## **ASSIGNMENT 3 : Assignment and practice of ChatGPT and its usage**

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## **Lab 1: Introduction to ChatGPT**

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### ***Output: Submit a one-page summary of ChatGPT's working with real-world examples.***

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### **Objective:**

To understand the basics of ChatGPT, including its origin, architecture, capabilities, and real-world applications.

### **What is ChatGPT?**

ChatGPT is an advanced AI language model developed by **OpenAI**, based on the **GPT (Generative Pre-trained Transformer)** architecture. It is capable of understanding and generating human-like responses to natural language inputs. ChatGPT interacts in a conversational manner and can perform tasks such as answering questions, summarizing text, writing essays, coding, and more.

### **How Does ChatGPT Work?**

ChatGPT is built on the **Transformer architecture**, which uses a mechanism called **self-attention** to understand the relationships between words in a sentence. The model is trained in two stages:

1. **Pre-training:** It learns language patterns, grammar, facts, and reasoning from a large corpus of internet text.
2. **Fine-tuning:** It is trained on specific tasks and human feedback to align its behavior with user expectations.

The model does not "understand" language like a human but predicts the most likely next word based on the context.

### **Capabilities of ChatGPT:**

* Answering questions and explanations
* Language translation and summarization
* Creative writing (poems, stories)
* Code generation and debugging
* Sentiment and emotion analysis

### **Real-World Applications:**

#### **1. Education:**

* Acts as a tutor for math, science, and languages
* Helps students write essays and prepare for exams

#### **2. Health:**

* Assists with basic health information and mental wellness chatbots
* Summarizes medical reports (non-diagnostic)

#### **3. Business:**

* Automates customer service
* Drafts emails, reports, and business proposals
* Provides data insights and summaries

#### **4. Creativity:**

* Generates story ideas, poems, or songs
* Assists in content creation and brainstorming

**Lab 2: Types of Prompts and Prompt Engineering Basics**

***Output: Submit 5 examples of each type and compare results.***

### **Objective:**

**To explore different types of prompts—instructional, interrogative, zero-shot, and few-shot—and understand how prompt design impacts the quality of AI-generated responses.**

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### **1. Instructional Prompts (Give a direct command)**

| **Prompt** | **Output Summary** |
| --- | --- |
| 1. Write a poem about the moon. | Generates a 4-line poem describing the moon's beauty. |
| 2. Summarize the following paragraph. | Returns a concise, clear summary. |
| 3. Create a table of 5 European countries with capitals. | Structured table with accurate data. |
| 4. Explain the concept of gravity in simple words. | Easy-to-understand explanation. |
| 5. Convert the following sentence to passive voice. | Converts sentences correctly using grammar rules. |

### **2. Interrogative Prompts (Ask a question)**

| **Prompt** | **Output Summary** |
| --- | --- |
| 1. What causes rainbows to form? | Scientific explanation involving light refraction. |
| 2. How do computers store data? | Describes binary storage and hardware. |
| 3. Why is exercise important for health? | Lists physical and mental health benefits. |
| 4. What is the capital of Australia? | Gives the correct answer: Canberra. |
| 5. Who invented the telephone? | Correctly identifies Alexander Graham Bell |

### **3. Zero-Shot Prompts (No examples given)**

| **Prompt** | **Output Summary** |
| --- | --- |
| 1. Write a slogan for a coffee shop. | Creative and catchy slogan. |
| 2. Classify this sentence: "I love this product!" | Correctly labels it as Positive sentiment. |
| 3. List five uses of AI in agriculture. | Provides practical use-cases like crop monitoring. |
| 4. Write a story in one paragraph about a lost puppy. | Coherent short story with emotional tone. |
| 5. Generate a Python function to calculate factorial. | Accurate code with correct logic. |

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### **4. Few-Shot Prompts (Includes examples)**

| **Prompt** | **Output Summary** |
| --- | --- |
| 1. Translate English to Marathi:  “Hello” → “नमस्कार”, “Thank you” → | Continues with accurate translation patterns. |
| 2. Classify reviews:  “Excellent service!” → Positive  “Too slow” → Negative  “It was okay” → | Follows pattern and classifies tone correctly. |
| 3. Convert sentences into questions:  “She is coming.” → “Is she coming?”  “They are ready.” → | Accurately converts the next sentence into a question. |
| 4. Summarize tweets:  “Just landed in Mumbai!” → “User has arrived in Mumbai”  “So tired today.” → | Maintains style and brevity in summarizing. |
| 5. Write titles for news headlines:  “Floods in Delhi disrupt traffic” → “Heavy Floods Halt Delhi Commute” | Imitates concise journalistic tone. |

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### **Comparison of Results**

| **Type** | **Strengths** | **Weaknesses** | **Ideal Use** |
| --- | --- | --- | --- |
| **Instructional** | Clear and direct output, task-oriented | May need additional context for complex tasks | Formatting, creative writing, summarizing |
| **Interrogative** | Natural question form, good for learning | Can give brief or vague answers | Q&A, explanations, trivia |
| **Zero-Shot** | Fast and efficient, no setup needed | Output may vary in format or depth | Quick tasks, creative outputs |
| **Few-Shot** | High accuracy, consistent output, follows pattern | Needs more prompt design effort | Classification, translation, structured tasks |

**Lab 3: Precision Prompting for Information Extraction**

**Output: Document prompt + output accuracy and format.**

### **Objective:**

To extract structured data from ChatGPT responses using precision prompting techniques.

### **Activities:**

#### Activity 1: Format Response in JSON

Prompt:

Extract the following information from the paragraph below and return the output in JSON format:  
 Paragraph:  
 “John Smith is a Senior Software Engineer at Google, specializing in cloud computing and AI. He can be reached at johnsmith@gmail.com or at (123) 456-7890. He previously worked at Microsoft and graduated from MIT in 2015.”

**ChatGPT Response:**

"name": "John Smith",

"current\_position": "Senior Software Engineer",

"company": "Google",

"specialization": ["cloud computing", "AI"],

"email": "johnsmith@gmail.com",

"phone": "(123) 456-7890",

"previous\_company": "Microsoft",

"education": {

"university": "MIT",

"graduation\_year": 2015

#### **Activity 2: Extract Resume Sections from Paragraph**

**Prompt:**

Extract and format the resume of the following candidate into sections: Personal Info, Work Experience, Skills, Education.  
 Paragraph:  
 “Aditi Sharma is a Data Analyst with 3 years of experience in Python, SQL, and Tableau. She works at Infosys and holds a B.Sc. in Statistics from Delhi University. Contact: aditisharma@email.com, 9876543210.”

**ChatGPT Response:**

| **Section** | **Details** |
| --- | --- |
| Personal Info | Name: Aditi Sharma  Email: aditisharma@email.com  Phone: 9876543210 |
| Work Experience | Data Analyst at Infosys (3 years experience) |
| Skills | Python, SQL, Tableau |
| Education | B.Sc. in Statistics, Delhi University |

#### **Activity 3: Extract Keywords**

**Prompt:**

Extract 5 key technical skills and 3 soft skills from the paragraph below:  
 “Ravi Mehra is a Machine Learning Engineer skilled in TensorFlow, Python, R, data cleaning, and model deployment. He is also an excellent communicator, team player, and problem solver.”

**ChatGPT Response:**

{

"technical\_skills": [

"TensorFlow",

"Python",

"R",

"data cleaning",

"model deployment"

],

"soft\_skills": [

"communication",

"teamwork",

"problem-solving"

]

}

**Lab 4: Summarization and Text Transformation**

### **Objective:**

To use ChatGPT for summarizing lengthy content and transforming tone/style of text such as emails or notes.

### **Activities:**

#### **Activity 1: Summarization of a News Article**

Original Text:

“The Indian Space Research Organisation (ISRO) has successfully launched the PSLV-C57 rocket carrying the Aditya-L1 spacecraft. This marks India’s first solar observatory mission, aimed at studying the Sun’s outermost layer and solar wind. The launch took place from the Satish Dhawan Space Centre and is a significant step in India's growing space capabilities.”

**Prompt Given to ChatGPT:**

Summarize the above news article in 2-3 lines.

**ChatGPT Output (Summary):**

ISRO successfully launched PSLV-C57 with Aditya-L1, India’s first solar observatory mission, to study the Sun’s outermost layer and solar wind. The launch enhances India’s space research capabilities.

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#### **Activity 2: Summarization of a Research Abstract**

**Original Abstract:**

“This study investigates the role of artificial intelligence in predictive healthcare analytics. By applying machine learning algorithms to patient data, early signs of diseases can be detected, enabling preventive measures. The research highlights improved patient outcomes and reduced healthcare costs through AI adoption.”

**Prompt Given to ChatGPT:**

Summarize this abstract into 1-2 sentences for a layperson.

**ChatGPT Output (Summary):**

The study shows how AI can help doctors detect diseases early by analyzing patient data, which improves health and saves costs. Machine learning helps in better predictions and preventive care.

#### **Activity 3: Rewrite an Email – Informal to Formal**

**Original Informal Email:**

“Hey Sir, I can’t make it to class tomorrow. Got something urgent to take care of. Please let me know what I’ll miss.”

**Prompt Given to ChatGPT:**

Rewrite the above email in a formal tone.

**ChatGPT Output (Formal Version):**

“Dear Sir,  
 I hope you are doing well. I would like to inform you that I will not be able to attend class tomorrow due to an urgent personal matter. Kindly let me know the topics that will be covered during the session.  
 Thank you for your understanding.  
 Sincerely,  
 [Your Name]”

#### **Activity 4: Rewrite an Email – Formal to Informal**

**Original Formal Email:**

“Dear Riya,  
 I hope this message finds you well. I am writing to confirm our meeting scheduled for 3 PM tomorrow. Please let me know if there are any changes.  
 Best regards,  
 Meena”

**Prompt Given to ChatGPT:**

Rewrite this email in an informal tone.

**ChatGPT Output (Informal Version):**

“Hey Riya!  
 Just wanted to confirm if we're still on for our 3 PM meeting tomorrow. Let me know if anything changes.  
 Cheers,  
 Meena :)”

**Lab 5: ChatGPT in Code Generation and Debugging**

### **Objective:**

To explore how ChatGPT can assist in writing, understanding, and debugging code across programming languages such as Python, C++, and Java.

### **Activities:**

#### **Activity 1: Code Generation**

**Prompt Given to ChatGPT:**

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

**ChatGPT Generated Code:**

def is\_prime(n):

if n <= 1:

return False

for i in range(2, int(n\*\*0.5) + 1):

if n % i == 0:

return False

return True

# Test

num = int(input("Enter a number: "))

if is\_prime(num):

print(f"{num} is a prime number.")

else:

print(f"{num} is not a prime number.")

**Expected Output:**

For input 7:

7 is a prime number.

#### **Activity 2: Code Debugging (C++)**

**Original C++ Code (Bugged):**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter a number: ";

cin >> n;

for (int i = 0; i <= n; i++) {

if (n % i == 0)

cout << i << " ";

}

return 0;

}

**Error: Division by zero (when i = 0)**

**Prompt Given to ChatGPT:**

Debug this C++ code that prints factors of a number.

**ChatGPT Debugged Code:**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter a number: ";

cin >> n;

for (int i = 1; i <= n; i++) {

if (n % i == 0)

cout << i << " ";

}

return 0;

}

**Expected Output:**

For input 6:

1 2 3 6

#### **Activity 3: Java Code Generation from Prompt**

**Prompt Given to ChatGPT:**

Generate Java code to calculate the factorial of a number using recursion.

**ChatGPT Generated Code:**

public class Factorial {

static int factorial(int n) {

if (n == 0)

return 1;

else

return n \* factorial(n - 1);

}

public static void main(String[] args) {

int num = 5;

System.out.println("Factorial of " + num + " is: " + factorial(num));

}

}

**Expected Output:**

Factorial of 5 is: 120

**Lab 6: Domain-Specific Applications**

### **Objective:**

To explore how ChatGPT can be applied in domain-specific tasks such as medical chatbots, legal document analysis, or educational tool development.

### **Chosen Activity: Educational Quiz Generation**

### **Prompt Design:**

**Prompt Given to ChatGPT:**

Generate 5 multiple-choice quiz questions with 4 options each based on the topic "Data Structures in C". Include the correct answer for each.

### **ChatGPT Output:**

| **No.** | **Question** | **Options** | **Correct Answer** |
| --- | --- | --- | --- |
| 1 | What is the time complexity of accessing an element in an array? | A. O(1), B. O(n), C. O(log n), D. O(n log n) | A. O(1) |
| 2 | Which data structure uses FIFO (First In First Out)? | A. Stack, B. Queue, C. Tree, D. Graph | B. Queue |
| 3 | Which traversal is used in Binary Search Trees to get sorted order? | A. Preorder, B. Postorder, C. Inorder, D. Level | C. Inorder |
| 4 | What is the maximum number of children in a binary tree node? | A. 1, B. 2, C. 3, D. 4 | B. 2 |
| 5 | Which data structure is used for implementing recursion? | A. Queue, B. Stack, C. Array, D. Linked List | B. Stack |

### **Output Evaluation:**

| **Criteria** | **Evaluation** |
| --- | --- |
| **Relevance** | All questions directly relate to Data Structures in C |
| **Clarity** | Questions and options are clearly phrased |
| **Correctness** | Correct answers are accurate and valid |
| **Usefulness in Education** | Suitable for quizzes, interviews, or tests |