***Assignment and practice of ChatGPT and its usage***

**Lab 1:** Introduction to ChatGPT

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

applications.

***1. What is ChatGPT?****ChatGPT is an AI chatbot made by OpenAI. It uses a language model called GPT (Generative Pre-trained Transformer) to understand and respond to human language in a smart, natural way.*

***2. Origin and Technology:*** *ChatGPT is built on the* ***transformer architecture****, introduced in the 2017 paper "Attention is All You Need" by Vaswani et al. Transformers use self-attention mechanisms to process input data in parallel, allowing the model to understand context over long passages of text. GPT models are first pre-trained on large datasets and then fine-tuned for specific tasks through supervised learning and reinforcement learning from human feedback (RLHF).*

***3. Capabilities:***

* *Natural language understanding and generation*
* *Text 34esummarization, translation, and rewriting*
* *Code generation and debugging*
* *Data analysis and visualization (in advanced versions)*
* *Dialogue and interactive problem-solving*

***4. Real-World Applications:***

* ***Education:*** *Acts as a virtual tutor, simplifies complex topics, creates quizzes, and assists with homework.Example: A student asks ChatGPT to explain the Pythagorean theorem or generate a practice test.*
* ***Healthcare:*** *Provides general health information, mental health support (not a substitute for professional advice).Example: A patient receives guidance on managing stress or understanding symptoms.*
* ***Business:*** *Automates customer service, drafts emails, analyzes data, and assists in marketing content creation. Example: A business uses ChatGPT to generate product descriptions or automate FAQs.*
* ***Creativity:*** *Helps in story writing, poetry, songwriting, and idea brainstorming.Example: An author gets inspiration or a plot twist idea from ChatGPT.*

***5. Interface Exploration:*** *Users interact with ChatGPT via a simple text interface on platforms like OpenAI’s website or integrated tools (e.g., in Microsoft Word or coding editors). Inputs are typed as questions or prompts, and ChatGPT generates contextual responses in real time.*

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

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

***1. Instructional Prompts (Tells ChatGPT to do something)***

| ***Prompt*** | ***Result*** |
| --- | --- |
| Summarize the paragraph about climate change. | Clear summary given in 2–3 sentences. |
| Write a thank-you email for a job interview. | Polite and well-structured email. |
| Create a recipe for a vegetarian sandwich. | Step-by-step recipe provided. |
| Write a poem about winter. | 4-line original poem generated. |
| Generate a list of 5 study tips. | Helpful and practical tips listed. |

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

| ***Prompt*** | ***Result*** |
| --- | --- |
| What is the capital of Australia? | “Canberra” – correct. |
| Why do leaves change color in autumn? | Explained simply and clearly. |
| How does photosynthesis work? | Detailed, but beginner-friendly answer. |
| Who wrote \*Romeo and Juliet\*? | “William Shakespeare” – correct. |
| What are the benefits of exercise? | Listed multiple benefits with short explanations. |

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

| ***Prompt*** | ***Result*** |
| --- | --- |
| Translate “Good night” to Spanish. | Buenas noches” – correct. |
| Generate a tweet about healthy eating. | Short, catchy tweet created. |
| Solve: What is 13 x 7? | Correct answer: 91. |
| Write a review of a fictional movie. | Creative and detailed fake review. |
| Make a slogan for a travel agency. | “Explore More, Worry Less!” – original and catchy. |

***4. Few-Shot Prompts (Prompt with examples)***

| ***Prompt*** | ***Result*** |
| --- | --- |
| Translate with examples | More consistent and context-aware. |
| Math pattern with examples | Continued pattern accurately. |
| Grammar correction with examples | Corrected sentence with clear logic. |
| Sentence rewriting with examples | Matches style and tone of given examples. |
| Naming products with examples | Created names similar in tone and branding. |

***Comparison of Prompt Types:***

| ***Prompt Type*** | ***Strengths*** | ***Weaknesses*** |
| --- | --- | --- |
| Instructional | Clear, direct tasks | Needs well-defined instructions |
| Interrogative | Good for getting facts | May lack depth if not specific |
| Zero-Shot | Fast and simple | May misinterpret vague prompts |
| Few-Shot | Better understanding of patterns | Takes more effort to write |

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

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

**Activity 1:** Format Response in JSON

**Prompt:**

Extract the following fields from the text below and format your response as JSON:

- Full Name

- Email Address

- Phone Number

- Skills

- Education

- Work Experience

Text:

"John Smith is a software engineer with 7 years of experience. He holds a BSc in Computer Science from Stanford University. His skills include Python, JavaScript, and AWS. You can reach him at john.smith@example.com or +1-555-987-6543. He has worked at Google and Netflix."

**Expected Output (Accuracy: High | Format: JSON)**

{

"Full Name": "John Smith",

"Email Address": "john.smith@example.com",

"Phone Number": "+1-555-987-6543",

"Skills": ["Python", "JavaScript", "AWS"],

"Education": "BTech in Computer Science from Stanford University",

"Work Experience": ["Google", "Netflix"]

}

**Activity 2:** Extract Resume Sections from a Paragraph.

**Prompt:**

Extract and structure the following resume sections from the paragraph:

- Summary

- Education

- Experience

- Skills

Text:

"Jane Doe is an experienced product manager with a decade in the tech industry. She earned her MBA from Harvard Business School and has worked at Microsoft and Slack. Her core competencies include product strategy, user research, and agile development."

**Expected Output (Accuracy: Medium to High | Format: JSON)**

{

"Summary": "Experienced product manager with a decade in the tech industry.",

"Education": "MBA from Harvard Business School",

"Experience": ["Microsoft", "Slack"],

"Skills": ["Product strategy", "User research", "Agile development"]

}

**Activity 3:** Extract Keywords from Job Description Paragraph

Extract and list key technical and soft skills as keywords from the following job description:

"Looking for a data analyst proficient in SQL, Python, and Excel. Must be detail-oriented, analytical, and a good communicator. Experience with Tableau and large datasets is a plus."

**Expected Output (Accuracy: High | Format: List)**

{

"Technical Skills": ["SQL", "Python", "Excel", "Tableau"],

"Soft Skills": ["Detail-oriented", "Analytical", "Good communicator"]

}

**Output Evaluation**

| **Activity** | **Output Format** | **Accuracy** | **Notes** |
| --- | --- | --- | --- |
| 1 | JSON | High | Clear structure, reliable info extraction |
| 2 | JSON | Medium-High | May vary slightly depending on phrasing |
| 3 | JSON/List | High | Consistent identification of keywords |

**Lab 4:** Summarization and Text Transformation

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

**Activity 1:** Summarize a News Article

**Prompt:**

Summarize the following news article in 3-4 sentences:

"Tech giant OpenAI has launched a new version of its AI model, GPT-5, claiming it outperforms previous models in reasoning, coding, and creative writing. According to CEO Sam Altman, this version also includes stronger guardrails and memory features. Industry experts believe GPT-5 may reshape multiple sectors, including education, software development, and media. However, some critics warn about increasing AI dependency and call for tighter regulation."

**Output (Summary):**

OpenAI has released GPT-5, an advanced AI model with improved reasoning, coding, and writing capabilities. CEO Sam Altman highlighted its enhanced memory and safety features. Experts expect it to impact fields like education and media, though concerns about AI reliance and regulation persist.

**Activity 2:** Summarize a Research Abstract

**Prompt:**

Summarize this abstract in simple language:

"This study examines the impact of remote work on employee productivity across multiple industries during the COVID-19 pandemic. Using survey data from over 2,000 participants, we found that while productivity varied by sector, the majority of respondents reported stable or increased output. Key factors influencing productivity included home office setup, communication tools, and managerial support."

**Output (Summary):**

The study looked at how remote work affected productivity during COVID-19. Most people said their productivity stayed the same or got better. Important factors were having a good home office, using helpful tools, and getting support from managers.

**Activity 3:** Rewrite Email (Formal → Informal)

**Original Email (Formal):**

Dear Mr. Taylor,

I hope this message finds you well. I am writing to follow up on the proposal I submitted last week. Please let me know if you have any feedback or if there's a good time for us to discuss it further.

Best regards,

Amanda

**Prompt:**

Rewrite the following email in an informal tone.

**Output (Informal Version):**

Hi Taylor,

Hope you're doing great! Just checking in on the proposal I sent over last week. Let me know what you think or if you’d like to chat about it sometime.

Cheers,

Amanda

**Activity 4:** Rewrite Email (Informal → Formal)

**Original Email (Informal):**

Hey, just wanted to check if you had a chance to look over the doc I sent. No rush—just curious what you think!

**Prompt:**

Rewrite the following message in a formal tone.

**Output (Formal Version):**

Dear Taylor,

I hope you are well. I wanted to kindly follow up to see if you’ve had a chance to review the document I sent. Please feel free to share your thoughts when convenient.

Best regards,

Amanda

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

**Objective:** Explore how ChatGPT can assist in programming.

### **Activity 1:** Generate Code from Prompt

**Prompt:**

Write a Python function that checks if a given number is a 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

**Expected Output Comparison:**

| **Test Case** | **Input** | **Output** | **Matches Expected?** |
| --- | --- | --- | --- |
| 1 | 7 | True | Yes |
| 2 | 10 | False | Yes |
| 3 | 1 | False | Yes |

Code is correct and efficient (uses √n optimization)

**Activity 2:** Generate Java Code

**Prompt:**

Write a Java class with a method to reverse a string.

**ChatGPT-Generated Code:**

public class StringUtil {

public static String reverse(String input) {

return new StringBuilder(input).reverse().toString();

}

}

**Expected Output Comparison:**

| **Input** | **Output** | **Matches Expected?** |
| --- | --- | --- |
| "hello" | "olleh" | Yes |
| "OpenAI" | "IAnepO" | Yes |

**Efficient use of StringBuilder.reverse()**

### **Activity 3:** Debug Code Snippet

**Prompt:**

This Python code gives an error. Fix it.

def add\_numbers(a, b)

return a + b

**ChatGPT Debugged Code:**

def add\_numbers(a, b):

return a + b

**Explanation:**

The original code was missing a colon : at the end of the function definition.

**Fix is correct and clearly explained.**

### **Activity 4:** C++ Code Generation

**Prompt:**

Write a C++ program to compute the factorial of a number using recursion.

**ChatGPT-Generated Code:**

#include <iostream>

using namespace std;

int factorial(int n) {

if (n <= 1)

return 1;

return n \* factorial(n - 1);

}

int main() {

int num;

cout << "Enter a number: ";

cin >> num;

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

return 0;

}

**Expected Output Comparison:**

| **Input** | **Output** | **Matches Expected?** |
| --- | --- | --- |
| 5 | 120 | Yes |
| 0 | 1 | Yes |

**Lab 6:** Domain-Specific Applications

**Objective:** Use ChatGPT tasks.

## **Selected Activity:** Educational Quiz Generation

### **Prompt Design**

**Prompt:**

Generate a 5-question multiple-choice quiz for high school students based on the following passage about photosynthesis. Include 4 options for each question and mark the correct answer.

Passage:

"Photosynthesis is the process by which green plants, algae, and some bacteria convert light energy, usually from the Sun, into chemical energy in the form of glucose. This process occurs mainly in the chloroplasts of plant cells, which contain a green pigment called chlorophyll. The basic equation for photosynthesis is:

6CO₂ + 6H₂O + sunlight → C₆H₁₂O₆ + 6O₂. This means that six molecules of carbon dioxide and six of water, in the presence of sunlight, are converted into one molecule of glucose and six molecules of oxygen."

**ChatGPT Output:**

{

"quiz": [

{

"question": "What is the main purpose of photosynthesis?",

"options": [

"To produce heat",

"To convert chemical energy into light energy",

"To convert light energy into chemical energy",

"To absorb oxygen from the air"

],

"answer": "To convert light energy into chemical energy"

},

{

"question": "Which organelle is primarily responsible for photosynthesis in plant cells?",

"options": [

"Mitochondria",

"Nucleus",

"Chloroplast",

"Ribosome"

],

"answer": "Chloroplast"

},

{

"question": "What pigment is involved in photosynthesis?",

"options": [

"Hemoglobin",

"Chlorophyll",

"Melanin",

"Carotene"

],

"answer": "Chlorophyll"

},

{

"question": "What is the chemical formula for glucose?",

"options": [

"CO₂",

"H₂O",

"C₆H₁₂O₆",

"O₂"

],

"answer": "C₆H₁₂O₆"

},

{

"question": "How many molecules of oxygen are produced in the photosynthesis reaction?",

"options": [

"2",

"4",

"6",

"8"

],

"answer": "6"

}

]

}

### 

### **Output Evaluation:**

| **Criteria** | **Evaluation** |
| --- | --- |
| **Relevance** | All questions are directly based on the passage. |
| **Clarity** | Clear and concise language used. |
| **Difficulty** | Appropriate for high school level. |
| **Correctness** | All answers are scientifically accurate. |
| **Format** | JSON format allows easy integration with quiz tools or LMS. |

## **Summary:**

| **Task** | **Prompt** | **Output Format** | **Accuracy** | **Use Case** |
| --- | --- | --- | --- | --- |
| Educational Quiz Generation | Passage + quiz generation prompt | JSON-formatted MCQ quiz | High | For teachers, tutors, and LMS integration |