning**

Learning patterns from unlabeled data.

96. User Prompt

The prompt entered by a user.

V**97. Vector Database**

A database optimized for storing and searching vector embeddings.

98. Vector Embedding

A numerical representation of data used for similarity search.

99. Validation Dataset

Data used to evaluate model performance during development.

W

100. Workflow Automation

Using AI to automate repetitive tasks.

101. Word Embedding

A vector representation of words that captures semantic relationships.

Z

102. Zero-Shot Prompting

A prompting technique where the AI completes a task without seeing examples.

103. Zero-Day Prompt Injection

A newly discovered prompt injection technique that exploits vulnerabilities before defenses are available.

104. Zero-Trust AI

An approach where AI outputs are always verified rather than accepted by default.

ABOUT THIS LABORATORY MANUAL

This laboratory manual introduces students to the art and science of Prompt Engineering using modern Large Language Models (LLMs). Through a series of well-structured experiments, students will learn to design, optimize, and evaluate prompts for a wide range of real-world applications including text generation, summarization, translation, code generation, chatbot development, and more.

The manual emphasizes hands-on learning, responsible AI usage, ethical considerations, and development of industry-relevant skills.

YOU WILL LEARN

- ✓ Prompt Design & Engineering
- ✓ Zero-shot, Few-shot & CoT Prompting
- ✓ Role-based & Context-aware Prompting
- ✓ Prompt Optimization & Evaluation
- ✓ AI Applications Across Domains
- ✓ Ethical & Responsible AI Usage
- ✓ Structured Output Generation
- ✓ Code Generation with AI
- ✓ Mini Project Development
- ✓ Real-world Problem Solving

TOOLS & TECHNOLOGIES



ChatGPT



Gemini



Claude



GitHub
Copilot



Python



Other
AI Tools

SKILLS YOU WILL DEVELOP



Critical
Thinking



Prompt
Design



Problem
Solving



Creativity



Communication



AI
Literacy



RESPONSIBLE AI. ETHICAL FUTURE.

Use AI tools responsibly. Verify outputs.
Respect privacy and intellectual property.
Promote fairness, inclusiveness and safety.



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