# Assignment 03: ChatGPT in Action — Expanded Report

This report explores how ChatGPT can assist with writing, information extraction, coding, and quiz generation. It covers six lab activities with clear explanations and examples to demonstrate ChatGPT’s capabilities.

## Lab 1: Understanding ChatGPT

**Goal:** Learn how ChatGPT works and what it can do.

1. **What It Is:** ChatGPT is an AI chatbot developed by OpenAI. It can answer questions, generate content, and support learning tasks. It’s based on a machine-learning model called the Transformer, which excels at language understanding.
2. **How It Learns:** ChatGPT is trained on large text collections—books, websites, and articles. It breaks sentences into smaller units (tokens) and uses attention mechanisms to capture relationships among words.
3. **Training Phases:**
   * **Pre‑training:** The AI predicts missing words in millions of sentences to learn grammar and meaning.
   * **Fine‑tuning:** Human reviewers rate outputs, guiding the model toward accurate and safe responses.
4. **Key Abilities:**
   * Answer questions with clarity or depth
   * Summarize long passages into concise points
   * Translate text between languages
   * Rewrite content in a formal or informal tone
   * Structure information into tables, JSON, or lists

**Example:**

* **Input:** “Explain photosynthesis simply.”
* **Output:** “Plants use sunlight, water, and carbon dioxide to produce food and oxygen.”

ChatGPT is valuable in education, healthcare, business, and many other fields.

## Lab 2: Types of Prompts

**Goal:** Practice crafting different prompts and observe ChatGPT’s responses.

* **Instructional Prompt:** Direct command. Example: “List three uses of artificial intelligence.”
* **Interrogative Prompt:** Question format. Example: “What is machine learning?”
* **Zero‑Shot Prompt:** No examples provided; the model applies its knowledge directly.
* **Few‑Shot Prompt:** Includes examples to guide the response format.

| Prompt Type | Speed | Reliability | Ideal Use Cases |
| --- | --- | --- | --- |
| Instructional | Fast | High | Step-by-step guides, lists |
| Interrogative | Medium | Moderate | Concept explanations |
| Zero‑Shot | Fast | Variable | Simple, common tasks |
| Few‑Shot | Medium | High | Custom formats |

Selecting the appropriate prompt type improves output quality.

## Lab 3: Extracting Information from Text

**Goal:** Convert an unstructured sentence into a structured format.

**Original Text:**

“John Doe, Software Engineer at TechSolutions Inc., can be reached at [john.doe@example.com](mailto:john.doe@example.com) or +1‑555‑1234. LinkedIn: linkedin.com/in/johndoe. Graduated from MIT in 2022.”

**ChatGPT Output (JSON):**

{  
 "name": "John Doe",  
 "role": "Software Engineer",  
 "email": "john.doe@example.com",  
 "linkedin": "https://linkedin.com/in/johndoe",  
 "graduation\_year": 2022  
}

This structure is ideal for applications, websites, and databases.

## Lab 4: Summarizing and Changing Tone

**Goal:** Use ChatGPT to condense text or adjust its style.

**Summary Example:**

Original: The city council approved a $10 million plan to install green infrastructure in flood-prone areas.

Summary: The city authorized a $10 million green infrastructure project for flood-prone zones.

**Tone Adjustment Example:**

Informal: “Send the slides ASAP!”  
Formal: “Please share the presentation slides at your earliest convenience.”

ChatGPT adapts content to suit different audiences and purposes.

## Lab 5: Writing and Debugging Python Code

**Goal:** Leverage ChatGPT to generate code and fix simple errors.

**Function Generation Example:**

def average\_score(csv\_path):  
 import csv  
 total, count = 0.0, 0  
 with open(csv\_path, newline='') as f:  
 for row in csv.DictReader(f):  
 try:  
 total += float(row['score'])  
 count += 1  
 except ValueError:  
 continue  
 return round(total / count, 2) if count else 0.0

This function reads scores from a CSV file and returns the average.

**Debugging Example:**

# Incorrect  
print("Hello, {user}!")  
  
# Correct  
print(f"Hello, {user}!")

The fixed version uses an f-string to include the user’s name correctly.

## Lab 6: Creating Educational Quizzes

**Goal:** Generate quizzes with ChatGPT for learning and assessment.

**Neural Network Quiz Sample:**

1. What is a perceptron?
   * A single-layer neural unit
2. What does the sigmoid function do?
   * Produces output between 0 and 1
3. What is backpropagation used for?
   * Calculating gradients
4. What adds non-linearity to a network?
   * Activation function
5. What does an optimizer do?
   * Adjusts weights to minimize loss

These quizzes support review, practice, and testing.