**Lab Exercise 4- Exploring the OpenAI Playground**

**Objective:**

To experiment with different language models, fine-tune responses by adjusting parameters, and understand how to leverage the OpenAI Playground for various text-based tasks.

**Prerequisites:**

* Access to the OpenAI Playground (via OpenAI's website). You may need an OpenAI API key, depending on the account setup.
* Basic understanding of how to structure text prompts.

**Step 1: Getting Started with the Playground**

1. **Open the Playground**:
   * Navigate to [OpenAI Playground](https://platform.openai.com/playground).
   * Sign in using your OpenAI account or API key.
2. **Familiarize Yourself with the Interface**:
   * You will see a text input box for writing prompts.
   * On the right-hand side, there are adjustable parameters for model behavior.

**Step 2: Basic Interaction with GPT**

1. **Task**: Simple Q&A
   * In the prompt box, type:

What is the capital of France?

* + Click **Submit** or press **Enter**.
  + Observe the model’s response, which should be “Paris.”

1. **Task**: Try a Conversational Prompt
   * Type:

Explain how photosynthesis works in simple terms.

* + Run the prompt and review the output. The model should generate a concise explanation.

**Step 3: Experimenting with Parameters**

1. **Task**: Adjusting **Temperature**
   * The **temperature** controls the randomness of the output.
     + Low temperature (e.g., 0.2) = deterministic and focused.
     + High temperature (e.g., 0.8) = creative and varied.
   * **Prompt**:

Write a short story about a robot exploring Mars.

* + Set the **temperature** to 0.2 and observe the output.
  + Then, change the **temperature** to 0.8 and compare the outputs.
  + **Reflection**: What differences do you notice? How does temperature affect creativity in writing?

1. **Task**: Modifying **Maximum Length (Tokens)**
   * Tokens represent words or parts of words. Increasing the max length allows the model to generate longer responses.
   * **Prompt**:

Describe the process of water purification in detail.

* + Set **Max Tokens** to 50 and observe the output.
  + Increase **Max Tokens** to 150 and rerun the prompt.
  + **Reflection**: Does the longer output give more information? How does it affect the completeness of the answer?

**Step 4: Using Pre-Built Prompts**

1. **Task**: Pre-built Prompt for Code Generation
   * On the right side, find **Examples** and select **Code Generation**.
   * The pre-built prompt will appear. Modify it to:

Write a Python function to calculate the factorial of a number.

* + Run the prompt and observe the generated code.

1. **Task**: Summarization
   * Go to the **Examples** section again and select **Summarize for a 2nd grader**.
   * Input the following text:

Photosynthesis is the process used by plants, algae, and some bacteria to convert light energy into chemical energy, which can later be released to fuel the organism's activities. This process is essential for the survival of plants and produces the oxygen we breathe.

* + Review the simplified output generated by the model.

**Step 5: Custom Prompt Engineering**

1. **Task**: Generate a Poem
   * In the prompt box, type:

Write a poem about the ocean during a storm.

* + Modify the **top-p** value to 0.9 to encourage more diversity in word choices.
  + Run the prompt and observe the generated poem.

1. **Task**: Role-Playing Conversation
   * Type a prompt that simulates a conversation:

You are a helpful assistant. I'm feeling anxious about an upcoming presentation. How can I calm my nerves?

* + Review the model’s response and notice how it engages in a conversational manner.

**Step 6: Advanced Use Case - Text Completion and Continuation**

1. **Task**: Completing Text
   * In the prompt box, type:

The year is 2050. Humanity has finally established a colony on Mars. The colonists are beginning to face their first major challenge:

* + Set **temperature** to 0.7 and **max tokens** to 100.
  + Run the prompt and let the model complete the text.

**Step 7: Understanding Model Limitations**

1. **Task**: Explore Model Accuracy and Limitations
   * Type a fact-based prompt:

What is the population of the world in 2023?

* + Observe the model's response and verify it using an external source.
  + **Reflection**: Note that the model may not always provide the most accurate or up-to-date information, as it was trained on data available until a certain time.