Introduction to LangChain

Lecture 1
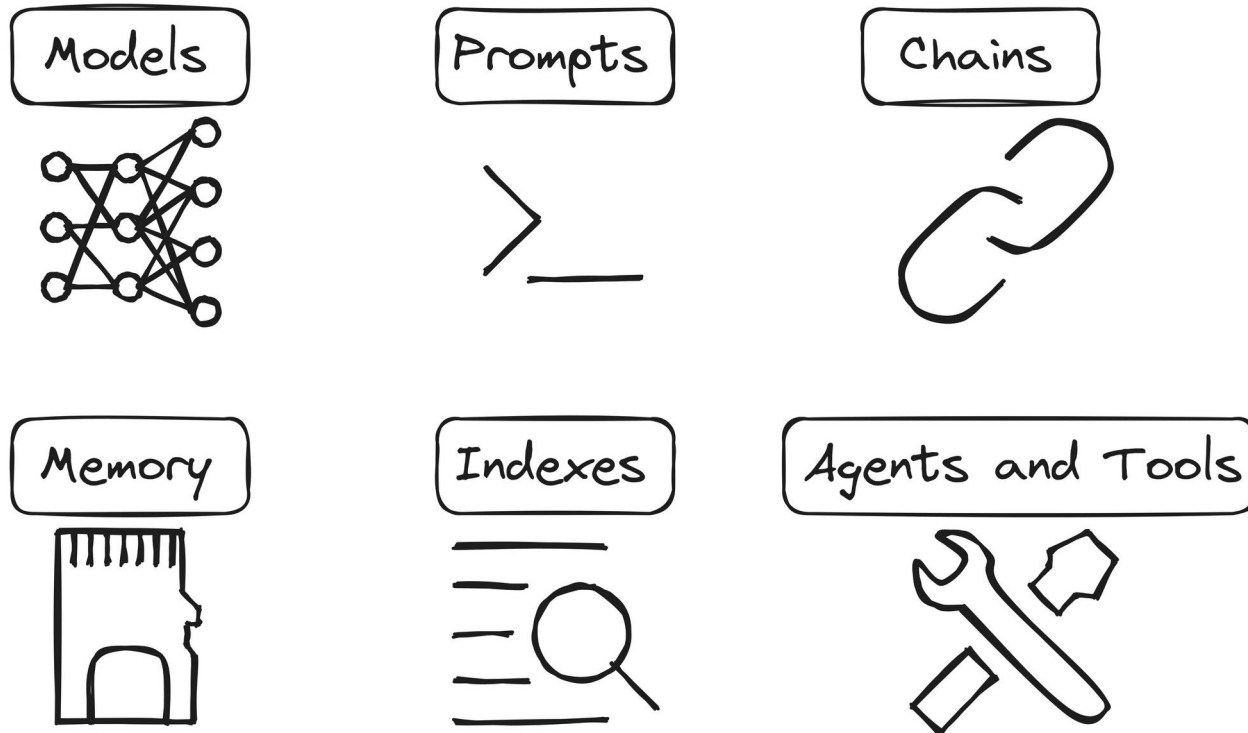
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v1.0

Plan

- What is LangChain?

- What are the components of LangChain?

- How do LangChain components work together?

- Practical case

What is LangChain?

LangChain is a framework that makes it easier to create applications using large language models (LLMs).

Models

Prompts

Chains

Memory

Indexes

Agents and Tools

Models

LangChain supports a variety of different models, so you can choose the one that suits your needs best
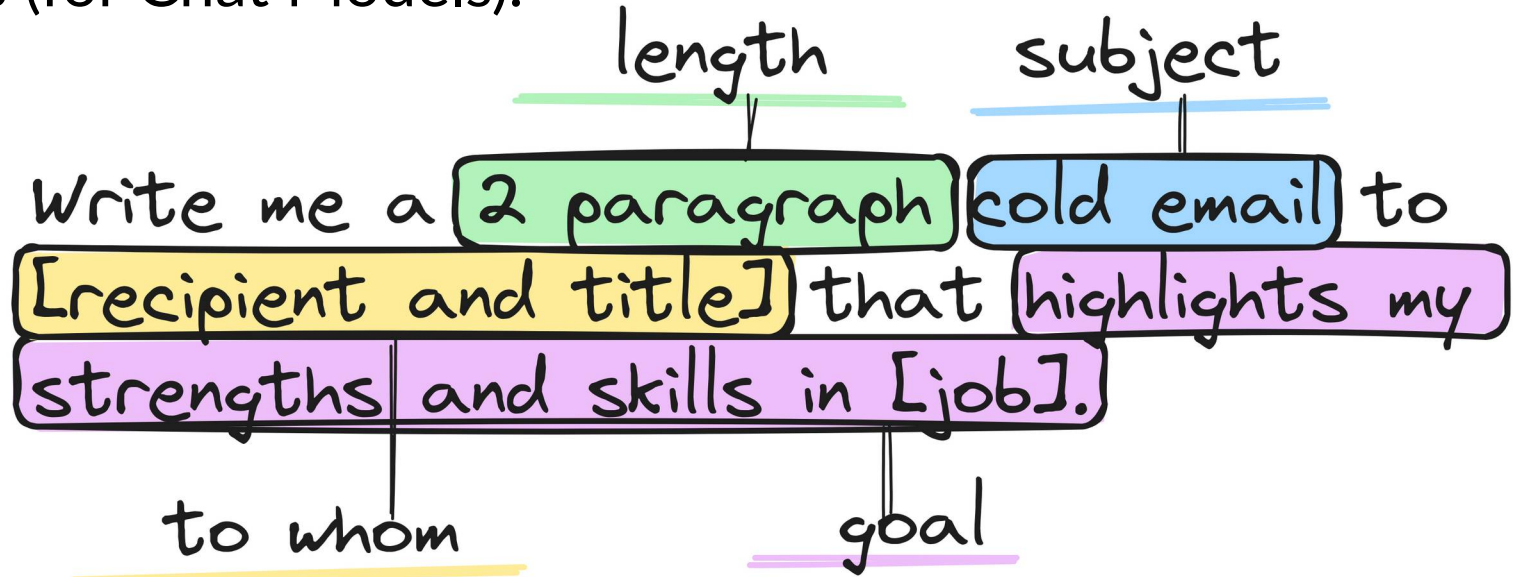
- **Language Models** are used **for generating text**
    - LLMs utilize APIs that take input text and generate text outputs
    - ChatModels employ models that process chat messages and produce responses.
- **Text Embedding Models** convert text into **numerical representations**
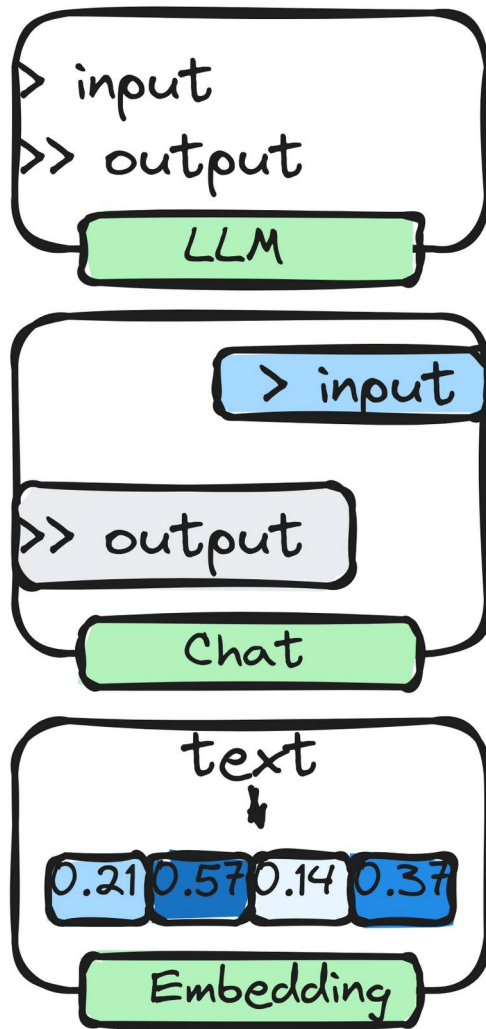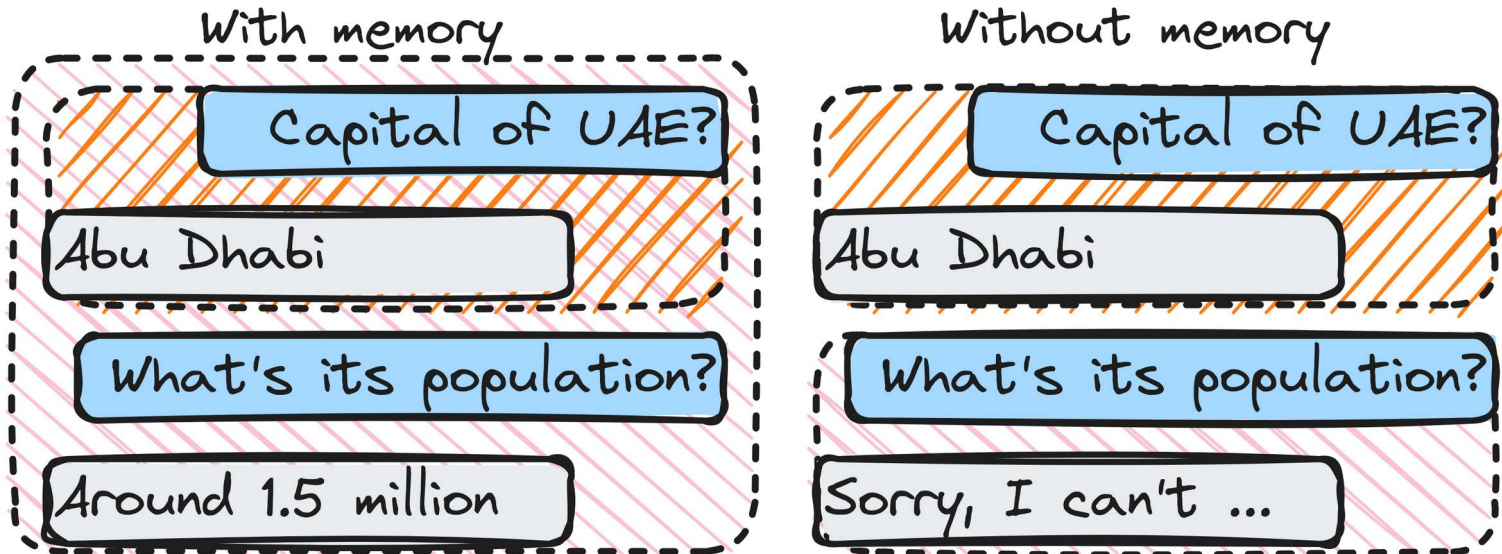
Prompts

Prompts are the instructions that you give to the LLM. They tell the LLM what you want it to do, and how you want it to do it.

Prompts can take the form of a string (for Language Models) or a list of messages (for Chat Models).

length   subject

Write me a [2 paragraph] [cold email] to [recipient and title] that [highlights my strengths and skills in [job].

to whom   goal

Memory

LangChain introduces memory components that enable the retention and utilization of past interactions. By default, LangChain components are stateless, treating each query independently. Memory in LangChain allows for the storage and management of previous chat messages.

With memory

Capital of UAE?

Abu Dhabi

What's its population?

Around 1.5 million

Without memory

Capital of UAE?

Abu Dhabi

What's its population?

Sorry, I can't ...

Indexes

Indexes are databases of information that can be used to provide context to the LLM.
For example, if you are asking the LLM to answer a question about a particular topic, you could use an index to provide the LLM with a list of relevant articles or websites.
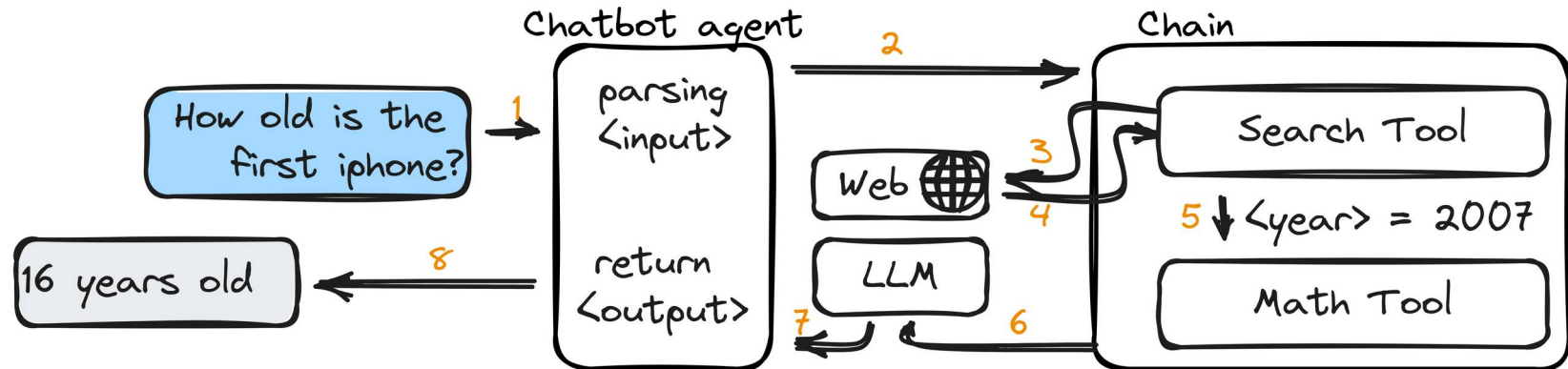

With index

Without index
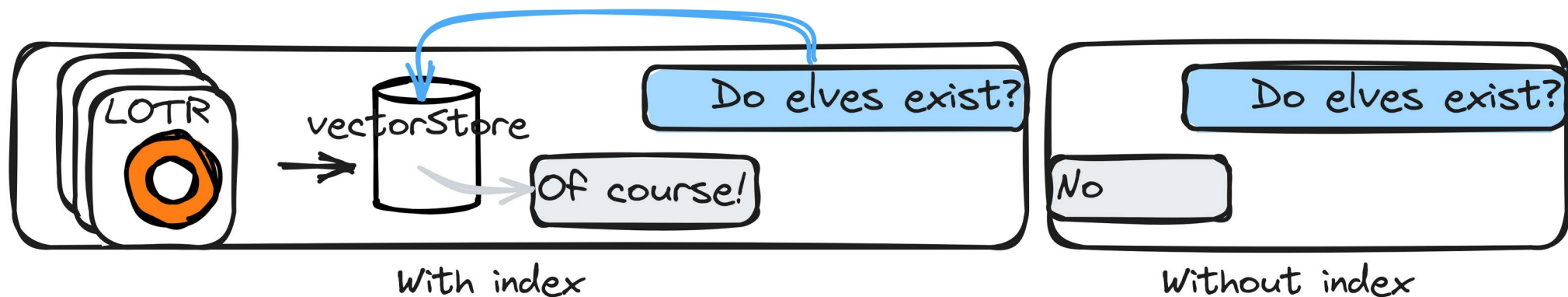
Chains

Chains are sequences of calls to the LLM. They allow you to perform complex tasks by chaining together multiple calls to the LLM. There are multiple types of chains to solve different cases.
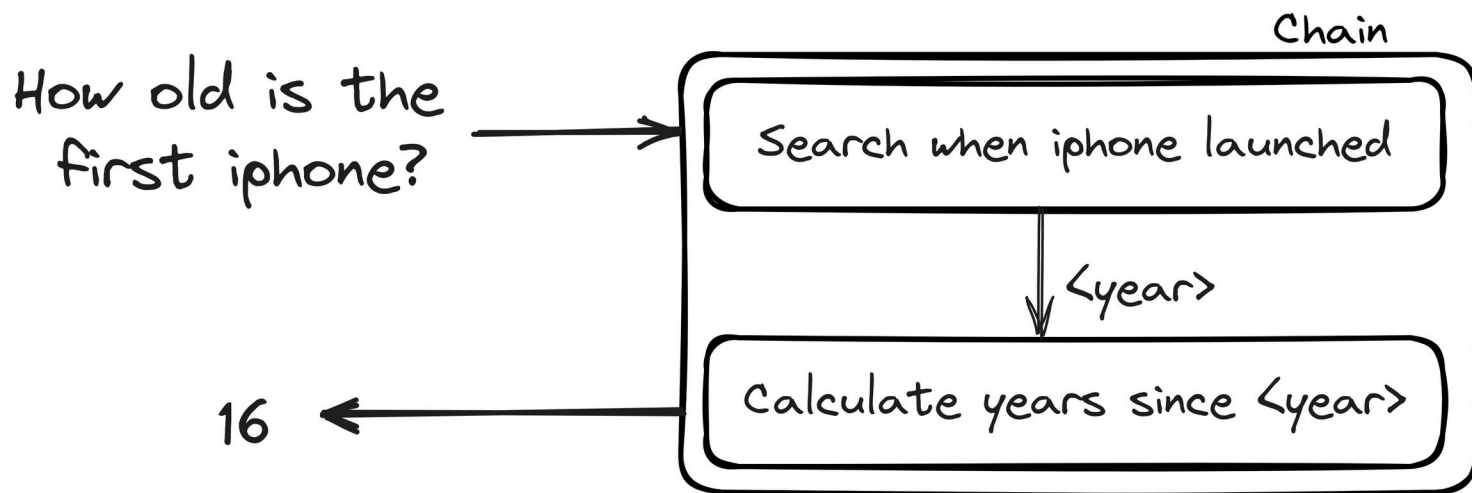
Agents and Tools

Agents are objects that manage interaction between the user and the LLM. They handle things like *parsing input*, *generating output* and determining the sequence of actions to follow and tools to use.

A tool is a function designed to perform a specific task. Examples of tools can range from *Google Search, DB lookups, API calls*, to other chains. The standard interface for a tool is a function that accepts a string as input and returns a string as output.

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Scenario: Public Holidays

When is this year's holiday marking the end of Ramadan?

Chatbot agent

1 → parsing <input>

Prompt Template

return <output>

11 → April 21

2

Chain

Search Tool: What is the holiday name?

3 → Web
4 ←

5 ↓ <name>

10 ↑

CSVLoader Tool

vectorStore

6
7

Retriever: When is it celebrated?

8 → ChatOpenAI Model
9 ←

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