**Task 1: Prompt Engineering**

**Prompt:**

*"Write a well-structured blog post on the topic 'The Impact of Generative AI on the Future of Work.' The blog should have an engaging introduction, well-defined sections, and a compelling conclusion. Discuss how generative AI is reshaping industries, job roles, and workplace efficiency. Include real-world examples of AI applications, ethical considerations, and potential challenges. Maintain a professional yet accessible tone, ensuring readability for both technical and non-technical audiences. Format the content with clear headings, bullet points, and concise paragraphs for easy readability. Conclude with insights on how businesses and employees can adapt to this AI-driven future."*

**Task 2: Model Understanding**

**Non-Technical Explanation (Analogy: The Super Librarian & Magic Books)**

Imagine you walk into a **huge library**, and there's a **super-intelligent librarian** who has read every book in the world. You ask them a question, and instead of just pointing you to one book, they do something magical:

1. **They Predict the Best Next Words**
   * Instead of copying from a book, the librarian **predicts what should come next** based on everything they have read.
   * If you say, **"Once upon a time…"**, the librarian knows the next words could be **"there was a kingdom"** instead of **"pizza is delicious."**
2. **They Use Context to Improve Predictions**
   * If you ask about "climate change," they look at scientific books.
   * If you ask about "Harry Potter," they look at fantasy novels.
   * They don’t just guess randomly—they **understand the context** and respond accordingly.
3. **They Work in Small Pieces (Tokens)**
   * Instead of thinking in full sentences, they **build responses word by word** (or even piece by piece, like "unbeliev-" + "able").
   * This helps them be flexible and generate creative, coherent text.

**Technical Explanation (How It Works Under the Hood)**

GPT-4 is a **transformer-based model** that generates text through a **three-step process:**

1. **Tokenization (Breaking Text into Pieces)**

* Before processing, the model **breaks text into "tokens"** (small pieces of words).
* Example:
  + **"Hello world!"** → Tokens: ["Hello", "world", "!"]
  + **"Artificial Intelligence"** → Tokens: ["Artificial", "Intel", "ligence"]

1. **Attention Mechanism (The "Focus" System)**

* Unlike older models that read text one word at a time, transformers **look at all words at once** and decide what’s most important.
* Example: If the sentence is **"The cat sat on the mat because it was tired,"**
  + The model understands that **"it"** refers to **"the cat"** (not "the mat") by checking **relationships between words** using *self-attention.*

1. **Predicting the Next Token (The Smart Autocomplete)**

* The model **does not "think" or "memorize"** but predicts the most probable next word.
* It assigns probabilities to different words based on previous patterns.
  + Example: If the input is **"Once upon a"**, possible predictions are:
    - **"time"** (90% likely)
    - **"dream"** (7% likely)
    - **"sandwich"** (0.01% likely – very unlikely!)

**TASK 3 - Practical Implementation**

I will be sharing task3.ipynb file for this part of the assignment. I will be using grok api and langchain for this assignment.