

```
!pip install langchain langchain-community chromadb sentence-transformers transformers accelerate
```

```
Requirement already satisfied: google-auth>=1.0.1 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb)
Requirement already satisfied: websocket-client!=0.40.0,!>=0.41.*,>=0.42.*,>=0.32.0 in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: requests-oauthlib in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb)
Requirement already satisfied: urllib3<2.4.0,>=1.24.2 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb)
Requirement already satisfied: durationpy>=0.7 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb)
Requirement already satisfied: langchain-text-splitters<2.0.0,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain>=2.0.0->chromadb)
Requirement already satisfied: jsonpatch<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: uuid-utils<1.0,>=0.12.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: langgraph-checkpoint<4.0.0,>=2.1.0 in /usr/local/lib/python3.12/dist-packages (from langgraph<1.1.0,>=2.1.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: langgraph-prebuilt<1.1.0,>=1.0.2 in /usr/local/lib/python3.12/dist-packages (from langgraph<1.1.0,>=2.1.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: langgraph-sdk<0.4.0,>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from langgraph<1.1.0,>=2.1.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: xxhash>=3.5.0 in /usr/local/lib/python3.12/dist-packages (from langgraph<1.1.0,>=2.1.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: requests-toolbelt>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.1.125->langgraph)
Requirement already satisfied: zstandard>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.1.125->langgraph)
Requirement already satisfied: coloredlogs in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (15)
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (25)
Requirement already satisfied: protobuf in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (5.29)
Requirement already satisfied: sympy in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (1.14.0)
Requirement already satisfied: importlib-metadata<8.8.0,>=6.0 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-api>=0.6.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: googleapis-common-protos~1.57 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-e&gt;=0.6.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: opentelemetry-exporter-otlp-proto-common==1.39.1 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-exporter-otlp-proto-common>=1.39.1 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: opentelemetry-expo in /usr/local/lib/python3.12/dist-packages (from opentelemetry-expo>=0.6.0 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: opentelemetry-semantic-conventions==0.6.0b1 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-semantic-conventions>=0.6.0b1 in /usr/local/lib/python3.12/dist-packages)
Requirement already satisfied: backoff>=1.10.0 in /usr/local/lib/python3.12/dist-packages (from posthog<6.0.0,>=2.4.0->chromadb)
Requirement already satisfied: distro>=1.5.0 in /usr/local/lib/python3.12/dist-packages (from posthog<6.0.0,>=2.4.0->chromadb)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4->chromadb)
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4->chromadb)
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4->chromadb)
Requirement already satisfied: python-dotenv>=0.21.0 in /usr/local/lib/python3.12/dist-packages (from pydantic-settings<3.0.0,>=2.7.4->chromadb)
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2.32->chromadb)
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chromadb)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chromadb)
Requirement already satisfied: greenlet>=1 in /usr/local/lib/python3.12/dist-packages (from SQLAlchemy<3.0.0,>=1.4.0->langchain)
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transformer)
Requirement already satisfied: networkx>=2.5.1 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transformer)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transformer) (<2.11.3,>=2.11.3)
Requirement already satisfied: click>=8.0.0 in /usr/local/lib/python3.12/dist-packages (from typer>=0.9.0->chromadb) (8.3.1)
Requirement already satisfied: shellingham>=1.3.0 in /usr/local/lib/python3.12/dist-packages (from typer>=0.9.0->chromadb) (1.3.0)
Requirement already satisfied: httptools>=0.6.3 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->chromadb)
Requirement already satisfied: uvloop>=0.15.1 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->chromadb)
Requirement already satisfied: watchfiles>=0.13 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->chromadb)
Requirement already satisfied: websockets>=10.4 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->chromadb)
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn->sentence-transformer)
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn->sentence-transformer)
Requirement already satisfied: cachetools<7.0,>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kubernetes)
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kubernetes)
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kubernetes)
Requirement already satisfied: zipp>=3.20 in /usr/local/lib/python3.12/dist-packages (from importlib-metadata<8.8.0,>=6.0->opentelemetry)
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0.0,>=1.33.0->langgraph)
Requirement already satisfied: ormsgpack>=1.12.0 in /usr/local/lib/python3.12/dist-packages (from langgraph-checkpoint<4.0.0,>=4.0.0)
Requirement already satisfied: mdurl~>0.1 in /usr/local/lib/python3.12/dist-packages (from markdown-it-py>=2.2.0->rich>=10.11.0->chromadb)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from sympy->onnxruntime>=1.14.1->chromadb)
Requirement already satisfied: mypy-extensions>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from typing-inspect<1,>=0.4.0->chromadb)
Requirement already satisfied: humanfriendly>=9.1 in /usr/local/lib/python3.12/dist-packages (from coloredlogs->onnxruntime>=1.14.1->chromadb)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.12/dist-packages (from jinja2->torch>=1.11.0->sentence-transformer)
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.12/dist-packages (from requests-oauthlib->kubernetes)
Requirement already satisfied: pyasn1<0.7.0,>=0.6.1 in /usr/local/lib/python3.12/dist-packages (from pyasn1-modules>=0.2.1->google-cloud-aiplatform)
```

```
from langchain_community.document_loaders import WebBaseLoader

loader = WebBaseLoader(web_paths=["https://docs.python.org/3/tutorial/introduction.html#lists"])
docs = loader.load()

print("Pages loaded:", len(docs))
print("\nPreview:\n", docs[0].page_content[:300])
```

Pages loaded: 1

Preview:

### 3. An Informal Introduction to Python – Python 3.14.2 documentation

```
from langchain_text_splitters import RecursiveCharacterTextSplitter

splitter = RecursiveCharacterTextSplitter(
    chunk_size=500,
    chunk_overlap=50
)

splits = splitter.split_documents(docs)

print("Total chunks created:", len(splits))
print("\nExample chunk:\n", splits[0].page_content[:200])
```

**Theme**

Auto  
Light  
Dark

**Table of Contents****3. An Informal Introduction**

```
from langchain_community.embeddings import HuggingFaceEmbeddings

embedding_model = HuggingFaceEmbeddings(
    model_name="sentence-transformers/all-MiniLM-L6-v2"
)

print("Embedding model loaded!")
```

Embedding model loaded!

```
from langchain_community.vectorstores import Chroma

vector_db = Chroma.from_documents(
    documents=splits,
    embedding=embedding_model
)

retriever = vector_db.as_retriever()

print("Vector database created!")
print("Total vectors stored:", vector_db._collection.count())
```

Vector database created!  
Total vectors stored: 72

```
question = "What are Python lists?"

retrieved_docs = retriever.invoke(question)

print("Retrieved knowledge chunks:\n")
for i, doc in enumerate(retrieved_docs):
    print(i+1, "->", doc.page_content[:150], "\n")

Retrieved knowledge chunks:

1 -> 3.1.3. Lists¶
Python knows a number of compound data types, used to group together other
values. The most versatile is the list, which can be written

2 -> language's flavor and style. After reading it, you will be able to read and
write Python modules and programs, and you will be ready to learn more abo
```

3 -> 4.9.4. Arbitrary Argument Lists  
 4.9.5. Unpacking Argument Lists  
 4.9.6. Lambda Expressions  
 4.9.7. Documentation Strings  
 4.9.8. Function Annotations

4

4 -> This tutorial introduces the reader informally to the basic concepts and features of the Python language and system. Be aware that it expects you to h

```
from transformers import pipeline

llm = pipeline(
    "text2text-generation",
    model="google/flan-t5-base",
    max_new_tokens=150
)

print("LLM loaded!")
```

```
config.json:      1.40k/? [00:00<00:00, 96.0kB/s]
model.safetensors: 100%                                990M/990M [00:09<00:00, 134MB/s]
generation_config.json: 100%                            147/147 [00:00<00:00, 7.13kB/s]
tokenizer_config.json: 2.54k/? [00:00<00:00, 117kB/s]
spiece.model: 100%                                     792k/792k [00:00<00:00, 5.09MB/s]
tokenizer.json: 2.42M/? [00:00<00:00, 35.1MB/s]
special_tokens_map.json: 2.20k/? [00:00<00:00, 146kB/s]
Device set to use cpu
LLM loaded!
```

```
context = "\n".join([doc.page_content for doc in retrieved_docs])

prompt = f"""
Answer the question using only the context below.

Context:
{context}

Question: {question}

Answer:
"""

print("Prompt sent to LLM:\n", prompt)

response = llm(prompt)
print("\nFinal Answer:\n", response[0]["generated_text"])
```

Prompt sent to LLM:

Answer the question using only the context below.

Context:

### 3.1.3. Lists

Python knows a number of compound data types, used to group together other values. The most versatile is the list, which can be written as a list of comma-separated values (items) between square brackets. Lists might contain items of different types, but usually the items all have the same type.

```
>>> squares = [1, 4, 9, 16, 25]
```

```
>>> squares
```

```
[1, 4, 9, 16, 25]
```

language's flavor and style. After reading it, you will be able to read and write Python modules and programs, and you will be ready to learn more about the various Python library modules described in The Python Standard Library.

The Glossary is also worth going through.

### 4.9.4. Arbitrary Argument Lists

### 4.9.5. Unpacking Argument Lists

- 4.9.6. Lambda Expressions
- 4.9.7. Documentation Strings
- 4.9.8. Function Annotations

#### 4.10. Intermezzo: Coding Style

##### 5. Data Structures

###### 5.1. More on Lists

###### 5.1.1. Using Lists as Stacks

###### 5.1.2. Using Lists as Queues

###### 5.1.3. List Comprehensions

###### 5.1.4. Nested List Comprehensions

This tutorial introduces the reader informally to the basic concepts and features of the Python language and system. Be aware that it expects you to have a basic understanding of programming in general. It helps to have a Python interpreter handy for hands-on experience, but all examples are self-contained, so the tutorial can be read off-line as well.

For a description of standard objects and modules, see [The Python Standard Library](#).

Question: What are Python lists?

Answer:

Final Answer:

a list of comma-separated values (items) between square brackets