

What is ChatGPT?

ChatGPT is a conversational AI developed by **OpenAI**, released on **November 30, 2022**. It's based on large language models (LLMs) like **GPT-3.5** and **GPT-4 series**, and it's accessible through a free platform with optional paid tiers offering advanced features [TechRadarWikipedia](#).

Origins & Transformer Architecture

- Built on the **Generative Pre-trained Transformer (GPT)** architecture, which traces back to the landmark **Attention Is All You Need** paper by Vaswani et al. in 2017 [Wikipedia+1Mue AI+1](#).
- It uses a **decoder-only transformer** model: at each step it predicts the next token based on prior context via **masked multi-head self-attention**, positional encodings, and feed-forward layers with residual connections [Wikipedia](#).
- After large-scale pre-training on text, it was fine-tuned using supervised learning and then aligned through **Reinforcement Learning from Human Feedback (RLHF)** to ensure more reliable and human-aligned responses.

ChatGPT Interface & Exploration

- Users interact in a chat-like interface on web and mobile (iOS/Android/macOS), where you input prompts as text, voice, or image. ChatGPT responds conversationally, retaining memory of previous turns (if enabled) for improved coherence [github.com](#).
 - New features like **Study Mode** offer structured learning workflows—with stepwise guidance, Socratic questioning, and subject quizzes—available even for free users in India and other regions [economictimes.indiatimes.com+4theguardian.com+4timesofindia.indiatimes.com+4](#).
-

Use-Cases & Real-World Applications

Education

- Acts as a **24x7 tutor** explaining concepts across subjects, offering detailed breakdowns and personalized feedback chatgptconsultancy.com/umatechnology.org.
- Supports educators by generating lesson plans, quizzes, flashcards, and adaptive learning content simplilearn.com+2medium.com+2Mue AI+2.
- **Study Mode** encourages active learning by prompting students with questions instead of giving direct answers, to minimize misuse theguardian.com/wired.com.
- Some schools are using ChatGPT to foster critical thinking and classroom creativity, like turning math into rap or modernizing Shakespeare translations time.com.

Healthcare

- Supports **medical administration**: drafting patient notes, summarizing clinical records, and generating discharge instructions leewayhertz.com+1mdpi.com+1.
- Offers **patient education** and symptom-checking (non-diagnostic), mental health support, and medication reminders—especially useful in remote or underserved areas Mue AI.
- Enhances **EHR management** and research summarization in clinical environments (e.g., in systems like Epic) mdpi.com+1xicom.biz+1.

Business & Enterprise

- Handles **customer support and FAQs**, routing complex queries while reducing response times and cost Mue AIcentricconsulting.com.
- Automates **internal processes**: job descriptions, employee onboarding, resume screening, scheduling, and HR documentation centricconsulting.com.
- Helps in **finance and analytics**: generating reports, budgeting support, compliance checks, and trend analysis centricconsulting.com.
- Supports **content creation**: campaign ideas, marketing copy, blog posts, social media, and SEO content Mue AISimplilearn.com.
- **Creativity & Coding**

- Assists developers by debugging, explaining code, generating snippets in multiple languages, and drafting documentation [Mue AI](#).
- A creative partner for writers and marketers: helps brainstorm stories, name brands, outline scripts, explore plot ideas, or compose text in diverse styles [Mue Althereadtoday.com](#).
- Creative classrooms utilize ChatGPT to turn academic concepts into engaging, imaginative formats.

Summary Table

Area	Functionality & Benefits
Model & Training	Decoder-only GPT with RLHF fine-tuning for safe, coherent output
Interface	Conversational UI supporting text, voice, images + learning tools
Education	Tutoring, assignments, study support, adaptive lesson generation
Healthcare	Assisting clinical documentation, patient interaction, mental health info
Business	Automates customer support, HR, finance, marketing, legal drafting
Creativity & Dev	Brainstorming, drafting, coding help, documentation, ideation

LAB 2

Types of Prompts

1. Instructional Prompts

These prompts provide clear instructions to the AI, guiding it on how to respond.

Examples:

- Summarize the following article in 100 words.
- Translate the sentence into French: 'Hello, how are you?'
- List the steps to bake a chocolate cake.
- Explain the concept of quantum entanglement in simple terms.
- Generate a list of 5 creative writing prompts.

Use Cases:

- When you need specific information or tasks performed.
- To guide the AI in producing structured responses.

2. Interrogative Prompts

These prompts are in the form of questions, seeking information or clarification.

Examples:

- What is the capital of France?
- How does photosynthesis work?
- Why is the sky blue?
- Who wrote 'Pride and Prejudice'?
- When did World War II end?

Use Cases:

- To obtain factual information.
- When you want the AI to provide explanations or definitions.

3. Zero-Shot Prompts

In zero-shot prompting, the AI is asked to perform a task without any prior examples. It relies on its pre-existing knowledge and understanding.

Examples:

- Classify the following sentence as positive or negative: 'I love this movie!'
- Translate 'Good morning' into Spanish.
- Summarize the main points of this article.
- Identify the sentiment of the following tweet.
- Generate a poem about the ocean.

Use Cases:

- When you want the AI to generalize from its training data.
- For tasks where providing examples isn't feasible.

4. Few-Shot Prompts

Few-shot prompting involves providing the AI with a few examples to guide its response. This helps the model understand the desired output format and improves accuracy.

Examples:

- "Translate the following phrases into French:
 - 'I am happy' → 'Je suis heureux'
 - 'Good night' → 'Bonne nuit'
 - 'How are you?' → "
- "Classify the following sentences as positive or negative:
 - 'I love this book' → Positive
 - 'This movie is terrible' → Negative

- 'The food was delicious' → Positive
- "Summarize the following text:
 - 'The sun rises in the east and sets in the west.' → 'The sun follows a daily east-to-west path.'
 - 'Water boils at 100°C.' → "
- "Identify the sentiment of the following statements:
 - 'I am thrilled with my new job' → Positive
 - 'I hate waiting in long lines' → Negative
 - 'The concert was amazing' → "
- "Generate a haiku about autumn:
 - 'Golden leaves falling' → 'Golden leaves falling'
 - 'Crisp air and cool breeze' → 'Crisp air and cool breeze'
 - 'Pumpkins on the porch' → "

Use Cases:

- When you want the AI to learn from specific examples.
- For tasks requiring more nuanced understanding or creativity.

Comparison Table

Prompt Type	Examples Provided	Task Complexity	Accuracy	Use Case Suitability
Instructional	No	Low	High	Structured tasks, clear instructions

Interrogative	No	Low	High	Factual information retrieval
Zero-Shot	No	Medium	Variable	General tasks without examples
Few-Shot	Yes	High	High	Complex tasks needing guidance

Lab 3

Ask ChatGPT to Format Responses in JSON or Tabular Format

JSON Format Request:

```
{
  "Name": "John Doe",
  "Age": 30,
  "Occupation": "Software Engineer"
}
```

Tabular Format Request:

Prompt:

"Please convert the following information into a table format: Name, Age, Occupation; John Doe, 30, Software Engineer."

Name	age	occupation
John doe	30	SOFTWARE ENGINEER

: Extract Contact Information, Resume Sections, and Keywords

1. Extract Contact Information

- **Prompt:**

"Extract the contact information from the following text: 'John Doe, Email:

john.doe@example.com, Phone: +1-234-567-8901, Address: 123 Main St, Cityville, CV."

- **Expected Output:**

```
{  
  "Name": "John Doe",  
  "Email": "john.doe@example.com",  
  "Phone": "+1-234-567-8901",  
  "Address": "123 Main St, Cityville, CV"  
}
```

Extract Resume Sections

Prompt:

"Extract the resume sections from the following text: 'Professional Summary: Experienced software engineer with 5 years in the industry. Skills: Python, Java, SQL. Experience: Software Engineer at TechCorp (2019–2023). Education: B.Sc. in Computer Science from ABC University.'"

Expected Output:

```
{  
  "Professional Summary": "Experienced software engineer with 5 years in the  
industry.",  
  "Skills": ["Python", "Java", "SQL"],  
  "Experience": [  
    {  
      "Job Title": "Software Engineer",  
      "Company": "TechCorp",  
      "Duration": "2019–2023"  
    }  
  ]  
}
```



```
],  
  "Education": [  
    {  
      "Degree": "B.Sc. in Computer Science",  
      "Institution": "ABC University"  
    }  
  ]  
}
```

. Extract Keywords from a Paragraph

- **Prompt:**
"Extract the key skills from the following paragraph: 'John has expertise in Python programming, data analysis, and machine learning. He has worked with various data visualization tools and has a strong foundation in statistics.'"

- **Expected Output:**

```
{  
  "Skills": ["Python programming", "data analysis", "machine learning", "data  
visualization", "statistics"]  
}
```

Output Accuracy and Format

- **Accuracy:** The outputs should accurately reflect the information provided in the prompts. For instance, contact details should match exactly, and resume sections should be correctly identified and categorized.
 - **Format:** The responses should be in the specified format (JSON or tabular). JSON outputs should be properly structured with key-value pairs, and tabular outputs should align data correctly in rows and columns.
-

Tips for Crafting Effective Prompts

- **Be Specific:** Clearly define what you want ChatGPT to extract or format.
- **Provide Examples:** Including examples in your prompt can guide ChatGPT in understanding the desired output format.
- **Use Structured Prompts:** Organize your prompts to mirror the structure you expect in the output.

Activities:

1. Summarize News Articles and Research Abstracts:

- **Prompt:** "Summarize the following news article in 100 words: [Insert article text here]."
- **Expected Output:** A concise summary capturing the main points of the article. [AlZapBox+1EdrawMind+1](#)

2. Rewrite Emails in Formal/Informal Tone:

- **Prompt:** "Rewrite the following email in a formal tone: [Insert email text here]."
- **Expected Output:** The email rewritten with formal language and structure. [W3Schools](#)

Output:

- **Summary and Transformation Report:** Document the original text, the prompt used, and the output generated by ChatGPT. Evaluate the accuracy and appropriateness of the summary and tone transformation.

Activities:

1. Generate Code from Prompts:

- **Prompt:** "Write a Python function that calculates the factorial of a number."

- **Expected Output:** A Python function implementing the factorial calculation. [AlZapBox+1Codecademy+1](#)

2. Debug a Given Code Snippet:

- **Prompt:** "Identify and fix the error in the following Python code: [Insert code snippet here]."
- **Expected Output:** The corrected code with explanations for the changes made. [Java Guides](#)

Output:

- **Comparison Report:** Compare the code generated by ChatGPT with the expected output. Discuss any discrepancies and how they were addressed.

Lab 4: Summarization and Text Transformation

Objective: To explore how ChatGPT can assist in summarizing content, rewriting text, and transforming

tone for different communication needs.

Activities Performed

Activity 1: Summarize News Article

Original (News Excerpt):

"India has launched its first solar mission, Aditya-L1, aimed at studying the outer atmosphere of the Sun. The spacecraft will be positioned at the Lagrange Point 1, about 1.5 million kilometers from Earth, and will monitor solar activity such as solar flares and coronal mass ejections that can impact satellites and power grids on Earth."

Prompt:

"Summarize the following news article in 2-3 lines."

Output (Summary):

India launched its first solar mission, Aditya-L1, to study the Sun's outer atmosphere.

Positioned at Lagrange Point 1, it will observe solar activity that may affect Earth's satellites and

power systems.

Accuracy:

Transformation Quality:

✓ Clear, concise, and retains key information

Activity 2: Summarize Research Abstract

Original Abstract:

"This study proposes a novel convolutional neural network model for skin cancer classification. The model was trained on a dataset of 10,000 dermoscopic images and achieved 92% accuracy in distinguishing between malignant and benign skin lesions. The results demonstrate the model's potential for aiding dermatologists in early cancer detection."

Prompt:

"Summarize this research abstract in simple language."Output (Summary):

Researchers developed a new AI model to identify skin cancer using images. It correctly classified cancer in 92% of cases and can help doctors detect it early.

Accuracy:

Transformation Quality:

✓ Simplified for general understanding

Activity 3: Rewrite Email – Informal to Formal

Original (Informal Email):

"Hey, I can't make it to the meeting today. Got some other stuff lined up. Can we shift it to tomorrow?"

Prompt:

"Rewrite this email in a formal tone."

Output (Formal Email):

"Dear [Recipient],

I regret to inform you that I will be unable to attend today's meeting due to prior commitments. Would it be possible to reschedule it for tomorrow?

Best regards,

[Your Name]"

Transformation Quality:

✅ Formal, respectful, and professional tone

Activity 4: Rewrite Email – Formal to Informal

Original (Formal Email):

"Dear Team,

Kindly note that the deadline for project submissions is Friday, August 9th. Please ensure timely completion.

Best regards,

Manager"

Prompt:

"Rewrite this in an informal tone suitable for a student group chat."

Output (Informal Version): 👍

"Hey everyone! Just a reminder that the project's due on Friday (Aug 9). Let's make sure we wrap it up on time

Transformation Quality:

✅ Friendly, relaxed tone suitable for peers

Final Summary Table

Activity

Type

Original Format Transformed Output

1 News Summarization News Paragraph

2-Line Summary

2 Research Abstract

Summary Abstract

Simple Summary

3 Informal to Formal Email Casual Email

Formal Email

4 Formal to Informal Email Professional Note Student Chat Style

Quality



Lab 5: ChatGPT in Code Generation and Debugging

Objective:

To explore how ChatGPT can help in generating code and debugging errors in Python, C++, or

Java programs.

Activities Performed

Activity 1: Code Generation from Prompt (Python) Prompt:

"Write a Python function to check whether a number is prime."

ChatGPT Output:

```
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 Check:

- `is_prime(7)` → True
- `is_prime(10)` → False



Result:

Output matches expectations

Analysis: The code is optimized using square root logic and works efficiently.

Activity 2: Code Generation (C++)

Prompt:

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

ChatGPT Output:

```
#include <iostream>

using namespace std;

int factorial(int n) {

    if (n <= 1)

        return 1;

    else

        return n * factorial(n - 1);

}

int main() {

    int num;

    }

    cout << "Enter a number: ";

    cin >> num;

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

    return 0;
```

Expected Output Example:

Input: 5 → Output: 120



Result:

Matches expected result

Analysis: Recursion is correctly implemented; output is accurate.

Activity 3: Debugging Python Code

Given Buggy Code:

```
def add_numbers(a, b):  
  
    return a + b  
  
print(add_number(3, 4)) # Typo in function name
```

Prompt to ChatGPT:

"Debug this Python code."

ChatGPT Suggested Fix:

```
def add_numbers(a, b):  
  
    return a + b  
  
print(add_numbers(3, 4)) # Fixed function name
```

Expected Output: 7

Result:

Bug fixed correctly

Analysis: ChatGPT identified the naming error and provided the corrected version.



Activity 4: Debugging C++ Code

Buggy Code:

```
#include<iostream>using namespace std;

int main() {

    int a = 5, b = 0;

    cout << "Division: " << a / b; // Division by zero

    return 0;

}
```

ChatGPT Debugging Suggestion:#include<iostream>

using namespace std;

int main() {

int a = 5, b = 0;

if (b != 0)

cout << "Division: " << a / b;

else

cout << "Error: Division by zero";

```
return 0;
```

```
}
```



Expected Behavior: Prevent crash due to divide-by-zero

Result:

Corrected with safe condition

Analysis: Code now handles runtime errors gracefully.

Final Comparison Table

Activity

Task Type

Language

Input Type

1 Code

Generation Python Text Prompt

2 Code

Generation C++ Text Prompt

3 Debugging Python Buggy Code

4 Debugging C++ Runtime

error (0 div)

Output

Accuracy

Notes

Prime check

function works

Recursion

implemented

Function name

fixed

Error handled with

conditionLab 6: Domain-Specific Applications

Objective:

To explore domain-specific use cases of ChatGPT by designing prompts for a selected field and

evaluating its output.

Selected Activity:

☒ Educational Quiz Generation

Prompt Design:

Prompt:

"Create a 5-question multiple-choice quiz for second-year engineering students on the topic: Digital Logic Design. Include 4 options per question and mark the correct answer."

ChatGPT Output:

Quiz Title: Digital Logic Design – MCQ Quiz

1. Which of the following is a combinational circuit?

A. Flip-Flop

B. Counter

C. Multiplexer


D. Register

Correct Answer: C. Multiplexer

2. The output of a NOT gate is:

- A. Same as input
- B. Always high
- C. Always low
- D. Complement of input

Correct Answer: D. Complement of input

 3. Gray code is used in digital systems to:

- A. Reduce power consumption
- B. Simplify multiplication
- C. Prevent errors during transitions
- D. Increase speed

Correct Answer: C. Prevent errors during transitions



4. In a 4-bit binary number, the MSB represents:

- A. The smallest bit
- B. The parity bit
- C. The most significant bit
- D. The clock signal

Correct Answer: C. The most significant bit



5. What is the binary equivalent of decimal 13?

- A. 1110
- B. 1101

C. 1011

D. 1001

Correct Answer: B. 1101



Output Evaluation:

Criteria


Relevance

Clarity


Accuracy


Usefulness

Evaluation

 Questions are relevant to 2nd-year engineering syllabus

 Questions and options are clearly stated

 All correct answers verified

 Suitable for self-assessment or quizzes