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**Lab 1: Introduction to ChatGPT**

**Objective:** Understand the basics of ChatGPT, its origin, capabilities, and real-world applications.

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

### **What is ChatGPT?**

ChatGPT is an advanced **AI language model** developed by **OpenAI**, designed to interact in natural language. It is built using **GPT (Generative Pretrained Transformer)** architecture, allowing it to generate human-like text based on the input it receives.

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

* **Architecture**: ChatGPT uses the **Transformer model**, a type of neural network introduced by Google in 2017.
* **Process**:  
  1. Pre-trained on large datasets (books, articles, internet text).
  2. Fine-tuned for specific tasks (like answering questions or chatting).
  3. Uses **self-attention** to understand context and generate the next word or sentence.

### **Key Capabilities**

* Answering questions and providing explanations
* Writing essays, poems, stories, and code
* Translating languages
* Summarizing documents or articles
* Simulating conversations and interviews
* Analyzing images (in newer versions like GPT-4o)

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### **Origin and Evolution**

| **Version** | **Year** | **Features** |
| --- | --- | --- |
| GPT-1 | 2018 | First version, limited scale |
| GPT-2 | 2019 | Improved text generation |
| GPT-3 | 2020 | Large-scale model, 175B parameters |
| GPT-4 | 2023 | More accurate, understands visuals |
| GPT-4o | 2024 | Multimodal (text, image, voice) |

### **Real-World Applications**

| **Sector** | **Use-Cases** |
| --- | --- |
| **Education** | Personalized tutoring, concept explanation, language learning |
| **Health** | Wellness chatbots, mental health support, basic medical Q&A |
| **Business** | Email drafting, meeting summaries, customer service automation |
|  |  |
|  |  |

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

**Objective**: Learn types of prompts (instructional, interrogative, zero/few-shot)

Submit 5 examples of each type and compare results

## **1. Instructional Prompts (Commands)**

| **Prompt** | **Expected Response (Sample)** |
| --- | --- |
| * Write a paragraph about the solar system. | * A paragraph describing planets, the sun, and their arrangement. |
| * Generate a list of five healthy snacks. | * A bulleted list with items like nuts, yogurt, fruits, etc. |
| * Summarize the story of “The Tortoise and the Hare.” | * A short summary with the moral. |
| * Explain how photosynthesis works. | * Step-by-step or diagrammatic explanation |

## **2. Interrogative Prompts (Questions)**

| **Prompt** | **Expected Response (Sample)** |
| --- | --- |
| * What is artificial intelligence? | * A definition with basic examples. |
| * Why do we need oxygen to live? | * Scientific explanation of oxygen’s role in respiration. |
| * How does a computer boot up? | * Step-by-step booting process explained. |
| * Who wrote the Harry Potter series? | * “J.K. Rowling” |

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## **3. Zero-Shot Prompts (No Example Given)**

| **Prompt** | **Output Quality** |
| --- | --- |
| Translate "Good night" into Spanish. | “Buenas noches” |
| Classify the sentiment: “I really hate waiting.” | “Negative” |
| What is the capital of Japan? | “Tokyo” |
| Identify the language: “Bonjour, comment ça va?” | “French” |

## **4. Few-Shot Prompts (With Examples Given)**

| **Prompt with Examples** | **Output Quality** |
| --- | --- |
| Example: “I love it” → Positive  “I hate it” → Negative  “It’s okay” → ? | ✅ Answer: “Neutral” (more accurate than zero-shot) |
| Example: “Dog” → “Bark”, “Cat” → “Meow”  “Cow” → ? | ✅ Answer: “Moo” (correct) |
| Example: “Hello” → “Hola”, “Thanks” → “Gracias”  “Goodbye” → ? | ✅ Answer: “Adiós” (accurate) |
| Example: “Fast” → “Quick”, “Happy” → “Joyful”  “Cold” → ? | ✅ Answer: “Chilly” or “Freezing” |

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## **5. Comparison: Zero-Shot vs Few-Shot Prompts**

| **Criteria** | **Zero-Shot** | **Few-Shot** |
| --- | --- | --- |
| **Examples given** | ❌ No | ✅ Yes (1–3 examples) |
| **Complex task performance** | Sometimes inaccurate | Often more accurate and relevant |
| **Best for** | Simple Q&A, general instructions | Pattern tasks like classification, translation |
| **Result consistency** | May vary | More consistent and guided |

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

**Objective:** Extract structured data from ChatGPT responses.

Document prompt + output accuracy and format.

## **Example 1: Extract Contact Info from Paragraph**

Prompt:  
 Extract the contact details (Name, Email, Phone) from the following text and return it in JSON format:

*Text*:  
 "Hi, I'm Priya Sharma, a software engineer from Pune. You can reach me at priya.sharma99@gmail.com or call me at +91-9876543210."

**Output:**

{

"Name": "Priya Sharma",

"Email": "priya.sharma99@gmail.com",

"Phone": "+91-9876543210"

}

**Output Accuracy**: ✅ 100% correct

**Format**: JSON

## **Example 2: Resume Section Extraction**

**Prompt**:  
 Given this paragraph, extract the resume sections: Education, Skills, Experience in JSON format.

***Text***:  
 "Rahul Verma is an experienced web developer. He holds a B.Tech in Computer Science from IIT Delhi. He has worked at Infosys for 3 years and is skilled in HTML, CSS, JavaScript, and React."

**Output**:

{

"Education": "B.Tech in Computer Science from IIT Delhi",

"Experience": "Worked at Infosys for 3 years",

"Skills": ["HTML", "CSS", "JavaScript", "React"]

}

**Output Accuracy**: 100% correct

**Format**: JSON

## **Example 3: Keyword Extraction**

**🔹 Prompt**:  
 Extract keywords from this paragraph and return them as a bullet list.

***Text***:  
 "AI is transforming industries such as healthcare, finance, and education. Technologies like machine learning, natural language processing, and computer vision play a major role."

**🔹 Output**:

* AI
* Healthcare
* Finance
* Education
* Machine Learning
* Natural Language Processing
* Computer Vision

**🔹 Output Accuracy**: ✅ Correct and complete  
**🔹 Format**: Bullet list (Markdown or plain text)

## **Example 4: Tabular Output for Book Data**

**🔹 Prompt**:  
 Extract the following details from this text and present them in a table: Title, Author, Year.

***Text***:  
 "The book 'The Alchemist' was written by Paulo Coelho and published in 1988."

**🔹 Output**:

| **Title** | **Author** | **Year** |
| --- | --- | --- |
| The Alchemist | Paulo Coelho | 1988 |

**Output Accuracy**: ✅ 100% correct

**🔹 Format**: Table

## **Example 5: JSON Output for Job Posting Info**

**🔹 Prompt**:  
 Extract job title, company, location, and skills required from the following and return in JSON.

***Text***:  
 "Google is hiring for the role of Data Analyst in Bangalore. Required skills include SQL, Python, and data visualization."

**🔹 Output**:

{

"Job Title": "Data Analyst",

"Company": "Google",

"Location": "Bangalore",

"Skills": ["SQL", "Python", "Data Visualization"]

}

**Output Accuracy**: ✅ Accurate

**🔹 Format**: JSON

## **Summary Table**

| **ask** | **Prompt Format** | **Output Format** | **Accuracy** |
| --- | --- | --- | --- |
| Contact Info Extraction | Plain paragraph | JSON | ✅ Correct |
| Resume Sections | Plain paragraph | JSON | ✅ Correct |
| Keyword Extraction | Paragraph | Bullet List | ✅ Correct |
| Book Info (Title etc.) | Paragraph | Table | ✅ Correct |
| Job Posting Info | Paragraph | JSON | ✅ Correct |

**Lab 4: Summarization and Text Transformation**

**Objective:** Use ChatGPT for summarization, rewriting, tone transformation.

Summary and transformation report with original vs output.

### **Example 1: Summarizing a News Article**

**🧾 Task Type**: Summarization  
 **🔹 Original Text**:  
 "India launched its third moon mission, Chandrayaan-3, aiming to land near the moon’s south pole. This follows the failure of Chandrayaan-2 in 2019. The mission carries a lander and rover and is expected to explore lunar soil and conduct experiments."

**✅ Summarized Output**:  
 "Chandrayaan-3 is India’s new moon mission aiming for a south pole landing, carrying a lander and rover for lunar experiments."

### **📚 Example 2: Summarizing a Research Abstract**

**🧾 Task Type**: Summarization  
 **🔹 Original Text**:  
 "This research explores the use of AI in personalized learning. By analyzing student behavior and adapting content in real-time, AI tools can improve engagement and academic outcomes. The study involved 200 students and showed a 20% improvement in test scores."

**✅ Summarized Output**:  
 "The study shows that AI in personalized learning can boost student engagement and test scores by 20%."

### **✉️ Example 3: Rewriting Email – Informal to Formal**

**🧾 Task Type**: Tone Transformation  
 **🔹 Original Text**:  
 "Hey! Just wanted to let you know I can’t make it to the meeting tomorrow. Got something urgent to handle."

**✅ Formal Version**:  
 "Dear [Name], I regret to inform you that I will be unable to attend tomorrow’s meeting due to an urgent matter. Regards, [Your Name]"

### **✉️ Example 4: Rewriting Email – Formal to Informal**

**🧾 Task Type**: Tone Transformation  
 **🔹 Original Text**:  
 "Dear Team, Please be advised that the project deadline has been extended to next Friday."

**✅ Informal Version**:  
 "Hi everyone, just a heads-up — the project deadline’s been moved to next Friday!"

### **📝 Example 5: Rewriting a Paragraph (Clarity & Simplicity)**

**🧾 Task Type**: Text Rewriting  
 **🔹 Original Text**:  
 "The implementation of the aforementioned framework significantly enhanced the operational efficiency of the organization."

**✅ Rewritten Version**:  
 "This new system helped the organization work more efficiently."

## **Summary and Transformation Report (Final Table)**

|  | **Task Type** | **Original Text (Short)** | **Transformed Output** |
| --- | --- | --- | --- |
| 1 | Summarization | News on Chandrayaan-3 launch | India’s new moon mission to explore lunar south pole |
| 2 | Summarization | Research on AI in learning | AI improved engagement and scores by 20% |
| 3 | Tone Transformation | Informal email about missing meeting | Polite formal email version |
| 4 | Tone Transformation | Formal email about deadline | Friendly informal version |
| 5 | Text Rewriting | Complex sentence on framework efficiency | Simple sentence on system improvement |

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

**Objective:** Use ChatGPT tasks.

**Output:** Document the prompt design and output evaluation.

### **Example 1: Code Generation in Python**

**🔹 Prompt**:  
 “Write a Python program to check if a number is prime.”

**🧠 ChatGPT’s 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

print(is\_prime(29))

**Expected Output**:  
 True

**Actual Output**:  
 True

**Comparison**: ✅ Matches perfectly

### **Example 2: Code Generation in C++**

**🔹 Prompt**:  
 “Write a C++ program to find the factorial of a number.”

**🧠 ChatGPT’s Generated Code**:

#include <iostream>

using namespace std;

int factorial(int n) {

if (n == 0 || n == 1) return 1;

return n \* factorial(n - 1);

}

int main() {

int num = 5;

cout << "Factorial: " << factorial(num);

return 0;

}

**Expected Output**:  
 Factorial: 120

**Actual Output**:  
 Factorial: 120

**Comparison**: ✅ Matches perfectly

### **Example 3: Debugging a Python Snippet**

**🔹 Prompt**:  
 “This Python code isn’t working. Fix it.”

def add\_numbers(a, b)

return a + b

print(add\_numbers(5, 3))

**ChatGPT’s Debugged Code:**

def add\_numbers(a, b):

return a + b

print(add\_numbers(5, 3)

**Expected Output:** 8

**Actual Output:** 8

**Comparison:** ✅ Syntax error fixed, output is correct

### **Example 4: Java Code Generation**

**🔹 Prompt**:  
 “Write a Java program to reverse a string.”

**🧠 ChatGPT’s Generated Code**:

public class ReverseString {

public static void main(String[] args) {

String str = "hello";

String reversed = new StringBuilder(str).reverse().toString();

System.out.println("Reversed: " + reversed);

}

}

**Expected Output**:  
 Reversed: olleh

**Actual Output**:  
 Reversed: olleh

**Comparison**: ✅ Matches perfectly

## **Final Summary Table**

|  | **Task Type** | **Language** | **Prompt Summary** | **Output Match?** |
| --- | --- | --- | --- | --- |
| 1 | Code Gen | Python | Prime number check | ✅ Yes |
| 2 | Code Gen | C++ | Factorial using recursion | ✅ Yes |
| 3 | Debugging | Python | Fix missing colon | ✅ Yes |
| 4 | Code Gen | Java | Reverse a string | ✅ Yes |

**Lab 6: Domain-Specific Applications**

**Objective:** Use ChatGPT tasks.

**Output:** Document the prompt design and output evaluation.

### **Prompt Design**

“Generate a multiple-choice quiz (MCQ) with 5 questions on the topic ‘Photosynthesis’ for 8th-grade students. Include 4 options per question and highlight the correct answer.”

### **ChatGPT Output**

#### **Quiz: Photosynthesis (Grade 8 Level)**

**Q1. What is the main purpose of photosynthesis?** A. To absorb water from the soil  
 B. To convert sunlight into chemical energy ✅  
 C. To produce oxygen only  
 D. To use carbon dioxide only

**Q2. Which part of the plant carries out photosynthesis?** A. Root  
 B. Stem  
 C. Flower  
 D. Leaf ✅

**Q3. What gas is taken in by plants during photosynthesis?** A. Oxygen  
 B. Carbon dioxide ✅  
 C. Nitrogen  
 D. Hydrogen

**Q4. Which pigment in plants absorbs sunlight?** A. Hemoglobin  
 B. Chlorophyll ✅  
 C. Melanin  
 D. Carotene

**Q5. What are the products of photosynthesis?** A. Oxygen and glucose ✅  
 B. Carbon dioxide and oxygen  
 C. Water and sunlight  
 D. Oxygen and nitrogen

### **📊 Output Evaluation**

| **Criteria** | **Evaluation** |
| --- | --- |
| **Relevance** | ✅ Aligned with topic |
| **Grade Appropriateness** | ✅ Suitable for 8th-grade level |
| **Clarity** | ✅ Questions are clearly framed |
| **Answer Highlighting** | ✅ Correct answers identified |
| **Usefulness** | ✅ Ready for classroom use |