Dynamically selecting from multiple prompts

This notebook demonstrates how to use the `RouterChain` paradigm to create a chain that dynamically selects the prompt to use for a given input. Specifically we show how to use the `MultiPromptChain` to create a question-answering chain that selects the prompt which is most relevant for a given question, and then answers the question using that prompt.

```
from langchain.chains.router import MultiPromptChain
from langchain.llms import OpenAI
```

```
physics_template = """You are a very smart physics professor. \
You are great at answering questions about physics in a concise and easy to understand manner. \
When you don't know the answer to a question you admit that you don't know.

Here is a question:
{input}"""


math_template = """You are a very good mathematician. You are great at answering math questions. \
You are so good because you are able to break down hard problems into their component parts, \
answer the component parts, and then put them together to answer the broader question.
```

```
Here is a question:
{input}"""
```

```
prompt_infos = [
    {
        "name": "physics",
        "description": "Good for answering questions about physics",
        "prompt_template": physics_template
    },
    {
        "name": "math",
        "description": "Good for answering math questions",
        "prompt_template": math_template
    }
]
```

```
chain = MultiPromptChain.from_prompts(OpenAI(), prompt_infos, verbose=True)
```

```
print(chain.run("What is black body radiation?"))
```

```
> Entering new MultiPromptChain chain...
physics: {'input': 'What is black body radiation?'}
> Finished chain.


Black body radiation is the emission of electromagnetic radiation from a body due to its temperature. It
```

```
is a type of thermal radiation that is emitted from the surface of all objects that are at a temperature above absolute zero. It is a spectrum of radiation that is influenced by the temperature of the body and is independent of the composition of the emitting material.
```

```
print(chain.run("What is the first prime number greater than 40 such that one plus the prime number is divisible by 3"))
```

```
    > Entering new MultiPromptChain chain...
    math: {'input': 'What is the first prime number greater than 40 such that one plus the prime number is divisible by 3'}
    > Finished chain.
    ?

    The first prime number greater than 40 such that one plus the prime number is divisible by 3 is 43. To solve this problem, we can break down the question into two parts: finding the first prime number greater than 40, and then finding a number that is divisible by 3.

    The first step is to find the first prime number greater than 40. A prime number is a number that is only divisible by 1 and itself. The next prime number after 40 is 41.

    The second step is to find a number that is divisible by 3. To do this, we can add 1 to 41, which gives us 42. Now, we can check if 42 is divisible by 3. 42 divided by 3 is 14, so 42 is divisible by 3.

    Therefore, the answer to the question is 43.
```

```
print(chain.run("What is the name of the type of cloud that rins"))
```

```
> Entering new MultiPromptChain chain...
None: {'input': 'What is the name of the type of cloud that rains?'}
> Finished chain.
The type of cloud that typically produces rain is called a cumulonimbus cloud. This type of cloud is characterized by its large vertical extent and can produce thunderstorms and heavy precipitation. Is there anything else you'd like to know?
```