

ChatBot Using Langgraph

```
In [ ]: !pip install langgraph langsmith
```

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Requirement already satisfied: langgraph in /usr/local/lib/python3.11/dist-packages (0.4.8)
Requirement already satisfied: langsmith in /usr/local/lib/python3.11/dist-packages (0.3.45)
Requirement already satisfied: langchain-core>=0.1 in /usr/local/lib/python3.11/dist-packages (from langgraph) (0.3.66)
Requirement already satisfied: langgraph-checkpoint>=2.0.26 in /usr/local/lib/python3.11/dist-packages (from langgraph) (2.1.0)
Requirement already satisfied: langgraph-prebuilt>=0.2.0 in /usr/local/lib/python3.11/dist-packages (from langgraph) (0.2.2)
Requirement already satisfied: langgraph-sdk>=0.1.42 in /usr/local/lib/python3.11/dist-packages (from langgraph) (0.1.70)
Requirement already satisfied: pydantic>=2.7.4 in /usr/local/lib/python3.11/dist-packages (from langgraph) (2.11.7)
Requirement already satisfied: xxhash>=3.5.0 in /usr/local/lib/python3.11/dist-packages (from langgraph) (3.5.0)
Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from langsmith) (0.28.1)
Requirement already satisfied: orjson<4.0.0,>=3.9.14 in /usr/local/lib/python3.11/dist-packages (from langsmith) (3.10.18)
Requirement already satisfied: packaging>=23.2 in /usr/local/lib/python3.11/dist-packages (from langsmith) (24.2)
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Requirement already satisfied: requests-toolbelt<2.0.0,>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from langsmith) (1.0.0)
Requirement already satisfied: zstandard<0.24.0,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from langsmith) (0.23.0)
Requirement already satisfied: anyio in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.23.0->langsmith) (4.9.0)
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Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.11/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->langsmith) (0.16.0)
Requirement already satisfied: tenacity!=8.4.0,<10.0.0,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from langchain-core>=0.1->langgraph) (9.1.2)
Requirement already satisfied: jsonpatch<2.0,>=1.33 in /usr/local/lib/python3.11/dist-packages (from langchain-core>=0.1->langgraph) (1.33)
Requirement already satisfied: PyYAML>=5.3 in /usr/local/lib/python3.11/dist-packages (from langchain-core>=0.1->langgraph) (6.0.2)
Requirement already satisfied: typing-extensions>=4.7 in /usr/local/lib/python3.11/dist-packages (from langchain-core>=0.1->langgraph) (4.14.0)
Requirement already satisfied: ormsgpack>=1.10.0 in /usr/local/lib/python3.11/dist-packages (from langgraph-checkpoint>=2.0.26->langgraph) (1.10.0)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-packages (from pydantic>=2.7.4->langgraph) (0.7.0)
Requirement already satisfied: pydantic-core==2.33.2 in /usr/local/lib/python3.11/dist-packages (from pydantic>=2.7.4->langgraph) (2.33.2)
Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from pydantic>=2.7.4->langgraph) (0.4.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langsmith) (3.4.2)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langsmith) (2.4.0)
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.11/dist-packages (from jsonpatch<2.0,>=1.33->langchain-core>=0.1->langgraph) (3.0.0)
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.11/dist-packages (from anyio->httpx<1,>=0.23.0->langsmith) (1.3.1)
```

```
In [ ]: !pip install langchain langchain_groq langchain_community
```

```
Requirement already satisfied: langchain in /usr/local/lib/python3.11/dist-packages (0.3.26)
Requirement already satisfied: langchain_groq in /usr/local/lib/python3.11/dist-packages (0.3.4)
Requirement already satisfied: langchain_community in /usr/local/lib/python3.11/dist-packages (0.3.26)
Requirement already satisfied: langchain-core<1.0.0,>=0.3.66 in /usr/local/lib/python3.11/dist-packages (from langchain) (0.3.66)
Requirement already satisfied: langchain-text-splitters<1.0.0,>=0.3.8 in /usr/local/lib/python3.11/dist-packages (from langchain) (0.3.8)
Requirement already satisfied: langsmith>=0.1.17 in /usr/local/lib/python3.11/dist-packages (from langchain) (0.3.45)
Requirement already satisfied: pydantic<3.0.0,>=2.7.4 in /usr/local/lib/python3.11/dist-packages (from langchain) (2.11.7)
Requirement already satisfied: SQLAlchemy<3,>=1.4 in /usr/local/lib/python3.11/dist-packages (from langchain) (2.0.41)
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Requirement already satisfied: requests<3,>=2 in /usr/local/lib/python3.11/dist-packages (from langchain) (2.32.3)

Requirement already satisfied: PyYAML>=5.3 in /usr/local/lib/python3.11/dist-packages (from langchain) (6.0.2)

Requirement already satisfied: groq<1,>=0.28.0 in /usr/local/lib/python3.11/dist-packages (from langchain_groq) (0.28.0)

Requirement already satisfied: aiohttp<4.0.0,>=3.8.3 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (3.11.15)

Requirement already satisfied: tenacity!=8.4.0,<10,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (9.1.2)

Requirement already satisfied: dataclasses-json<0.7,>=0.5.7 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (0.6.7)

Requirement already satisfied: pydantic-settings<3.0.0,>=2.4.0 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (2.10.0)

Requirement already satisfied: httpx-sse<1.0.0,>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (0.4.0)

Requirement already satisfied: numpy>=1.26.2 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (2.0.2)

Requirement already satisfied: aiohappyeyeballs>=2.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (2.6.1)

Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (1.3.2)

Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (25.3.0)

Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (1.7.0)

Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (6.4.4)

Requirement already satisfied: propcache>=0.2.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (0.3.2)

Requirement already satisfied: yarl<2.0,>=1.17.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp<4.0.0,>=3.8.3->langchain_community) (1.20.1)

Requirement already satisfied: marshmallow<4.0.0,>=3.18.0 in /usr/local/lib/python3.11/dist-packages (from dataclasses-json<0.7,>=0.5.7->langchain_community) (3.26.1)

Requirement already satisfied: typing-inspect<1,>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from dataclasses-json<0.7,>=0.5.7->langchain_community) (0.9.0)

Requirement already satisfied: anyio<5,>=3.5.0 in /usr/local/lib/python3.11/dist-packages (from groq<1,>=0.28.0->langchain_groq) (4.9.0)

Requirement already satisfied: distro<2,>=1.7.0 in /usr/local/lib/python3.11/dist-packages (from groq<1,>=0.28.0->langchain_groq) (1.9.0)

Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from groq<1,>=0.28.0->langchain_groq) (0.28.1)

Requirement already satisfied: sniffio in /usr/local/lib/python3.11/dist-packages (from groq<1,>=0.28.0->langchain_groq) (1.3.1)

Requirement already satisfied: typing-extensions<5,>=4.10 in /usr/local/lib/python3.11/dist-packages (from groq<1,>=0.28.0->langchain_groq) (4.14.0)

Requirement already satisfied: jsonpatch<2.0,>=1.33 in /usr/local/lib/python3.11/dist-packages (from langchain-core<1.0.0,>=0.3.66->langchain) (1.33)

Requirement already satisfied: packaging<25,>=23.2 in /usr/local/lib/python3.11/dist-packages (from langchain-core<1.0.0,>=0.3.66->langchain) (24.2)

Requirement already satisfied: orjson<4.0.0,>=3.9.14 in /usr/local/lib/python3.11/dist-packages (from langsmith>=0.1.17->langchain) (3.10.18)

Requirement already satisfied: requests-toolbelt<2.0.0,>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from langsmith>=0.1.17->langchain) (1.0.0)

Requirement already satisfied: zstandard<0.24.0,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from langsmith>=0.1.17->langchain) (0.23.0)

Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-packages (from pydantic<3.0.0,>=2.7.4->langchain) (0.7.0)

Requirement already satisfied: pydantic-core==2.33.2 in /usr/local/lib/python3.11/dist-packages (from pydantic<3.0.0,>=2.7.4->langchain) (2.33.2)

Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from pydantic<3.0.0,>=2.7.4->langchain) (0.4.1)

Requirement already satisfied: python-dotenv>=0.21.0 in /usr/local/lib/python3.11/dist-packages (from pydantic-settings<3.0.0,>=2.4.0->langchain_community) (1.1.1)

Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langchain) (3.4.2)

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langchain) (3.10)

Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langchain) (2.4.0)

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2->langchain) (2025.6.15)

Requirement already satisfied: greenlet>=1 in /usr/local/lib/python3.11/dist-packages (from SQLAlchemychemy<3,>=1.4->langchain) (3.2.3)

Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.23.0->groq<1,>=0.28.0->langchain_groq) (1.0.9)

Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.11/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->groq<1,>=0.28.0->langchain_groq) (0.16.0)

Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.11/dist-packages (from jsonpatch<2.0,>=1.33->langchain-core<1.0.0,>=0.3.66->langchain) (3.0.0)

Requirement already satisfied: mypy-extensions>=0.3.0 in /usr/local/lib/python3.11/dist-packages (from typing-inspect<1,>=0.4.0->dataclasses-json<0.7,>=0.5.7->langchain_community) (1.1.0)

In []: `from google.colab import userdata`

```
groq_api_key=userdata.get('groq_api_key')
langsmith=userdata.get('langsmith_api_key')
print(langsmith)
print(groq_api_key)
```

```
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
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
```

```
In [ ]: import os
os.environ["LANGCHAIN_API_KEY"] = langsmith
os.environ["LANGCHAIN_TRACING_V2"]="true"
os.environ["LANGCHAIN_PROJECT"]="CourseLanggraph"
```

```
In [ ]: from langchain_groq import ChatGroq
```

```
In [ ]: llm=ChatGroq(groq_api_key=groq_api_key,model_name="Gemma2-9b-It")
llm
```

```
Out[ ]: ChatGroq(client=<groq.resources.chat.completions.Completions object at 0x7fd8e35b0d50>, async_client=<groq.resources.chat.completions.AsyncCompletions object at 0x7fd8e3678890>, model_name='Gemma2-9b-It', model_kwargs={}, groq_api_key=SecretStr('*****'))
```

Build The chatbot Using Langgraph

```
In [ ]: from typing import Annotated
from typing_extensions import TypedDict
from langgraph.graph import StateGraph , START , END
from langgraph.graph.message import add_messages
```

```
In [ ]: class State(TypedDict):
    # Messages have the type "list". The `add_messages` function
    # in the annotation defines how this state key should be updated
    # (in this case, it appends messages to the list, rather than overwriting them)
    messages: Annotated[list, add_messages]

graph_builder=StateGraph(State)
```

```
In [ ]: graph_builder
```

```
Out[ ]: <langgraph.graph.state.StateGraph at 0x7fd8e3cc7510>
```

```
In [ ]: def chatbot(state: State):
    if not state.get("messages"):
        print("Error: 'messages' list is empty in state.")
        return {"messages": []}

    response = llm.invoke(state["messages"])
    return {"messages": [response]} # Must return a list
```

```
In [ ]: graph_builder.add_node("chatbot", chatbot)
```

```
Out[ ]: <langgraph.graph.state.StateGraph at 0x7fd8e3cc7510>
```

```
In [ ]: print(graph_builder)

<langgraph.graph.state.StateGraph object at 0x7fd8e3cc7510>
```

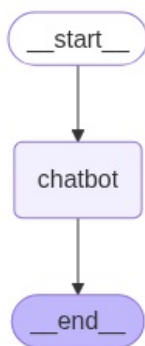
Now We Connect The Chatbot to Start And End Node

```
In [ ]: graph_builder.add_edge(START, "chatbot")
graph_builder.add_edge("chatbot", END)
```

```
Out[ ]: <langgraph.graph.state.StateGraph at 0x7fd8e3cc7510>
```

```
In [ ]: graph =graph_builder.compile()
```

```
In [ ]: from IPython.display import Image ,display
try:
    display(Image(graph.get_graph().draw_mermaid_png()))
except Exception:
    pass
```



```

In [ ]: while True:
    user_input = input("User: ")
    if user_input.lower() in ["quit", "q"]:
        print("Good Bye")
        break

    for event in graph.stream({
        "messages": [{"role": "user", "content": user_input}]
    }):
        for value in event.values():
            if not value:
                continue
            for message in value.get("messages", []):
                # message is an AIMessage, access .content directly
                print("Assistant:", message.content)
  
```

User: hii

Assistant: Hello!

What can I do for you today? 😊

User: what are doing?

Assistant: As an AI language model, I don't "do" things in the way a human does. I don't have experiences or feelings.

Right now, I'm waiting for your instructions. I can process your text input and respond with relevant information, generate creative content, translate languages, and much more.

What can I do for you?

User: what is python?

Assistant: Python is a **high-level, interpreted, general-purpose programming language**.

Let's break down what that means:

- * **High-level:** Python is designed to be easy for humans to read and write. It uses words and syntax that are closer to natural language than machine code (the language computers understand directly).
- * **Interpreted:** Python code is executed line by line by an interpreter, rather than being compiled into machine code beforehand. This makes it easier to test and debug code, as you can see the results of each line immediately.
- * **General-purpose:** Python can be used for a wide variety of tasks, including:
 - * **Web development:** Building websites and web applications.
 - * **Data science and machine learning:** Analyzing data, building predictive models, and creating artificial intelligence.
 - * **Scripting and automation:** Automating repetitive tasks, such as system administration or web scraping.
 - * **Game development:** Creating games using libraries like Pygame.
 - * **Desktop applications:** Building standalone applications for Windows, macOS, and Linux.
- Why is Python so popular?**
 - * **Easy to learn:** Python's clear syntax and readability make it a great language for beginners.
 - * **Large and active community:** There is a huge community of Python developers who contribute to its development and provide support.
 - * **Extensive libraries and frameworks:** Python has a vast collection of pre-written code (libraries) and frameworks that can be used to simplify development.
 - * **Cross-platform compatibility:** Python runs on Windows, macOS, Linux, and other operating systems.

If you're interested in learning to program, Python is an excellent choice. There are many resources available online and in libraries to help you get started.

User: what is langgraph?

Assistant: LangGraph is a powerful open-source library developed by the Hugging Face team. It's essentially a framework for building and exploring **language models** (large language models, specifically) with a focus on **graph neural networks (GNNs)**.

Here's a breakdown of its key features and what makes it special:

* **GNN-based:** LangGraph utilizes the strengths of graph neural networks to represent and understand language in a more structured way.

* **Modular Design:** It's built with a modular architecture, allowing researchers and developers to easily customize and experiment with different components like:

- * **Graph Embeddings:** Methods for representing words and their relationships as nodes and edges in a graph.
- * **Message Passing Mechanisms:** How information flows between nodes in the graph during training.
- * **Decoder Architectures:** Different ways to generate text output from the learned graph representations.

* **Focus on Scalability:** LangGraph is designed to handle large-scale language modeling tasks efficiently.

* **Open-Source and Accessible:** Being open-source, LangGraph encourages collaboration and transparency within the AI research community.

* **Hugging Face Integration:** It seamlessly integrates with the Hugging Face ecosystem, allowing for easy sharing, deployment, and fine-tuning of models.

Why use LangGraph?

- * **Improved Language Understanding:** GNNs can capture complex relationships between words in a sentence, leading to a deeper understanding of context and meaning.
- * **Enhanced Text Generation:** LangGraph's modularity allows for the creation of text generation models that are tailored to specific tasks or domains.
- * **New Research Opportunities:** Its open-source nature provides a platform for exploring innovative ideas and pushing the boundaries of language modeling.

Let me know if you have any more questions about LangGraph or want to delve into specific aspects of it!