

# MRKL Chat

This notebook showcases using an agent to replicate the MRKL chain using an agent optimized for chat models.

This uses the example Chinook database. To set it up follow the instructions on <https://database.guide/2-sample-databases-sqlite/>, placing the `.db` file in a notebooks folder at the root of this repository.

```
from langchain import OpenAI, LLMMathChain, SerpAPIWrapper, SQLDatabase,
SQLDatabaseChain
from langchain.agents import initialize_agent, Tool
from langchain.chat_models import ChatOpenAI
```

```
llm = ChatOpenAI(temperature=0)
llm1 = OpenAI(temperature=0)
search = SerpAPIWrapper()
llm_math_chain = LLMMathChain(llm=llm1, verbose=True)
db = SQLDatabase.from_uri("sqlite:///../../../../../notebooks/Chinook.db")
db_chain = SQLDatabaseChain(llm=llm1, database=db, verbose=True)
tools = [
    Tool(
        name = "Search",
        func=search.run,
        description="useful for when you need to answer questions about current
events. You should ask targeted questions"
    ),
    Tool(
        name="Calculator",
        func=llm_math_chain.run,
        description="useful for when you need to answer questions about math"
    ),
    Tool(
        name="FooBar DB",
        func=db_chain.run,
        description="useful for when you need to answer questions about FooBar.
Input should be in the form of a question containing full context"
    )
]
```

```
mrkl = initialize_agent(tools, llm, agent="chat-zero-shot-react-description",
```

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```
mrkl.run("Who is Leo DiCaprio's girlfriend? What is her current age raised to the 0.43 power?")
```

> Entering new AgentExecutor chain...

Thought: The first question requires a search, while the second question requires a calculator.

Action:

...

```
{
  "action": "Search",
  "action_input": "Who is Leo DiCaprio's girlfriend?"
}
```

Observation: Camila Morrone

Thought: For the second question, I need to use the calculator tool to raise her current age to the 0.43 power.

Action:

...

```
{
  "action": "Calculator",
  "action_input": "22.0^(0.43)"
}
```

> Entering new LLMMathChain chain...

22.0^(0.43)

```python

import math

print(math.pow(22.0, 0.43))

```

Answer: 3.777824273683966

> Finished chain.

Observation: Answer: 3.777824273683966

Thought: I now know the final answer.

Final Answer: Camila Morrone, 3.777824273683966.

> Finished chain.

'Camila Morrone, 3.777824273683966.'

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```
what albums of theirs are in the FooBar database?")
```

> Entering new AgentExecutor chain...

Question: What is the full name of the artist who recently released an album called 'The Storm Before the Calm' and are they in the FooBar database? If so, what albums of theirs are in the FooBar database?

Thought: I should use the Search tool to find the answer to the first part of the question and then use the FooBar DB tool to find the answer to the second part of the question.

Action:

```
...
```

```
{
  "action": "Search",
  "action_input": "Who recently released an album called 'The Storm Before the Calm'"
}
```

Observation: Alanis Morissette

Thought: Now that I have the name of the artist, I can use the FooBar DB tool to find their albums in the database.

Action:

```
...
```

```
{
  "action": "FooBar DB",
  "action_input": "What albums does Alanis Morissette have in the database?"
}
```

> Entering new SQLiteDatabaseChain chain...

What albums does Alanis Morissette have in the database?

SQLQuery:

```
/Users/harrisonchase/workplace/langchain/langchain/sql_database.py:141: SAWarning:
Dialect sqlite+pysqlite does *not* support Decimal objects natively, and
SQLAlchemy must convert from floating point - rounding errors and other issues may
occur. Please consider storing Decimal numbers as strings or integers on this
platform for lossless storage.
```

```
sample_rows = connection.execute(command)
```

```
SELECT Title FROM Album WHERE ArtistId IN (SELECT ArtistId FROM Artist WHERE Name
= 'Alanis Morissette') LIMIT 5;
```

```
SQLResult: [('Jagged Little Pill',)]
```

Answer: Alanis Morissette has the album 'Jagged Little Pill' in the database.

> Finished chain.

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**Final Answer: The artist who recently released an album called 'The Storm Before the Calm' is Alanis Morissette. The album 'Jagged Little Pill' is in the FooBar database.**

**> Finished chain.**

"The artist who recently released an album called 'The Storm Before the Calm' is Alanis Morissette. The album 'Jagged Little Pill' is in the FooBar database."