Dynamically selecting from multiple retrievers

This notebook demonstrates how to use the `RouterChain` paradigm to create a chain that dynamically selects which Retrieval system to use. Specifically we show how to use the `MultiRetrievalQAChain` to create a question-answering chain that selects the retrieval QA chain which is most relevant for a given question, and then answers the question using it.

```python
from langchain.chains.router import MultiRetrievalQAChain
from langchain.llms import OpenAI
```

```python
from langchain.embeddings import OpenAIEmbeddings
from langchain.document_loaders import TextLoader
from langchain.vectorstores import FAISS

sou_docs = TextLoader('../../state_of_the_union.txt').load_and_split()
sou_retriever = FAISS.from_documents(sou_docs, OpenAIEmbeddings()).as_retriever()

pg_docs = TextLoader('../../paul_graham_essay.txt').load_and_split()
pg_retriever = FAISS.from_documents(pg_docs, OpenAIEmbeddings()).as_retriever()

personal_texts = [
    "I love apple pie",
    "My favorite color is fuchsia",
    "My dream is to become a professional dancer",
```

```python
    "I broke my arm when I was 12",
    "My parents are from Peru",
]
personal_retriever = FAISS.from_texts(personal_texts, OpenAIEmbeddings()).as_retriever()
```

```python
retriever_infos = [
    {
        "name": "state of the union",
        "description": "Good for answering questions about the 2023 State of the Union address",
        "retriever": sou_retriever
    },
    {
        "name": "pg essay",
        "description": "Good for answering questions about Paul Graham's essay on his career",
        "retriever": pg_retriever
    },
    {
        "name": "personal",
        "description": "Good for answering questions about me",
        "retriever": personal_retriever
    }
]
```

```python
chain = MultiRetrievalQAChain.from_retrievers(OpenAI(), retriever_infos, verbose=True)
```

```python
print(chain.run("What did the president say about the economy?"))
```

```
    > Entering new MultiRetrievalQAChain chain...
    state of the union: {'query': 'What did the president say about the economy in the 2023 State of the
Union address?'}
    > Finished chain.
     The president said that the economy was stronger than it had been a year prior, and that the American
Rescue Plan helped create record job growth and fuel economic relief for millions of Americans. He also
proposed a plan to fight inflation and lower costs for families, including cutting the cost of prescription
drugs and energy, providing investments and tax credits for energy efficiency, and increasing access to child
care and Pre-K.
```

```python
print(chain.run("What is something Paul Graham regrets about his work?"))
```

```
    > Entering new MultiRetrievalQAChain chain...
    pg essay: {'query': 'What is something Paul Graham regrets about his work?'}
    > Finished chain.
     Paul Graham regrets that he did not take a vacation after selling his company, instead of immediately
starting to paint.
```

```python
print(chain.run("What is my background?"))
```

```
    > Entering new MultiRetrievalQAChain chain...
    personal: {'query': 'What is my background?'}
```

```
    > Finished chain.
     Your background is Peruvian.
```

```
print(chain.run("What year was the Internet created in?"))
```

```
    > Entering new MultiRetrievalQAChain chain...
    None: {'query': 'What year was the Internet created in?'}
    > Finished chain.
    The Internet was created in 1969 through a project called ARPANET, which was funded by the United States
Department of Defense. However, the World Wide Web, which is often confused with the Internet, was created in
1989 by British computer scientist Tim Berners-Lee.
```