RAG CODE

```
!nvidia-smi
```

```
Sun Dec  7 05:21:42 2025
+-----------------------------------------------------------------------------------------+
| NVIDIA-SMI 550.54.15              Driver Version: 550.54.15      CUDA Version: 12.4      |
|-----------------------------------------+------------------------+----------------------+
| GPU  Name                 Persistence-M | Bus-Id          Disp.A | Volatile Uncorr. ECC |
| Fan  Temp   Perf          Pwr:Usage/Cap |           Memory-Usage | GPU-Util  Compute M. |
|                                         |                        |               MIG M. |
|=========================================+========================+======================|
|   0  Tesla T4                       Off |   00000000:00:04.0 Off |                    0 |
| N/A   43C    P8               9W /  70W |       0MiB /  15360MiB |      0%      Default |
|                                         |                        |                  N/A |
+-----------------------------------------+------------------------+----------------------+

+-----------------------------------------------------------------------------------------+
| Processes:                                                                              |
|  GPU   GI   CI        PID   Type   Process name                              GPU Memory |
|        ID   ID                                                               Usage      |
|=========================================================================================|
|  No running processes found                                                            |
+-----------------------------------------------------------------------------------------+
```

```
!pip uninstall -y chromadb langchain langchain-groq langchain-community langchain-chroma langchain-text-splitters transform
!pip install -U chromadb langchain==0.1.18 langchain-groq==0.1.5 langchain-community==0.0.18 langchain-chroma==0.1.5 langch
```

```
WARNING: Skipping chromadb as it is not installed.
WARNING: Skipping langchain as it is not installed.
WARNING: Skipping langchain-groq as it is not installed.
WARNING: Skipping langchain-community as it is not installed.
WARNING: Skipping langchain-chroma as it is not installed.
WARNING: Skipping langchain-text-splitters as it is not installed.
Found existing installation: transformers 4.57.3
Uninstalling transformers-4.57.3:
  Successfully uninstalled transformers-4.57.3
WARNING: Skipping sentence-transformers as it is not installed.
Found existing installation: unstructured 0.18.21
Uninstalling unstructured-0.18.21:
  Successfully uninstalled unstructured-0.18.21
WARNING: Skipping langchain-huggingface as it is not installed.
Collecting chromadb
  Using cached chromadb-1.3.5-cp39-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (7.2 kB)
ERROR: Could not find a version that satisfies the requirement langchain==0.1.18 (from versions: 0.0.1, 0.0.2, 0.0.3, 0.0.4,
ERROR: No matching distribution found for langchain==0.1.18
```

```
#!apt-get install poppler-utils
```

```
!pip install --upgrade unstructured[local-inference]
```

```
Collecting unstructured[local-inference]
  Using cached unstructured-0.18.21-py3-none-any.whl.metadata (25 kB)
Requirement already satisfied: charset-normalizer in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infe
Requirement already satisfied: filetype in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (1
Requirement already satisfied: python-magic in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]
Requirement already satisfied: lxml in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (6.0.2
Requirement already satisfied: nltk in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (3.9.1
Requirement already satisfied: requests in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inferenc
Requirement already satisfied: emoji in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.15
Requirement already satisfied: dataclasses-json in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infere
Requirement already satisfied: python-iso639 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference
Requirement already satisfied: langdetect in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference])
Requirement already satisfied: numpy in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.0.
Requirement already satisfied: rapidfuzz in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (
Requirement already satisfied: backoff in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infer
Requirement already satisfied: unstructured-client in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inf
Requirement already satisfied: wrapt in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.0.
Requirement already satisfied: tqdm in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (4.67.
Requirement already satisfied: psutil in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (5.9
Requirement already satisfied: python-oxmsg in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]
Requirement already satisfied: html5lib in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (1
Requirement already satisfied: pi_heif in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (1.
Requirement already satisfied: pdf2image in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (
Requirement already satisfied: openpyxl in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (3
Requirement already satisfied: pdfminer.six in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]
Requirement already satisfied: unstructured-inference>=1.1.1 in /usr/local/lib/python3.12/dist-packages (from unstructured
Requirement already satisfied: google-cloud-vision in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inf
Requirement already satisfied: pandas in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.2
Requirement already satisfied: markdown in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (3
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Requirement already satisfied: python-docx>=1.1.2 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infe
Requirement already satisfied: onnx>=1.17.0 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]
Requirement already satisfied: onnxruntime>=1.19.0 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inf
Requirement already satisfied: xlrd in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (2.0.2
Requirement already satisfied: unstructured.pytesseract>=0.3.12 in /usr/local/lib/python3.12/dist-packages (from unstructu
Requirement already satisfied: pikepdf in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (10
Requirement already satisfied: pypdf in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (6.4.
Requirement already satisfied: msoffcrypto-tool in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infere
Requirement already satisfied: pypandoc in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (1
Requirement already satisfied: networkx in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (3
Requirement already satisfied: effdet in /usr/local/lib/python3.12/dist-packages (from unstructured[local-inference]) (0.4
Requirement already satisfied: python-pptx>=1.0.1 in /usr/local/lib/python3.12/dist-packages (from unstructured[local-infe
Requirement already satisfied: protobuf>=4.25.1 in /usr/local/lib/python3.12/dist-packages (from onnx>=1.17.0->unstructure
Requirement already satisfied: ml_dtypes>=0.5.0 in /usr/local/lib/python3.12/dist-packages (from onnx>=1.17.0->unstructure
Requirement already satisfied: coloredlogs in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.19.0->unstructu
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.19.0->unstructu
Requirement already satisfied: packaging in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.19.0->unstructure
Requirement already satisfied: sympy in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.19.0->unstructured[lo
Requirement already satisfied: Pillow>=3.3.2 in /usr/local/lib/python3.12/dist-packages (from python-pptx>=1.0.1->unstruct
Requirement already satisfied: XlsxWriter>=0.5.7 in /usr/local/lib/python3.12/dist-packages (from python-pptx>=1.0.1->unst
Requirement already satisfied: python-multipart in /usr/local/lib/python3.12/dist-packages (from unstructured-inference>=1
Requirement already satisfied: huggingface-hub in /usr/local/lib/python3.12/dist-packages (from unstructured-inference>=1.
Requirement already satisfied: opencv-python>=4.12 in /usr/local/lib/python3.12/dist-packages (from unstructured-inference
Requirement already satisfied: matplotlib in /usr/local/lib/python3.12/dist-packages (from unstructured-inference>=1.1.1->
Requirement already satisfied: torch in /usr/local/lib/python3.12/dist-packages (from unstructured-inference>=1.1.1->unstr
Requirement already satisfied: timm in /usr/local/lib/python3.12/dist-packages (from unstructured-inference>=1.1.1->unstru
```

```
!pip install langchain
!pip install langchain-community
!pip install langchain-text-splitters
!pip install langchain-chroma
```

```
!pip install sentence-transformers
```

```
Collecting sentence-transformers
  Downloading sentence_transformers-5.1.2-py3-none-any.whl.metadata (16 kB)
Requirement already satisfied: transformers<5.0.0,>=4.41.0 in /usr/local/lib/python3.12/dist-packages (from sentence-transfc
Requirement already satisfied: tqdm in /usr/local/lib/python3.12/dist-packages (from sentence-transformers) (4.67.1)
Requirement already satisfied: torch>=1.11.0 in /usr/local/lib/python3.12/dist-packages (from sentence-transformers) (2.9.0+
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.12/dist-packages (from sentence-transformers) (1.6.1)
Requirement already satisfied: scipy in /usr/local/lib/python3.12/dist-packages (from sentence-transformers) (1.16.3)
Requirement already satisfied: huggingface-hub>=0.20.0 in /usr/local/lib/python3.12/dist-packages (from sentence-transformer
Requirement already satisfied: Pillow in /usr/local/lib/python3.12/dist-packages (from sentence-transformers) (11.3.0)
Requirement already satisfied: typing_extensions>=4.5.0 in /usr/local/lib/python3.12/dist-packages (from sentence-transforme
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0->sentence-t
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0->se
Requirement already satisfied: packaging>=20.9 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0->ser
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0->sentenc
Requirement already satisfied: requests in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0->sentence-t
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub>=0.20.0
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transforn
Requirement already satisfied: sympy>=1.13.3 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transf
Requirement already satisfied: networkx>=2.5.1 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-trar
Requirement already satisfied: jinja2 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transformers)
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.6.77 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.6.77 in /usr/local/lib/python3.12/dist-packages (from torch>=1.1
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.6.80 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.
Requirement already satisfied: nvidia-cudnn-cu12==9.10.2.21 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->
Requirement already satisfied: nvidia-cublas-cu12==12.6.4.1 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->
Requirement already satisfied: nvidia-cufft-cu12==11.3.0.4 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->s
Requirement already satisfied: nvidia-curand-cu12==10.3.7.77 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0-
Requirement already satisfied: nvidia-cusolver-cu12==11.7.1.2 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0
Requirement already satisfied: nvidia-cusparse-cu12==12.5.4.2 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0
Requirement already satisfied: nvidia-cusparselt-cu12==0.7.1 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0-
Requirement already satisfied: nvidia-nccl-cu12==2.27.5 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sent
Requirement already satisfied: nvidia-nvshmem-cu12==3.3.20 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->s
Requirement already satisfied: nvidia-nvtx-cu12==12.6.77 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->ser
Requirement already satisfied: nvidia-nvjitlink-cu12==12.6.85 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0
Requirement already satisfied: nvidia-cufile-cu12==1.11.1.6 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->
Requirement already satisfied: triton==3.5.0 in /usr/local/lib/python3.12/dist-packages (from torch>=1.11.0->sentence-transf
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.12/dist-packages (from transformers<5.0.0,>=4.41.0->ser
Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.12/dist-packages (from transformers<5.0.0,>=4.41.
Requirement already satisfied: tokenizers<=0.23.0,>=0.22.0 in /usr/local/lib/python3.12/dist-packages (from transformers<5.0
Requirement already satisfied: safetensors>=0.4.3 in /usr/local/lib/python3.12/dist-packages (from transformers<5.0.0,>=4.41
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn->sentence-transfc
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn->sentence-
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from sympy>=1.13.3->torch>=1.1
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.12/dist-packages (from jinja2->torch>=1.11.0->sente
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests->huggingfa
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub>=0.2€
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub
Downloading sentence_transformers-5.1.2-py3-none-any.whl (488 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 488.0/488.0 kB 10.0 MB/s eta 0:00:00
Installing collected packages: sentence-transformers
Successfully installed sentence-transformers-5.1.2
```

```
!pip install langchain-groq
```

```
Collecting langchain-groq
  Downloading langchain_groq-1.1.0-py3-none-any.whl.metadata (2.4 kB)
Collecting groq<1.0.0,>=0.30.0 (from langchain-groq)
  Downloading groq-0.37.1-py3-none-any.whl.metadata (16 kB)
Requirement already satisfied: langchain-core<2.0.0,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain-groq)
Requirement already satisfied: anyio<5,>=3.5.0 in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.30.0->langcha
Requirement already satisfied: distro<2,>=1.7.0 in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.30.0->langch
Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.30.0->langch
Requirement already satisfied: pydantic<3,>=1.9.0 in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.30.0->lang
Requirement already satisfied: sniffio in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.30.0->langchain-groq)
Requirement already satisfied: typing-extensions<5,>=4.10 in /usr/local/lib/python3.12/dist-packages (from groq<1.0.0,>=0.3€
Requirement already satisfied: jsonpatch<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: langsmith<1.0.0,>=0.3.45 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: packaging<26.0.0,>=23.2.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0
Requirement already satisfied: pyyaml<7.0.0,>=5.3.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,>=
Requirement already satisfied: tenacity!=8.4.0,<10.0.0,>=8.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain-cc
Requirement already satisfied: idna>=2.8 in /usr/local/lib/python3.12/dist-packages (from anyio<5,>=3.5.0->groq<1.0.0,>=0.3€
Requirement already satisfied: certifi in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->groq<1.0.0,>=0.30.
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->groq<1.0.0,>
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.12/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->g
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0.0,>=1.33.0->l
Requirement already satisfied: orjson>=3.9.14 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->lar
Requirement already satisfied: requests-toolbelt>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=€
Requirement already satisfied: requests>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->la
Requirement already satisfied: zstandard>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic<3,>=1.9.0->g
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic<3,>=1.9.0->gr
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic<3,>=1.9.0-
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests>=2.0.0->la
```

```
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.12/dist-packages (from requests>=2.0.0->langsmit
Downloading langchain_groq-1.1.0-py3-none-any.whl (19 kB)
Downloading groq-0.37.1-py3-none-any.whl (137 kB)
                                       ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 137.5/137.5 kB 5.3 MB/s eta 0:00:00
Installing collected packages: groq, langchain-groq
Successfully installed groq-0.37.1 langchain-groq-1.1.0
```

```
!pip install unstructured
!pip install unstructured[pdf]
```

```
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.12/dist-packages (from requests->unstructured[
Requirement already satisfied: aiofiles>=24.1.0 in /usr/local/lib/python3.12/dist-packages (from unstructured-client->unst
Requirement already satisfied: httpcore>=1.0.9 in /usr/local/lib/python3.12/dist-packages (from unstructured-client->unstr
Requirement already satisfied: httpx>=0.27.0 in /usr/local/lib/python3.12/dist-packages (from unstructured-client->unstruc
Requirement already satisfied: pydantic>=2.11.2 in /usr/local/lib/python3.12/dist-packages (from unstructured-client->unst
Requirement already satisfied: requests-toolbelt>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from unstructured-clie
Requirement already satisfied: cffi>=1.12 in /usr/local/lib/python3.12/dist-packages (from cryptography>=36.0.0->pdfminer.
Requirement already satisfied: googleapis-common-protos<2.0.0,>=1.56.2 in /usr/local/lib/python3.12/dist-packages (from go
Requirement already satisfied: grpcio-status<2.0.0,>=1.33.2 in /usr/local/lib/python3.12/dist-packages (from google-api-co
Requirement already satisfied: cachetools<7.0,>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from google-auth!=2.24.0
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.12/dist-packages (from google-auth!=2.24.0,
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.12/dist-packages (from google-auth!=2.24.0,!=2.25.0
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.12/dist-packages (from httpcore>=1.0.9->unstructured-cl
Requirement already satisfied: anyio in /usr/local/lib/python3.12/dist-packages (from httpx>=0.27.0->unstructured-client->
Requirement already satisfied: antlr4-python3-runtime==4.9.* in /usr/local/lib/python3.12/dist-packages (from omegaconf>=2
Requirement already satisfied: PyYAML>=5.1.0 in /usr/local/lib/python3.12/dist-packages (from omegaconf>=2.0->effdet->unst
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic>=2.11.2->u
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic>=2.11.2->un
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic>=2.11.2-
Requirement already satisfied: safetensors in /usr/local/lib/python3.12/dist-packages (from timm->unstructured-inference>=
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-inference>=1.
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-inference>=
Requirement already satisfied: networkx>=2.5.1 in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-infere
Requirement already satisfied: jinja2 in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-inference>=1.1.
Requirement already satisfied: fsspec>=0.8.5 in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-inferenc
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.6.77 in /usr/local/lib/python3.12/dist-packages (from torch->uns
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.6.77 in /usr/local/lib/python3.12/dist-packages (from torch->u
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.6.80 in /usr/local/lib/python3.12/dist-packages (from torch->uns
Requirement already satisfied: nvidia-cudnn-cu12==9.10.2.21 in /usr/local/lib/python3.12/dist-packages (from torch->unstru
Requirement already satisfied: nvidia-cublas-cu12==12.6.4.1 in /usr/local/lib/python3.12/dist-packages (from torch->unstru
Requirement already satisfied: nvidia-cufft-cu12==11.3.0.4 in /usr/local/lib/python3.12/dist-packages (from torch->unstruc
Requirement already satisfied: nvidia-curand-cu12==10.3.7.77 in /usr/local/lib/python3.12/dist-packages (from torch->unstr
Requirement already satisfied: nvidia-cusolver-cu12==11.7.1.2 in /usr/local/lib/python3.12/dist-packages (from torch->unst
Requirement already satisfied: nvidia-cusparse-cu12==12.5.4.2 in /usr/local/lib/python3.12/dist-packages (from torch->unst
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Requirement already satisfied: nvidia-nvshmem-cu12==3.3.20 in /usr/local/lib/python3.12/dist-packages (from torch->unstruc
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Requirement already satisfied: nvidia-nvjitlink-cu12==12.6.85 in /usr/local/lib/python3.12/dist-packages (from torch->unst
Requirement already satisfied: nvidia-cufile-cu12==1.11.1.6 in /usr/local/lib/python3.12/dist-packages (from torch->unstru
Requirement already satisfied: triton==3.5.0 in /usr/local/lib/python3.12/dist-packages (from torch->unstructured-inferenc
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from sympy->onnxruntime>=1.1
Requirement already satisfied: tokenizers<=0.23.0,>=0.22.0 in /usr/local/lib/python3.12/dist-packages (from transformers>=
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub->unst
Requirement already satisfied: mypy-extensions>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from typing-inspect<1,>=
Requirement already satisfied: humanfriendly>=9.1 in /usr/local/lib/python3.12/dist-packages (from coloredlogs->onnxruntim
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructured-
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructured-infe
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructured
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructured
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructured
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.12/dist-packages (from matplotlib->unstructu
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.12/dist-packages (from pandas->unstructured-inferenc
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.12/dist-packages (from pandas->unstructured-infere
Requirement already satisfied: pycparser in /usr/local/lib/python3.12/dist-packages (from cffi>=1.12->cryptography>=36.0.0
Requirement already satisfied: pyasn1<0.7.0,>=0.6.1 in /usr/local/lib/python3.12/dist-packages (from pyasn1-modules>=0.2.1
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.12/dist-packages (from anyio->httpx>=0.27.0->unstruc
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.12/dist-packages (from jinja2->torch->unstructure
```

```
import os
os.environ["GROQ_API_KEY"] = "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"
```

```
#fetch the pdf from url
import requests
url = "https://courses.cs.umbc.edu/671/fall12/notes/python/04_python_functions.pdf"

response = requests.get(url)
```

```
response
```

```
<Response [200]>
```

```
#save the pdf local file
```

```python
with open("python_inbuildfunctions.pdf", "wb") as f:
    f.write(response.content)
```

```python
from langchain_community.document_loaders import UnstructuredFileIOLoader

with open("python_inbuildfunctions.pdf", "rb") as f:
    loader = UnstructuredFileIOLoader(file=f)
    documents = loader.load()

documents  # This will be a list of Document objects
```

```
/tmp/ipython-input-1778148066.py:4: LangChainDeprecationWarning: The class `UnstructuredFileIOLoader` was deprecated in La
  loader = UnstructuredFileIOLoader(file=f)
Warning: No languages specified, defaulting to English.
[Document(metadata={}, page_content='Functions in Python\n\nDefining Functions\n\nFunction definition begins with "def."
Function name and its arguments.\n\ndef get_final_answer(filename): """Documentation String"""\n\nline1 line2 return
total_counter\n\nThe indentation matters… First line with less indentation is considered to be outside of the function
definition.\n\nThe keyword 'return' indicates the value to be sent back to the caller.\n\nNo header file or declaration
of types of function or arguments\n\nColon.\n\nPython and Types\n\nDynamic typing: Python determines the data types of
variable bindings in a program automatically\n\nStrong typing: But Python's not casual about types, it enforces the types
of objects\n\nFor example, you can't just append an integer to a string, but must first convert it to a string\n\nx =
"the answer is " # x bound to a string y = 23 # y bound to an integer. print x + y # Python will complain!\n\nCalling a
Function\n\nThe syntax for a function call is: >>> def myfun(x, y): return x * y >>> myfun(3, 4) 12\n\nParameters in
Python are Call by Assignment •\u202fOld values for the variables that are parameter names are hidden, and these
variables are simply made to refer to the new values\n\nAll assignment in Python, including binding function parameters,
uses reference semantics.\n\nFunctions without returns\n\nAll functions in Python have a return value, even if no return
line inside the code\n\nFunctions without a return return the special value None •\u202fNone is a special constant in the
language •\u202fNone is used like NULL, void, or nil in other\n\nlanguages\n\nNone is also logically equivalent to False
•\u202fThe interpreter's REPL doesn't print None\n\nFunction overloading? No.\n\nThere is no function overloading in
Python\n\nUnlike C++, a Python function is specified by its name alone The number, order, names, or types of arguments
cannot be used to distinguish between two functions with the same name\n\nTwo different functions can't have the same
name, even if they have different arguments\n\nBut: see operator overloading in later slides (Note: van Rossum playing
with function overloading for the future)\n\nDefault Values for Arguments\n\nYou can provide default values for a
function's arguments\n\nThese arguments are optional when the function is called\n\n>>> def myfun(b, c=3,
d="hello"):\n\nreturn b + c >>> myfun(5,3,"hello") >>> myfun(5,3) >>> myfun(5)\n\nAll of the above function calls return
8\n\nKeyword Arguments\n\nCan call a function with some/all of its arguments out of order as long as you specify their
names >>> def foo(x,y,z): return(2*x,4*y,8*z) >>> foo(2,3,4) (4, 12, 32) >>> foo(z=4, y=2, x=3) (6, 8, 32) >>> foo(-2,
z=-4, y=-3) (-4, -12, -32)\n\nCan be combined with defaults, too\n\n>>> def foo(x=1,y=2,z=3): return(2*x,4*y,8*z) >>>
foo() (2, 8, 24) >>> foo(z=100) (2, 8, 800)\n\nFunctions are first-class objects\n\nFunctions can be used as any
other\n\ndatatype, eg: •\u202fArguments to function •\u202fReturn values of functions •\u202fAssigned to variables
•\u202fParts of tuples, lists, etc\n\n>>> def square(x): return x*x\n\n>>> def applier(q, x): return q(x)\n\n>>>
applier(square, 7) 49\n\nLambda Notation\n\nPython's lambda creates anonymous functions >>> applier(lambda z: z * 42, 7)
14 •\u202fNote: only one expression in the lambda\n\nbody; its value is always returned\n\nPython supports functional
programming idioms: map, filter, closures, continuations, etc.\n\nLambda Notation\n\nBe careful with the syntax >>> f =
lambda x,y : 2 * x + y >>> f <function <lambda> at 0x87d30> >>> f(3, 4) 10 >>> v = lambda x: x*x(100) >>> v <function
<lambda> at 0x87df0> >>> v = (lambda x: x*x)(100) >>> v 10000\n\nExample: composition\n\n>>> def square(x): return x*x
>>> def twice(f): return lambda x: f(f(x)) >>> twice <function twice at 0x87db0> >>> quad = twice(square) >>> quad
<function <lambda> at 0x87d30> >>> quad(5) 625\n\nExample: closure\n\n>>> def counter(start=0, step=1): x = [start] def
_inc(): x[0] += step return x[0] return _inc >>> c1 = counter() >>> c2 = counter(100, -10) >>> c1() 1 >>> c2() 90\n\nmap,
filter, reduce\n\n>>> def add1(x): return x+1 >>> def odd(x): return x%2 == 1 >>> def add(x,y): return x + y >>>
map(add1, [1,2,3,4]) [2, 3, 4, 5] >>> map(+,[1,2,3,4],[100,200,300,400]) map(+,[1,2,3,4],[100,200,300,400]) ^
SyntaxError: invalid syntax >>> map(add,[1,2,3,4],[100,200,300,400]) [101, 202, 303, 404] >>> reduce(add, [1,2,3,4]) 10
>>> filter(odd, [1,2,3,4]) [1, 3]\n\nPython\n\nfunctional programming\n\nFunctions are first-class objects\n\nFunctions
can be used as any other\n\ndatatype, eg: •\u202fArguments to function •\u202fReturn values of functions •\u202fAssigned
to variables •\u202fParts of tuples, lists, etc\n\n>>> def square(x): return x*x\n\n>>> def applier(q, x): return
q(x)\n\n>>> applier(square, 7) 49\n\nLambda Notation\n\nPython's lambda creates anonymous functions >>> lambda x: x + 1
<function <lambda> at 0x1004e6ed8> >>> f = lambda x: x + 1 >>> f <function <lambda> at 0x1004e6f50> >>> f(100)
101\n\nLambda Notation\n\nBe careful with the syntax >>> f = lambda x,y: 2 * x + y >>> f <function <lambda> at 0x87d30>
>>> f(3, 4) 10 >>> v = lambda x: x*x(100) >>> v <function <lambda> at 0x87df0> >>> v = (lambda x: x*x)(100) >>> v
10000\n\nLambda Notation Limitations\n\nNote: only one expression in the lambda body; Its value is always returned\n\nThe
lambda expression must fit on one line!\n\nLambda will probably be deprecated in future versions of python\n\nGuido
is not a lambda fanboy\n\nFunctional programming\n\nPython supports functional programming idioms\n\nBuiltins for map,
reduce, filter, closures, continuations, etc.\n\nThese are often used with lambda\n\nExample: composition\n\n>>> def
square(x): return x*x >>> def twice(f): return lambda x: f(f(x)) >>> twice <function twice at 0x87db0> >>> quad =
twice(square) >>> quad <function <lambda> at 0x87d30> >>> quad(5) 625\n\nExample: closure\n\n>>> def counter(start=0,
step=1): x = [start] def _inc(): x[0] += step return x[0] return _inc >>> c1 = counter() >>> c2 = counter(100, -10) >>>
c1() 1 >>> c2() 90\n\nmap\n\n>>> def add1(x): return x+1 >>> map(add1, [1,2,3,4]) [2, 3, 4, 5] >>> map(lambda x: x+1,
[1,2,3,4]) [2, 3, 4, 5] >>> map(+, [1,2,3,4], [100,200,300,400]) map(+,[1,2,3,4],[100,200,300,400]) ^ SyntaxError:
```

```python
!pip install langchain-text-splitters
```

```
Requirement already satisfied: langchain-text-splitters in /usr/local/lib/python3.12/dist-packages (1.0.0)
Requirement already satisfied: langchain-core<2.0.0,>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langchain-text-
Requirement already satisfied: jsonpatch<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: langsmith<1.0.0,>=0.3.45 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: packaging<26.0.0,>=23.2.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0
Requirement already satisfied: pydantic<3.0.0,>=2.7.4 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,
Requirement already satisfied: pyyaml<7.0.0,>=5.3.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,>=
Requirement already satisfied: tenacity!=8.4.0,<10.0.0,>=8.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain-co
Requirement already satisfied: typing-extensions<5.0.0,>=4.7.0 in /usr/local/lib/python3.12/dist-packages (from langchain-co
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0.0,>=1.33.0->l
Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->l
Requirement already satisfied: orjson>=3.9.14 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->lar
Requirement already satisfied: requests-toolbelt>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0
Requirement already satisfied: requests>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->la
Requirement already satisfied: zstandard>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.
```

```
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.
Requirement already satisfied: anyio in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.0.0,>=0.
Requirement already satisfied: certifi in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.0.0,>=
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.
Requirement already satisfied: idna in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.0.0,>=0.3
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.12/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->l
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests>=2.0.0->la
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.12/dist-packages (from requests>=2.0.0->langsmit
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.12/dist-packages (from anyio->httpx<1,>=0.23.0->langsm
```

```python
from langchain_text_splitters import CharacterTextSplitter
text_splitter = CharacterTextSplitter(chunk_size = 100, chunk_overlap = 50)
```

```python
text_splitter
```

```
<langchain_text_splitters.character.CharacterTextSplitter at 0x7bf400caa5a0>
```

```python
texts = text_splitter.split_documents(documents)
```

```
WARNING:langchain_text_splitters.base:Created a chunk of size 113, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 110, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 174, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 149, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 179, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 113, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 238, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 120, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 121, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 214, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 191, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 163, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 358, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 120, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 178, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 213, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 191, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 163, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 218, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 169, which is longer than the specified 100
WARNING:langchain_text_splitters.base:Created a chunk of size 187, which is longer than the specified 100
```

```python
type(texts)
```

```
list
```

```python
texts[10]
```

```
Document(metadata={}, page_content='Calling a Function')
```

```python
pip install langchain-huggingface
```

```
Collecting langchain-huggingface
  Downloading langchain_huggingface-1.1.0-py3-none-any.whl.metadata (2.8 kB)
Requirement already satisfied: huggingface-hub<1.0.0,>=0.33.4 in /usr/local/lib/python3.12/dist-packages (from langchain-hug
Requirement already satisfied: langchain-core<2.0.0,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain-huggi
Requirement already satisfied: tokenizers<1.0.0,>=0.19.1 in /usr/local/lib/python3.12/dist-packages (from langchain-huggingf
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.33.4->lar
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.3
Requirement already satisfied: packaging>=20.9 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.33
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.33.4->
Requirement already satisfied: requests in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.33.4->lar
Requirement already satisfied: tqdm>=4.42.1 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>=0.33.4-
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0.0,>
Requirement already satisfied: jsonpatch<2.0.0,>=1.33.0 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: langsmith<1.0.0,>=0.3.45 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.
Requirement already satisfied: pydantic<3.0.0,>=2.7.4 in /usr/local/lib/python3.12/dist-packages (from langchain-core<2.0.0,
Requirement already satisfied: tenacity!=8.4.0,<10.0.0,>=8.1.0 in /usr/local/lib/python3.12/dist-packages (from langchain-co
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0.0,>=1.33.0->l
Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->l
Requirement already satisfied: orjson>=3.9.14 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->lar
Requirement already satisfied: requests-toolbelt>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0
Requirement already satisfied: zstandard>=0.23.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<1.0.0,>=0.3.45->
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests->huggingfa
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub<1.0.0
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.12/dist-packages (from requests->huggingface-hub
Requirement already satisfied: anyio in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.0.0,>=0.
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.12/dist-packages (from httpx<1,>=0.23.0->langsmith<1.
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.12/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->l
```

```
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.12/dist-packages (from anyio->httpx<1,>=0.23.0->langsm
Downloading langchain_huggingface-1.1.0-py3-none-any.whl (29 kB)
Installing collected packages: langchain-huggingface
Successfully installed langchain-huggingface-1.1.0
```

```python
from langchain_huggingface import HuggingFaceEmbeddings
embeddings = HuggingFaceEmbeddings(model_name="sentence-transformers/all-MiniLM-L6-v2")
persist_directory = "vector_db"
```

modules.json: 100%   349/349 [00:00<00:00, 34.7kB/s]

config_sentence_transformers.json: 100%   116/116 [00:00<00:00, 13.6kB/s]

README.md: 10.5k/? [00:00<00:00, 1.08MB/s]

sentence_bert_config.json: 100%   53.0/53.0 [00:00<00:00, 3.74kB/s]

config.json: 100%   612/612 [00:00<00:00, 68.3kB/s]

model.safetensors: 100%   90.9M/90.9M [00:02<00:00, 52.9MB/s]

tokenizer_config.json: 100%   350/350 [00:00<00:00, 21.0kB/s]

vocab.txt: 232k/? [00:00<00:00, 10.9MB/s]

tokenizer.json: 466k/? [00:00<00:00, 20.1MB/s]

special_tokens_map.json: 100%   112/112 [00:00<00:00, 10.3kB/s]

config.json: 100%   190/190 [00:00<00:00, 10.4kB/s]

```python
from langchain_chroma import Chroma

vectordb = Chroma.from_documents(
    documents=texts,
    embedding=embeddings,
    persist_directory=persist_directory
)
```

```python
print(vectordb)
```

```
<langchain_chroma.vectorstores.Chroma object at 0x7bf3a6fc4740>
```

```python
# Retrival

retriever = vectordb.as_retriever()
```

```python
from langchain_groq import ChatGroq
llm = ChatGroq(model = "llama-3.3-70b-versatile",temperature=0.2)
```

```python
!pip install -U langchain langchain-community langchain-groq chromadb
```

```
Requirement already satisfied: opentelemetry-proto==1.39.0 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-e>
Requirement already satisfied: opentelemetry-semantic-conventions==0.60b0 in /usr/local/lib/python3.12/dist-packages (from c
Requirement already satisfied: backoff>=1.10.0 in /usr/local/lib/python3.12/dist-packages (from posthog<6.0.0,>=2.4.0->chrom
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2.7.4
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic<3.0.0,>=2
Requirement already satisfied: python-dotenv>=0.21.0 in /usr/local/lib/python3.12/dist-packages (from pydantic-settings<3.0
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chromac
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chrom
Requirement already satisfied: greenlet>=1 in /usr/local/lib/python3.12/dist-packages (from SQLAlchemy<3.0.0,>=1.4.0->langch
Requirement already satisfied: huggingface-hub<2.0,>=0.16.4 in /usr/local/lib/python3.12/dist-packages (from tokenizers>=0.1
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) (
Requirement already satisfied: httptools>=0.6.3 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->
Requirement already satisfied: uvloop>=0.15.1 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->ch
Requirement already satisfied: watchfiles>=0.13 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->
Requirement already satisfied: websockets>=10.4 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->
Requirement already satisfied: cachetools<7.0,>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->k
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->ku
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: filelock in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<2.0,>=0.16.4->token
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<2.0,>=0.16
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<2.0,>=6
Requirement already satisfied: zipp>=3.20 in /usr/local/lib/python3.12/dist-packages (from importlib-metadata<8.8.0,>=6.0->c
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0.0,>=1.33.0->l
Requirement already satisfied: ormsgpack>=1.12.0 in /usr/local/lib/python3.12/dist-packages (from langgraph-checkpoint<4.0.6
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.12/dist-packages (from markdown-it-py>=2.2.0->rich>=10.1
Requirement already satisfied: mypy-extensions>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from typing-inspect<1,>=0
Requirement already satisfied: humanfriendly>=9.1 in /usr/local/lib/python3.12/dist-packages (from coloredlogs->onnxruntime>
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.12/dist-packages (from requests-oauthlib->kubernete
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from sympy->onnxruntime>=1.14
Requirement already satisfied: pyasn1<0.7.0,>=0.6.1 in /usr/local/lib/python3.12/dist-packages (from pyasn1 modules>=0.2.1
```

```python
from langchain_classic.chains import RetrievalQA

qa_chain = RetrievalQA.from_chain_type(
    llm=llm,
    chain_type="stuff",
    retriever=retriever,
    return_source_documents=True
)
```

```python
query = 'explain about filter, map, reduce'
qa_result = qa_chain.invoke({"query":query})
```

```python
print(qa_result)
```

```
{'query': 'explain about filter, map, reduce', 'result': "`filter`, `map`, and `reduce` are three fundamental functions in f
```

```python
print(qa_result['result'])
```

```
`filter`, `map`, and `reduce` are three fundamental functions in functional programming, commonly used in languages like Pyt

1. **Filter**:
    * Purpose: To create a new list with only the elements that satisfy a certain condition.
    * Syntax: `filter(function, iterable)`
    * Function: Takes a function and an iterable (like a list or tuple) as input. Applies the function to each element i
    * Example: `filter(odd, [1, 2, 3, 4])` would return `[1, 3]` if `odd` is a function that checks if a number is odd.
2. **Map**:
    * Purpose: To apply a function to each element in an iterable and return a new iterable with the results.
    * Syntax: `map(function, iterable)`
    * Function: Takes a function and an iterable as input. Applies the function to each element in the iterable and retu
    * Example: `map(square, [1, 2, 3, 4])` would return `[1, 4, 9, 16]` if `square` is a function that squares a number.
3. **Reduce**:
    * Purpose: To apply a function to the first two elements of an iterable, then to the result and the next element, an
    * Syntax: `reduce(function, iterable)`
    * Function: Takes a function and an iterable as input. Applies the function to the first two elements, then to the r
    * Example: `reduce(add, [1, 2, 3, 4])` would return `10` if `add` is a function that adds two numbers.

These functions are often used together to perform complex data transformations. They are also commonly used with lambda fun

Here's an example of using all three functions together:
```python
from functools import reduce

numbers = [1, 2, 3, 4, 5, 6]

# Filter out even numbers
odd_numbers = list(filter(lambda x: x % 2 != 0, numbers))

# Map each number to its square
squares = list(map(lambda x: x ** 2, odd_numbers))

# Reduce the squares to their sum
```

```
    sum_of_squares = reduce(lambda x, y: x + y, squares)

    print(sum_of_squares)  # Output: 35
    ```
    In this example, we first filter out the even numbers, then map each number to its square, and finally reduce the squares to
```