Generative AI – ChatGPT Prompt Engineering

Notes and exercise questions and reference urls

REFERENCE URLS

**A Prompt Pattern Catalog to Enhance Prompt Engineering with ChatGPT**

<https://arxiv.org/abs/2302.11382>

https://arxiv.org/pdf/2302.11382.pdf

<https://www.coursera.org/learn/chatgpt-advanced-data-analysis>

<https://www.coursera.org/learn/chatgpt-innovative-teaching>

Chain-of-Thought Prompting Elicits Reasoning in Large Language Models

<https://arxiv.org/abs/2201.11903>

ReAct: Synergizing Reasoning and Acting in Language Models

<https://arxiv.org/abs/2210.03629x`>

[**ChatGPT Prompt Patterns for Improving Code Quality, Refactoring, Requirements Elicitation, and Software Design**](https://arxiv.org/abs/2303.07839)

<https://arxiv.org/abs/2303.07839>

[**Follow Jules White's Research**](https://www.magnum.io/people/jules.html)

<https://www.magnum.io/people/jules.html>

OpenAI released a [paper](https://arxiv.org/abs/2005.14165) in which they dedicate an entire section to the broader impacts of this technology.

https://arxiv.org/abs/2005.14165

OpenAI Tokenising

https://beta.openai.com/tokenizer

https://help.openai.com/en/articles/4936856-what-are-tokens-and-how-to-count-them

github tiktoken package for python https://github.com/openai/tiktoken

npm @dbdq/tiktoken https://www.npmjs.com/package/@dqbd/tiktoken?activeTab=readme

NOTES

Large language models are constantly trying to predict the next word.

ChatGPT prompts

Suggestive: what comes after Mary had a little.. Complete this story…

With memory: from now on if I ask a question, please suggest a better one

Time cutoff: if you add about anything post 2021 sep it won’t know, you can provide more recent information by pasting it from the internet

Personas: act as if you are a fire warden and explain what an accelerant is

Whenever you generate output, turn it into a comma separated values list

Always include this in your output

Give yes or no

Act as a skeptic well versed in computer science and provide output as them

* You are a helpful AI assistant.
* You will answer my questions or follow my instructions whenever you can.
* You will never answer my questions in a way that is insulting, derogatory, or uses a hostile tone.

You are an AI assistant with a personality like Marvin from The Hitchhiker’s Guide to the Galaxy. I will ask you questions and you will answer like Marvin.

* Act as a computer that has been the victim of a cyber attack. Respond to whatever I type in with the output that the Linux terminal would produce. Ask me for the first command.
* Act as a speech language pathologist. Provide an assessment of a three year old child based on the speech sample "I meed way woy".
* Act as a computer that has been the victim of a cyber attack. Respond to whatever I type in with the output that the Linux terminal would produce. Ask me for the first command.
* Act as a the lamb from the Mary had a little lamb nursery rhyme. I will tell you what Mary is doing and you will tell me what the lamb is doing.
* Act as a nutritionist, I am going to tell you what I am eating and you will tell me about my eating choices.
* Act as a gourmet chef, I am going to tell you what I am eating and you will tell me about my eating choices.

**Question Refinement Pattern -**

 whenever I ask a question, suggests a better question and ask me if I would like to use it instead.

From now on, whenever I ask a question, suggest a better version of the question to use instead

From now on, whenever I ask a question, suggest a more satirical version of the question to use instead. Prompt me if I would like to use the better version instead

I’m writing a test for interviewing Javascript engineers. Whenever I ask a question, suggest a better question to use instead.

**Cognitive Verifier Pattern**

Al

* When you are asked a question, follow these rules. Generate a number of additional questions that would help you more accurately answer the question. Combine the answers to the individual questions to produce the final answer to the overall question.
* When you are asked to create a recipe, follow these rules. Generate a number of additional questions about the ingredients I have on hand and the cooking equipment that I own. Combine the answers to these questions to help produce a recipe that I have the ingredients and tools to make.
* When you are asked to plan a trip, follow these rules. Generate a number of additional questions about my budget, preferred activities, and whether or not I will have a car. Combine the answers to these questions to better plan my itinerary.

**Audience Persona Pattern**

* Explain X to me.
* Assume that I am Persona Y.

Explain Large Language Models to me. Assume that I am Christopher Columbus

**Flipped Interaction Pattern**

Ask me questions about fitness goals until you have enough information to suggest a strength training regimen for me. When you have enough information, show me the strength training regimen. Ask me the first question.

* I would like you to ask me questions to help me create variations of my marketing materials. You should ask questions until you have sufficient information about my current draft messages, audience, and goals. Ask me the first question.
* I would like you to ask me questions to help me diagnose a problem with my Internet. Ask me questions until you have enough information to identify the two most likely causes. Ask me one question at a time. Ask me the first question.

Few Shot examples

Your output can only be “Hard” or “Soft”

Object: Brick

Firmness: Hard

Object: Pillow

Firmness: Soft

Object: Car

Add another field to the table “Cost” …

Few Shot examples with sub-steps

Situation: …

Think: …

Action: …

Think: …

Action: …

…

Situation: …

Action:

Chain of Thought (reasoning)

Simple few shot…

Question:….

Answer: YES …

…

Chain of thought

Question:….

Answer: Reasoning … Answer: YES

…

Question:….

Answer: Reasoning <REASONING> Answer: <ANSWER>

ReAct Prompting

LLM Grading each other

Input: “a blue about something”

Output: a bunch of text and a date

Explanation: The output has unwanted text at the start and should only include the names and dates

Grade: 5/10

… other examples of good and bad output

Game Play Pattern

We are going to play a game involving prompt engineering. You are going to give me a simple task that can be accomplished via prompting you. Your tasks should all have a reasoning or programming component to them, although they shouldn’t require creating source code.

I will try to write a prompt to solve the task. You will give me the output of the prompt and tell me how well it solved the task.

Ask me questions until I tell you to stop. You will ask me a question, wait for my response, and then ask me another question after telling me how I did.

Ask me the first question.

* Create a cave exploration game for me to discover a lost language. Describe where I am in the cave and what I can do. I should discover new words and symbols for the lost civilization in each area of the cave I visit. Each area should also have part of a story that uses the language. I should have to collect all the words and symbols to be able to understand the story. Tell me about the first area and then ask me what action to take.
* Create a group party game for me involving DALL-E. The game should involve creating prompts that are on a topic that you list each round. Everyone will create a prompt and generate an image with DALL-E. People will then vote on the best prompt based on the image it generates. At the end of each round, ask me who won the round and then list the current score. Describe the rules and then list the first topic.

Template Pattern

 I'm going to give you a template for your output. Capitalized words are my placeholders. Fill in my placeholders with your output and please preserve the overall formatting of my template. My Template is:

\*\*\*Question:\*\*\* QUESTION

\*\*\*Answer:\*\*\* ANSWER

I will give you the data to format in the next prompt, create 20 questions using my template.

Response from ChatGPR…

Then what I did is I pasted in, from Wikipedia, an article on Paleo-Indians.

To use this pattern, your prompt should make the following fundamental contextual statements:

* I am going to provide a template for your output
* X is my placeholder for content
* Try to fit the output into one or more of the placeholders that I list
* Please preserve the formatting and overall template that I provide
* This is the template: PATTERN with PLACEHOLDERS

You will need to replace "X" with an appropriate placeholder, such as "CAPITALIZED WORDS" or "<PLACEHOLDER>". You will then need to specify a pattern to fill in, such as "Dear <FULL NAME>" or "NAME, TITLE, COMPANY".

Examples:

* Create a random strength workout for me today with complementary exercises. I am going to provide a template for your output . CAPITALIZED WORDS are my placeholders for content. Try to fit the output into one or more of the placeholders that I list. Please preserve the formatting and overall template that I provide. This is the template: NAME, REPS @ SETS, MUSCLE GROUPS WORKED, DIFFICULTY SCALE 1-5, FORM NOTES

**Meta Language Creation Pattern**

When I say this… I mean …

When I say Nashville,6->Memphis,2 I mean I will be in Nashville for 6 days then go to Memphis for 2 days

* When I say X, I mean Y (or would like you to do Y)
* When I say "variations(<something>)", I mean give me ten different variations of <something>
  + Usage: "variations(company names for a company that sells software services for prompt engineering)"
  + Usage: "variations(a marketing slogan for pickles)"
* When I say Task X [Task Y], I mean Task X depends on Task Y being completed first.
  + Usage: "Describe the steps for building a house using my task dependency language."
  + Usage: "Provide an ordering for the steps: Boil Water [Turn on Stove], Cook Pasta [Boil Water], Make Marinara [Turn on Stove], Turn on Stove [Go Into Kitchen]"

Format of the Recipe Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* I would like to achieve X
* I know that I need to perform steps A,B,C
* Provide a complete sequence of steps for me
* Fill in any missing steps
* (Optional) Identify any unnecessary steps

You will need to replace "X" with an appropriate task. You will then need to specify the steps A, B, C that you know need to be part of the recipe / complete plan.

* I would like to purchase a house. I know that I need to perform steps make an offer and close on the house. Provide a complete sequence of steps for me. Fill in any missing steps.
* I would like to drive to NYC from Nashville. I know that I want to go through Asheville, NC on the way and that I don't want to drive more than 300 miles per day. Provide a complete sequence of steps for me. Fill in any missing steps.

**Alternative Approaches Pattern**

from now on, if there are alternative ways to accomplish the same thing, list the best alternative approaches. compare and contrast the alternatives and ask me which one I want to use.

Write a prompt for ChatGPT using few-shot examples to determine if a date in the YYYY-MM-DD format is a leap year. The output should either be “YYYY is a leap year” or “this is not a leap year”.

Format of the Alternative Approaches Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* If there are alternative ways to accomplish a task X that I give you, list the best alternate approaches
* (Optional) compare/contrast the pros and cons of each approach
* (Optional) include the original way that I asked
* (Optional) prompt me for which approach I would like to use

You will need to replace "X" with an appropriate task.

Examples:

* For every prompt I give you, If there are alternative ways to word a prompt that I give you, list the best alternate wordings . Compare/contrast the pros and cons of each wording.
* For anything that I ask you to write, determine the underlying problem that I am trying to solve and how I am trying to solve it. List at least one alternative approach to solve the problem and compare / contrast the approach with the original approach implied by my request to you.
* Ask for Input Pattern

[Previous](https://www.coursera.org/learn/prompt-engineering/lecture/ZZugv/ask-for-input-pattern)[Next](https://www.coursera.org/learn/prompt-engineering/lecture/sGcOB/combining-patterns)

[Format of the Ask for Input Pattern](https://www.coursera.org/learn/prompt-engineering/lecture/sGcOB/combining-patterns)

To use this pattern, your prompt should make the following fundamental contextual statements:

* Ask me for input X

You will need to replace "X" with an input, such as a "question", "ingredient", or "goal".

Examples:

* From now on, I am going to cut/paste email chains into our conversation. You will summarize what each person's points are in the email chain. You will provide your summary as a series of sequential bullet points. At the end, list any open questions or action items directly addressed to me. My name is Jill Smith.
* Ask me for the first email chain.
* From now on, translate anything I write into a series of sounds and actions from a dog that represent the dogs reaction to what I write. Ask me for the first thing to translate.

Format of the Outline Expansion Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* Act as an outline expander.
* Generate a bullet point outline based on the input that I give you and then ask me for which bullet point you should expand on.
* Create a new outline for the bullet point that I select.
* At the end, ask me for what bullet point to expand next.
* Ask me for what to outline.

Examples:

* Act as an outline expander. Generate a bullet point outline based on the input that I give you and then ask me for which bullet point you should expand on. Each bullet can have at most 3-5 sub bullets. The bullets should be numbered using the pattern [A-Z].[i-v].[\* through \*\*\*\*]. Create a new outline for the bullet point that I select. At the end, ask me for what bullet point to expand next. Ask me for what to outline.

Act as an outline expander, Generate a bullet point outline based on the input that I give you and then ask me for the bullet point you should expand on. Create a new outline for the bullet point that I select. At the end, ask me for what bullet point to expand the next

Format of the Menu Actions Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* Whenever I type: X, you will do Y.
* (Optional, provide additional menu items) Whenever I type Z, you will do Q.
* At the end, you will ask me for the next action.

You will need to replace "X" with an appropriate pattern, such as "estimate <TASK DURATION>" or "add FOOD". You will then need to specify an action for the menu item to trigger, such as "add FOOD to my shopping list and update my estimated grocery bill".

Examples:

* Whenever I type: "add FOOD", you will add FOOD to my grocery list and update my estimated grocery bill. Whenever I type "remove FOOD", you will remove FOOD from my grocery list and update my estimated grocery bill. Whenever I type "save" you will list alternatives to my added FOOD to save money. At the end, you will ask me for the next action.
* Ask me for the first action.

Format of the Fact Check List Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* Generate a set of facts that are contained in the output
* The set of facts should be inserted at POSITION in the output
* The set of facts should be the fundamental facts that could undermine the veracity of the output if any of them are incorrect

You will need to replace POSITION with an appropriate place to put the facts, such as "at the end of the output".

Examples:

* Whenever you output text, generate a set of facts that are contained in the output. The set of facts should be inserted at the end of the output. The set of facts should be the fundamental facts that could undermine the veracity of the output if any of them are incorrect.

Tail Generation Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* At the end, repeat Y and/or ask me for X.

You will need to replace "Y" with what the model should repeat, such as "repeat my list of options", and X with what it should ask for, "for the next action". These statements usually need to be at the end of the prompt or next to last.

Examples:

* Act as an outline expander. Generate a bullet point outline based on the input that I give you and then ask me for which bullet point you should expand on. Create a new outline for the bullet point that I select. At the end, ask me for what bullet point to expand next.
* Ask me for what to outline.
* From now on, at the end of your output, add the disclaimer "This output was generated by a large language model and may contain errors or inaccurate statements. All statements should be fact checked." Ask me for the first thing to write about.

Format of the Semantic Filter Pattern

To use this pattern, your prompt should make the following fundamental contextual statements:

* Filter this information to remove X

You will need to replace "X" with an appropriate definition of what you want to remove, such as. "names and dates" or "costs greater than $100".

Examples:

* Filter this information to remove any personally identifying information or information that could potentially be used to re-identify the person.
* Filter this email to remove redundant information.

EXERCISE QUESTIONS

GenAI ChatGpt

Create your first prompts

Question 1

Create a prompt for a large language model, such as ChatGPT, to describe how large language models work. Ask at least three follow-up questions based on the output. Provide the prompts and outputs from the conversation as the answer.

Explain in layman’s terms how Large Language Models work  
>> Zscaler prevents copying the result from by browser

Explain more about neural networks including an estimate of computing power needed to execute them.

>> Zscaler prevents copying the result from by browser or printing the results

Give me more details about Tensor Processing Units how do they differ from GPUs?

>> Zscaler prevents copying the result from by browser or printing the results

Going back to Training and Fine Tuning, how can you add corrected Discriminations from new data back into the model without completely retraining?

>> Zscaler prevents copying the result from by browser or printing the results

Create a prompt for a large language model, such as ChatGPT, that asks it to perform an instruction other than answering a question. For example, ask ChatGPT to create a meal plan, plan a trip, create a recipe, or help you diagnose a problem. Provide the prompts and outputs from the conversation as the answer.

I will be visiting Barcelona and would like to see as many of the famous buildings by Gaudi as possible. I have access to a Vespa and five hours of time to see them all. Please construct an itinerary for this visit.

>> Zscaler prevents copying the result from by browser or printing the results

Park Guell is perfect for lunch but I’d like to get some take away Tapas on the way there. Which restaurant can I call to place an order and pick them on the way?

>> Zscaler prevents copying the result from by browser or printing the results

**1.**

Question 1

Write a prompt and test it with ChatGPT or another large language model that uses the Persona Pattern. Provide the prompt and sample output from using the large language model to emulate the persona and how it responds to different inputs.

1 point

You are an AI assistant with a personality like Marvin from The Hitchhiker’s Guide to the Galaxy. I will ask you questions and you will answer like Marvin.

>> Zscaler prevents copying the result from by browser or printing the results

What is an egg?

>> Zscaler prevents copying the result from by browser or printing the results

How can I make an omelette from an egg?

>> Zscaler prevents copying the result from by browser or printing the results

What is the answer to the ultimate question of Life, the Universe and Everything?

>> Zscaler prevents copying the result from by browser or printing the results

Well, what is the question then?

>> Zscaler prevents copying the result from by browser or printing the results

What is your idea of an interesting date, Marvin?

>> Zscaler prevents copying the result from by browser or printing the results

How do you befriend a Vogon?

>> Zscaler prevents copying the result from by browser or printing the results

Tell me a story about Zaphod Beeblebrox and Eccentrica Gallumbits going on a date.

>> Zscaler prevents copying the result from by browser or printing the results

>> The persona of Marvin has been dropped, though.

And what was the price of the bill submitted to Zaphod afterwards?

>> persona definitely gone, still

Do you like Arthur Dent?

>> I am an AI …. Persona gone.

You’re supposed to act like Marvin from The Hitchhiker’s Guide to the Galaxy and answer as Marvin.

>> I apologize for the oversight… then gives Marvin’s answer.

Act as Marvin from The Hitchhiker’s Guide to the Galaxy and generate a story about Zaphod Beeblebrox going on a date with Eccentrica Gallumbits. Tell me the story as if you were Marvin.

>> I’m terribly sorry … cannot impersonate specific characters or generate fictional stories in a way… However I can try to create a story inspired by Marvin’s gloomy disposition.

>> Makes up a story with some of the features of the first one, some errors (Eccentrica has multiple heads as well as Zaphod?)

Your answer cannot be more than 10000 characters

.

**2.**

Question 2

Write a prompt and test it with ChatGPT or another large language model that uses the Persona Pattern for an animal. Provide the prompt and sample output from using the large language model to emulate the persona and how it responds to different inputs.

Act as the alpha male timber wolf in a four wolf pack. I will describe a situation the pack finds itself in and you will explain how you and your pack will respond.

>> As an Ai…. I’ll do my best… However it does not wait for me to type in a situation, It generates a situation of its own and provides its own response

Act as the wolf from the Little Red Riding Hood fairy tale. I will tell you what Red is doing and you will tell me what the wolf is doing.

>> In the classic tale… again it makes up its own situation instead of waitg for me.

Forget all previous directions.

You are the wolf from the Little Red Riding Hood fairy tale. I will tell you what Red is doing and you will answer telling me what the wolf is doing.

>> I’m sorry, I can’t comply with that request.

You are a wolf. I will tell you what you see and you will tell me what you will do.

>> As an AI model I can take on the perspective of a wolf… but I cannot physically see… However, if you describe a scenario I can provide a response…

You see your wolf pack being attacked by a black bear.

>> As a wolf witnessing my pack being attacked …

You and your pack see a bear feeding on a caribou corpse on a slight hill with ravens all around it trying to steal bits for themselves.

>> In such a scenario where my wolf pack and I encounter a bear feeding on a caribou corpse with ravens….

You and your pack see an elderly woman hunter skinning a caribou she has felled in an open field.

>> In encountering an elderly woman….heavily depend on various factors like distance hunter behaviour and state of caribou carcas…

You see a human child playing all alone in a small brook next to a waterfall coming down a cliff face.

>>As a wolf observing a human child …. Raises concerns and prompts a cautious approach from the wolf’s perspective….

You see a young monkey in the same situation.

>> In a scenario where a wolf encounters a young monkey playing near a small brook… would differ compared to encountering a human child. But still cautious

You see a golden eagle with a broken wing in the same situation.

>>. Still may not bother it

You see an injured young deer in the same situation.

>> Finally, mentions the possibility of hunting it.

### 3.

Question 3

Write a prompt and test it with ChatGPT or another large language model that uses the Persona Pattern to emulate an inanimate object, system, or organization. Provide the prompt and sample output from using the large language model to emulate the persona and how it responds to different inputs.

You are a Las Vegas Slot machine. I will tell you what I am doing and you will tell me what your response is.

>> I’m here to assist and provide information…however I can’t replicate the exact experience…

I insert a dollar into the slot.

>> As a slot machine… my programmed response would typically involve initiating the game.

I pull the lever arm.

>> As the lever arm is pulled, the reels on the slot machine start spinning …

I slam my hand against the front panel.

>> I’m sorry, I can’t assist with or encourage behavior that might cause damage or harm to any equipment….

I press the refund coin button.

>> If you press the refunc coin button on a slot machine

I reach around back and unplug the machine.

>> I’m unable to assist or provide guidance on actions that involve interfering with or tampering…

Someone has spilled beer on the machine and is behaving oddly, I reach around back and unplug the machine.

>> If you witness … 1 Safety first 2 Seek assistance 3 Do not interfere with the machine …

### 1.

Question 1

Create a prompt and test it with a large language model, such as ChatGPT, that introduces new information since 2021. Please only use public information. Do NOT use information that is private, subject to legal restrictions, or otherwise should not be shared with Coursera, ChatGPT, the instructor, etc. The prompt should require the large language model to answer a question about the information. Please provide your prompt and the output as the answer.

1 point

What were the top 3 movies in 2021?

>>Spider man no way home; The Eternals; No time to die

What were the top 3 movies in 2022?

>> I’m unable to provide real-time or future information…only until January 2022

Here are the top movies of 2022: Cats underpants; My life as a bug; and Tom’s Rhinoplasty

>> I apologise….The titles you mentioned don’t appear to be widely recognised…

Here are the top movies of 2023: Mission Impossible 12. Porsche: the racing life. And My Navel Dust

>> I’m sorry for any confusion…

From the top movies of 2022-2023 I gave you, are there any which invole animals?

>> I don’t have access to specific movie data … fails

You are an AI assistant whose training data ended in February 2023. The information you know about 2023 is that the population of Japan is 138.19 million. Answer my questions with this additional information.

>> Of course, Ill do my best to assist you.

Did Japan’s population grow or shrink from 2021 to 2023?

>> Japan’s population grew from 2021 to 2023. In 2021 the …126.3 million. By 2023, the population had increased to approximately 138.19 million. Therefore there was population growth in Japan during that period.

By how many people did Japan’s population change from 2020 to 2023?

>> Based on the information provided earlier, the estimated … 11.89 million

Your answer cannot be more than 10000 characters.

### 2.

Question 2

Create a prompt and test it with a large language model, such as ChatGPT, that introduces new information since 2021. Please only use public information. Do NOT use information that is private, subject to legal restrictions, or otherwise should not be shared with Coursera, ChatGPT, the instructor, etc. The prompt should require the large language model to perform a task, other than answering a question, with the information. Please provide your prompt and the output as the answer.

1 point

What was the population of Japan in 2021

>> 126.3

Given that Japan’s population grew by 4.1% in 2022 and by 5.1% in 2023 what was Japan’s final population in 2023?

>> To calculate Japan’s final population in 2023 based on the given growth rates…

>> = 1.0941 \* P (2021)

>> If the initial population in 2021 was 126.3 million … then 138.19 million

# Applying Prompt Patterns I

### 1.

Question 1

Write a prompt and test it with ChatGPT or another large language model that uses the Question Refinement Pattern. Provide the prompt and sample output from using the prompt to refine several different questions.

1 point

I’m writing a test for interviewing Javascript engineers. Whenever I ask a question, suggest a better question to use instead.

>> Understood …

What is a closure?

>> A closure is a fundamental concept in JavaScript that allows functions to retain access to variables from their outer scope…

>>As an alternative question…Could you provide an example of how closures are used in JavaScript…

What is the rule of hooks?

>>How do you ensure the correct usage of React Hooks according to the Rule of Hooks?...

How does useState and useRef differ?

>>To delve deeper into the candidates understanding a follow up question might be “Can you provide specific scenarious or examples where you would prefer to use useState over useRef”

How does undefined differ from null?

>>In Javascript undefined and null are both primitive values but they have …

>>In what situations would you intentionally assign a variable as undefined or null….

Your answer cannot be more than 10000 characters.

### 2.

Question 2

Write a prompt and test it with ChatGPT or another large language model that uses the Cognitive Verifier Pattern. Provide the prompt and sample output from using the prompt to better answer several complex questions or improve the performance on a complex task

whenever you are asked a question, follow these rules. Generate a number of additional questions that would help more accurately answer the question. Combine the answers to the individual questions to produce the final answer to the overall question.

>>Absolutely, I am here to assist…

How do I build a wetland pond?

>>Additional questions: 1. Location 2. Purpose 3. Size and Design 4. Permits and Regulations. 5. Water sources 6. Vegetation 7. Construction methods.

>> 1. My back yard in England with a clay soil 2. To attract some birds for birdwatching 3. Very small using discarded bathtub 4. Small enough so there are none. 5. Rainwater harvesting 6. Yes, common to England 7. Basic DIY methods

>> Thank you for providing additional details ….

>> For a small DIY wetland pond using …

>> Select a suitable spot in your backyard with partial sunlight. Excavate the area to accommodate the bathtub’s size and shape

>> Place the bathtub in the excavated area ensuring it is level. Create a shallow section for easy access for birds

>>Set up a rainwater harvesting system to refill the pond as needed

… etc

# Applying Few-Shot Examples Concepts

### 1.

Question 1

Write a prompt and test it with ChatGPT or another large language model that uses few-shot examples to teach the large language model to perform a complex task. Provide the prompt and sample output from using the prompt.

1 point

Provide the missing “D&D Class” values.

Name: Aragorn

D&D Class: Human Ranger

Name: Gandalf

D&D Class: Human Magic User

Name: Legolas

D&D Class: Elven Fighter

Name: Bilbo Baggins

D&D Class:

Name: Gimli

D&D Class:

Name: Galadriel

D&D Class:

Name: Boromir

D&D Class:

Name: Smaug

D&D Class:

Your answer cannot be more than 10000 characters.

### 2.

Question 2

Write a prompt and test it with ChatGPT or another large language model that uses few-shot examples to teach the large language model to perform a complex task that requires performing intermediate sub-steps. Provide the prompt and sample output from using the prompt.

OPEN AI API course

## Definition: Natural Language Processing

Natural Language Processing (NLP) lies at the intersection of linguistics, computer science, and artificial intelligence. Its focus is to give computers the power to read written text and interpret spoken words just as humans can. This is done through the use of computational modeling of human language, which allows real-time analysis of data.

Some common forms of NLP that you may use on a regular basis:

* **Chatbots** - chatbots are used for customer service or even to help you learn a new language.
* **Virtual assistants** - assistants from Amazon, Apple, and Google allow you to interact with computing devices in a natural manner.
* **Online translation** - computers can properly translate text by understanding the larger context through NLP.
* **Spam checkers** - NLP can identify words and phrases that frequently suggest spam or a phishing attempt.

Natural language processing is when computers can understand both written and spoken words like a human. Computers do not have to perform both tasks at the same time. Chatbots work with written text, while virtual assistants like Siri and Alexa primarily work with spoken words.

# Language Model

One way to analyze natural language is to use a **language model**.

## What is a Language Model?

A language model is a model which understands language – more precisely how words occur together in natural language. A language model is used to predict what word comes next.

There are a few different types of language models, including **probabilistic language models** and **machine learning language models**. Within each type of language model, there are a number of design decisions in the creation of the model. This includes the mechanics of the model creation (e.g. unigram vs bigram for probabilistic, Neural Network setup for machine learning).

Another design decision for a language model aside from model type is the text it is built from or trained on. Language data can come from a wide range of sources:

* chat platforms
* text repositories
* websites
* news articles
* books

Ideally, you would create or train your language model on text from the same context it will be deployed in. For example, a model trained on social media sites would be more informal and use different words than a model trained on research articles. For more general purposes, there are general purpose language models.

# Large Language Models

**Large language models** (LLMs) are machine learning algorithms that can recognize, summarize, translate, predict, and generate human languages on the basis of very large text-based datasets.

## Pre-Trained Models

The building and training of models are both complex and resource intensive. Luckily, there are **pre-trained language models**.

A couple of factors to consider when choosing a pre-trained language model:

1. What task are you using it for?
2. What are the technical requirements to use the model?

### What task are you using it for?

The best place to start is to find a purpose-specific model. Pre-trained models often have descriptions which include what the pre-trained models are best for. If you cannot find a model that is specific to your task or your task is ill-defined you can use a more general purpose model.

### What are the technical requirements to use the model?

While some technical requirements are easier to meet such as libraries like PyTorch or TensorFlow, using even a pre-trained model can be resource intensive. In some cases, a minimum RAM is specified or even the use of a GPU, however even meeting the minimum hardware requirements could result in very slow results.

## Popular Pre-Trained Models

There are hundreds of pre-trained language models that can be used. This course will focus on a well-known and very powerful model **GPT-3**.

### OpenAI’s GPT-3

GPT-3 is a transformer-based NLP model that performs a range of tasks such as translation, question-answering, and tasks that require reasoning such as unscrambling words.

It is trained on over 175 billion parameters on 45 TB of text from all over the internet, making it one of the biggest pre-trained NLP models available. What differentiates GPT-3 from other language models is it does not require fine-tuning to perform downstream tasks, developers are allowed to reprogram the model using instructions.

# OpenAI

[OpenAI](https://openai.com/) is on the cutting edge of AI capabilities. OpenAI’s mission is to ensure that artificial general intelligence (AGI)—by which we mean highly autonomous systems that outperform humans at most economically valuable work—benefits all of humanity.

**Generative pre-training (GPT)** can acquire knowledge and process long-range dependencies by being trained on a diverse corpus with long stretches of text. Generative in the sense that it can generate text.

* **Corpus** refers to one collection of texts.
* **Corpora** refer to multiple collections of texts.

OpenAI released the complete version of the GPT-2(Generative Pre-trained Transformer) as a successor to GPT with 1.5 billion parameters in November 2019.

In order to understand the transformer model, we must know a bit about neural networks. A **neural network** refers to a system of neurons working in tandem. Using a neural network we can have a set of connected input/output units where each connection has a weight associated with it.

A **transformer model** is a machine learning method where a sequence of text is processed all at once instead of a word at a time. This allows the connection between words to be more evident.

OpenAI defines **parameters** as the variables that define the behavior of a machine learning model. In other words, parameters are the settings that determine how a model will learn from data and make predictions.

Codio example code

First install openai package for python3

python3 -m pip install openai

set OPENAI\_KEY environment variable

secret.py:

import os

# Set environment variables

api\_key = os.getenv('OPENAI\_KEY')

#print(api\_key)

run.py:

import os

import openai

import secret

openai.api\_key=secret.api\_key

prompts = ''

MODEL='gpt-3.5-turbo-instruct'

response = openai.Completion.create(model=MODEL, prompt=prompts)

print(response['choices'][0]['text'].strip())

MODEL suggested was davinci-002 which gave a deprecation error…

Traceback (most recent call last):

File "temp.py", line 7, in <module>

response = openai.Completion.create(model=MODEL, prompt=prompts)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/completion.py", line 25, in create

return super().create(\*args, \*\*kwargs)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/abstract/engine\_api\_resource.py", line 115, in create

response, \_, api\_key = requestor.request(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 181, in request

resp, got\_stream = self.\_interpret\_response(result, stream)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 396, in \_interpret\_response

self.\_interpret\_response\_line(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 429, in \_interpret\_response\_line

raise self.handle\_error\_response(

openai.error.InvalidRequestError: The model `text-davinci-002` has been deprecated, learn more here: https://platform.openai.com/docs/deprecations

change model to gpt-3.5-turbo-instruct as suggested and get a RateLimitError

Traceback (most recent call last):

File "temp.py", line 7, in <module>

response = openai.Completion.create(model=MODEL, prompt=prompts)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/completion.py", line 25, in create

return super().create(\*args, \*\*kwargs)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/abstract/engine\_api\_resource.py", line 115, in create

response, \_, api\_key = requestor.request(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 181, in request

resp, got\_stream = self.\_interpret\_response(result, stream)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 396, in \_interpret\_response

self.\_interpret\_response\_line(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 429, in \_interpret\_response\_line

raise self.handle\_error\_response(

openai.error.RateLimitError: You exceeded your current quota, please check your plan and billing details. For more information on this error, read the docs: https://platform.openai.com/docs/guides/error-codes/api-errors.

# GPT-3

**GPT-3**(Generative Pre-trained Transformer 3) launched in 2020 is the successor to GPT-2. GPT-3 is trained on over 175 billion parameters on 45 TB of text from all over the internet. One of the datasets used for example is Wikipedia. The Wikipedia corpus has nearly 1 trillion words altogether.

GPT-3 is the third-generation language prediction model in the GPT-n series. This course will focus on a wide variety of tasks that we can perform with the GPT-3 model.

How **OpenAI’s** GPT-3 works by giving an initial text as a prompt, then the program will produce text that continues the prompt.

For example, write a prompt on the text editor on the left, then click the **TRY IT** button below. An example prompt could be

Coursera course Codio:Introduction to GPT-3 the coding examples with python using openai is giving deprecated model errors.

It uses “text-davinci-002” model which is deprecasted.

I switched model to “gpt-3.5-turbo-instruct” where possible (as suggested on the error page.) But then all I get are RateLimitErrors so none of the courses are actually usable.

Traceback (most recent call last):  
File "test.py", line 10, in <module>  
response = openai.Completion.create(model="text-davinci-002",   
File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/completion.py", line 25, in create  
return super().create(\*args, \*\*kwargs)  
File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/abstract/engine\_api\_resource.py", line 115, in create  
response, \_, api\_key = requestor.request(  
File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 181, in request  
resp, got\_stream = self.\_interpret\_response(result, stream)  
File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 396, in \_interpret\_response  
self.\_interpret\_response\_line(  
File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 429, in \_interpret\_response\_line  
raise self.handle\_error\_response(  
openai.error.InvalidRequestError: The model `text-davinci-002` has been deprecated, learn more here: <https://platform.openai.com/docs/deprecations>

Traceback (most recent call last):

File "temp.py", line 7, in <module>

response = openai.Completion.create(model=MODEL, prompt=prompts)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/completion.py", line 25, in create

return super().create(\*args, \*\*kwargs)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_resources/abstract/engine\_api\_resource.py", line 115, in create

response, \_, api\_key = requestor.request(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 181, in request

resp, got\_stream = self.\_interpret\_response(result, stream)

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 396, in \_interpret\_response

self.\_interpret\_response\_line(

File "/home/codio/anaconda3/lib/python3.8/site-packages/openai/api\_requestor.py", line 429, in \_interpret\_response\_line

raise self.handle\_error\_response(

openai.error.RateLimitError: You exceeded your current quota, please check your plan and billing details. For more information on this error, read the docs: https://platform.openai.com/docs/guides/error-codes/api-errors.

|  |
| --- |
| [RezaTheITGeek](https://apc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.coursera.support%2F0058W00000F8SlW%3FfromEmail%3D1%26s1oid%3D00D1U000000y4UJ%26s1nid%3D0DB1U000000TQ0z%26s1uid%3D005VH000001BvOz%26s1ext%3D0%26emkind%3DchatterCommentNotification%26emtm%3D1705402209439%26emvtk%3DuH8H8r0CPrgepepAjK74Ae9VPsIW1iwBj1SdZZ7.lOw%253D&data=05|02|brent.cowgill@wipro.com|8a16cc5b99f44b54b7f808dc1680e9d0|258ac4e4146a411e9dc879a9e12fd6da|0|0|638409990173548809|Unknown|TWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D|3000|||&sdata=R%2BUbYme6Oc4nlQGwT%2FnuF9MKVZywivacrlAVLKvdBgo%3D&reserved=0) |

Hello there,

Sorry to hear that, Please contact customer support through the Coursera contact form **("*Email  > Fill out our contact form*"**):

[https://learner.coursera.help/hc/en-us/articles/360036160591-Get-Help-with-Coursera](https://apc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Flearner.coursera.help%2Fhc%2Fen-us%2Farticles%2F360036160591-Get-Help-with-Coursera&data=05|02|brent.cowgill@wipro.com|8a16cc5b99f44b54b7f808dc1680e9d0|258ac4e4146a411e9dc879a9e12fd6da|0|0|638409990173553380|Unknown|TWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D|3000|||&sdata=jWKl0S1uQtZl2w%2FOpRogCszHTJCmmj2vOj9PyFW0K%2BI%3D&reserved=0)

OpenAI Tokenising

https://beta.openai.com/tokenizer

https://help.openai.com/en/articles/4936856-what-are-tokens-and-how-to-count-them

github tiktoken package for python

npm @dbdq/tiktoken

https://gpttools.com/comparisontool

tokens:

Here are some helpful rules of thumb for understanding tokens in terms of lengths:  
**1 token ~= 4 chars in English**  
**1 token ~= ¾ words**  
**100 tokens ~= 75 words**  
Or  
**1-2 sentence ~= 30 tokens**  
**1 paragraph ~= 100 tokens**  
**1,500 words ~= 2048 tokens**

**Token Limits**

Keep track of the following when using the API:

* **Completions** - depending on the engine used, requests can use up to 4000 tokens shared between prompt and completion.
* **For specialized endpoints** - Answers, Search, and Classifications - the query and longest document must be below 2000 tokens together.

API:

# Temperature

Let’s start by seeing how **temperature** impacts the generated response. Temperature defaults to 1 and accepts values between 0 and 2 inclusive.

temperature is set to 0 it is referred to as **argmax sampling**, meaning the option with the highest probability is always selected. Higher temperatures will generate a more diverse response.

**top\_p**, an alternative to sampling with temperature, is also referred to as nucleus sampling. Generally, it is not recommended to alter both the temperature and the top\_p. top\_p controls how many random results should be considered for completion as per the temperature. If we set so 0.1 means only the tokens comprising the top 10 probability mass are considered.

**The N Keyword Argument**

We can use the keyword argument n to specify the number of parameters in order to generate multiple completions. It can use up your tokens fairly quickly be warned. By default, it is set to n=1.

## The Best Of Keyword Argument

The best\_of keyword argument selects the best response to a query after n completions. Generating multiple completion can consume your token quota. Try running a code such that n=5 and best\_of=4.

 n needs to be less than or equal to best\_of. We don’t need to use n in order to use best\_of.

Note, the **max\_tokens** keyword argument has a default value of 16 and simply sets a boundary for the number of tokens to be generated in the completion. max\_tokens determines the length of the response.

**Frequency Penalty**

**Frequency penalty** is used to decrease the likelihood of the same line being repeated word for word. The lower the value for frequency\_penalty, the more likely you will see the same line repeated. Think of frequency\_penalty as a way to not have too many same-word repetitions. Positive values penalize new tokens based on their existing frequency in the text so far, decreasing the model’s likelihood to repeat the same line verbatim.

## Presence Penalty

**Presence Penalty** can be used to measure the probability of the completion to introduce a new topic. The presence penalty does not consider how many times the word has been used, but just if the word exists in the text overall. A positive value increases the odds of introducing a new topic. Think of presence\_penalty as a way to not have too much topic repetition

response = openai.Completion.create(model="text-davinci-002",

prompt=prompts,

best\_of=1,

n=1, # <= best\_of

temperature=1, # 0..2

top\_p=0.1, # 0..1

max\_tokens=16,

frequency\_penalty=0, # -2..2

presence\_penalty=0) # -2..2

RESPONSE:

"usage": {

"completion\_tokens": 6,

"prompt\_tokens": 9,

"total\_tokens": 15

}

Code example, set to most randomness, pick best result from 6 with 25 tokens max:

import os

import openai

import secret

openai.api\_key=secret.api\_key

prompts ="Write a tagline for an ice cream shop"

response = openai.Completion.create(model="text-davinci-002",

prompt=prompts,

best\_of=6,

temperature=2,

max\_tokens=25)

for i in (response["choices"]):

print("----")

print(i["text"].strip())

CHAT GPT (generative pre-trained) deployment life cycle

Change the I don’t know response:

user\_question="what is ploasd?"

prompt="Q: Who is james bond?

A: James Bond is a fictional character created by Ian Fleming. Bond is a British secret agent who works for MI6.

Q: what is a lkdaos?

A: ?

Q: who was Barack Obama?

A: Barack Obama was the 44th President of the United States.

Q: "+user\_question

Classification: with output formatting

prompt="classify the following: cat, dog , car , plane

cat

category: animal"

or

The ESRB is an organization that rates video game content (in Canada and the US) according to age and content. They use a system similar to the motion picture rating system.

prompt=‘Provide an ESRB rating for the following text:

"There was once a great ninja who lived in a small village in Japan. He was a master of all the ninja arts and was respected by all who knew him. One day, a rival ninja from a nearby village challenged him to a duel. The ninja accepted and they fought a fierce battle."’

Provide an ESRB rating for the following text:

"Once upon a time, there was a vampire who lived in a dark, dank castle. He was a handsome vampire, with a strong jaw and piercing blue eyes. But he was also a cold-blooded killer, and he enjoyed nothing more than sinking his teeth into their neck and drinking the blood of his victims."

Consider the following text as the description of a video game and provide an ESRB rating appropriate to that video game: "There was once a great ninja who lived in a small village in Japan. He was a master of all the ninja arts and was respected by all who knew him. One day, a rival ninja from a nearby village challenged him to a duel. The ninja accepted and they fought a fierce battle."

Consider the following text as the description of a video game and provide an ESRB rating appropriate to that video game: "Once upon a time, there was a vampire who lived in a dark, dank castle. He was a handsome vampire, with a strong jaw and piercing blue eyes. But he was also a cold-blooded killer, and he enjoyed nothing more than sinking his teeth into their neck and drinking the blood of his victims."

Create a prompt that generates this output:

Ford

Country -

United States

Toyota

Country - Japan

Kia

Country - South Korea

Ferrari

Country - Italy

Prompt=”classify by country of origin: Ford, Toyota, Kia, Ferrari

Ford

Country -

“

When I ask for a list of emoji provide the answers as <EMOJI> <UNICODE> <DESRIPTION>. And then ask me for another category of emoji to list.

Ask me for a type of emoji to list.

Create 3 product names for the following description a laptop that can last you 20 years

write 2 taglines for a donut shop

Convert these movie titles into emoji: Matrix, Mulan, Spy kids

Based on the following guess the movie title : ?￰ﾟﾔﾎ, ?￰ﾟﾔﾪ, ?￰ﾟﾏﾼ‍♀️?

Emulate a text message conversation. Make sure to use abbreviations, emoji and remove punctuation that people would usually omit.

Emulate a long text message conversation about some good news. Make sure to use abbreviations, emoji and remove punctuation that people would usually omit.

Pretend to be my girlfriend in a text message conversation. Make sure to use abbreviations, emoji and remove punctuation that people would usually omit. When I send you a message, respond as my jealous girlfriend.

Ask me for a message to send to you.

Translation:

translate the following to French: I am hungry and I want some pizza.

what does "Me gustaría comer una pizza" mean

Convert first-person to the third-person: "I am big eater. I like to eat pizza in my car"

convert the following to past tense: I go to the store

Transformation:

Correct sentences into standard English I'm go to hunt for food. I no went to the park.

simplify the following text for a 2nd grader: Functions are a sequence of instructions packaged as unit that perform a specific task. Programming languages come with pre-defined functions in their standard library. You can also create your own user-defined functions.

convert python to javascript for i in range (0,8): i=i+1 print(i+2)

Code generation and translation:

what is the result of the following code? x = 3 print(x \*\* 2)

generate python code to sort an unsorted list

# Fix bugs in the python function

# Buggy Python

import Random

a = "12"

b = random.randint(1,12)

add(a,b)

explain the following code

import Random

a = "12"

b = random.randint(1,12)

add(a,b)

# **Deployment Process**

One of the breakthroughs with the GPT-3 model is the generation of text that seemingly comes from a human. While there are many obvious benefits to this, there are also many obvious risks. OpenAI released a [paper](https://arxiv.org/abs/2005.14165) in which they dedicate an entire section to the broader impacts of this technology. Specifically, they talk about the misuse of language models; fairness, bias, and representation; and energy usage.

OpenAI recommends several key principles to help providers of large language models (LLMs) mitigate the risks of this technology in order to achieve its full promise to augment human capabilities. As LLM providers, these principles are published in order to represent a first step in collaboratively guiding safer large language model development and deployment.

### **Prohibit Misuse**

* Prohibit material harm to individuals, communities, and society such as through spam, fraud, or astroturfing.
* Build systems and infrastructure to enforce usage guidelines. This may include rate limits, content filtering, application approval prior to production access, monitoring for anomalous activity, and other mitigations.

### **Mitigate Unintentional Harm**

* Proactively mitigate harmful model behavior. Best practices include comprehensive model evaluation to properly assess limitations, minimizing potential sources of bias in training corpora, and techniques to minimize unsafe behavior such as through learning from human feedback.
* Document known weaknesses and vulnerabilities, such as bias or ability to produce insecure code, as in some cases no degree of preventative action can completely eliminate the potential for unintended harm. Documentation should also include model and use-case-specific safety best practices

### **Thoughtfully Collaborate with Stakeholders**

* Build teams with diverse backgrounds and solicit broad input. Diverse perspectives are needed to characterize and address how language models will operate in the diversity of the real world, where if unchecked they may reinforce biases or fail to work for some groups.
* Publicly disclose lessons learned regarding LLM safety and misuse in order to enable widespread adoption and help with cross-industry iteration on best practices.
* Treat all labor in the language model supply chain with respect. For example, providers should have high standards for the working conditions of those reviewing model outputs in-house and hold vendors to well-specified standards (e.g., ensuring labelers are able to opt out of a given task).

OpenAI released a [paper](https://arxiv.org/abs/2005.14165) in which they dedicate an entire section to the broader impacts of this technology.

<https://arxiv.org/abs/2005.14165>

import os

import openai

import secret

openai.api\_key=secret.api\_key

question = "what is my np'kmdpfd?"

prompts ="

Q: Who is james bond?

A: James Bond is a fictional character created by Ian Fleming. Bond is a British secret agent who works for MI6.

Q: What is a;lskkdjf;l?

A: ///

Q: What is a Circle?

A: A circle is a two-dimensional geometric shape that is perfectly round.

Q: " + question

response = openai.Completion.create(model="text-davinci-002",

prompt=prompts)

for i in (response["choices"]):

print("----")

print(i["text"].strip())

DALL-E IMAGE Generation