```python
import os
import requests
import json
from pypdf import PdfReader
from langchain_community.llms import Ollama
from langchain_community.vectorstores import FAISS
from langchain.embeddings.base import Embeddings
from langchain.text_splitter import CharacterTextSplitter
from langchain.chains import RetrievalQA
from langchain.docstore.document import Document
```

```python
class OllamaEmbeddings(Embeddings):
    def __init__(self, model='llama3.2', url='http://localhost:11434/api/embeddings'):
        self.model = model
        self.url = url

    def embed(self, text):
        headers = {
            'Content-Type': 'application/json'
        }
        payload = {
            'model': self.model,
            'prompt': text
        }

        response = requests.post(self.url, headers=headers, data=json.dumps(payload))

        if response.status_code == 200:
            response_json = response.json()
```

```python
        if response.status_code == 200:
            response_json = response.json()
            # Print the response structure for debugging
            print("Response JSON:", 1) #response_json)
            # Check the actual structure of the response and extract embeddings accordingly
            if 'embedding' in response_json:
                return response_json['embedding']
            else:
                print("Key 'embedding' not found in response")
                return None
        else:
            print(f"Error {response.status_code}: {response.text}")
            raise Exception(f"Error {response.status_code}: {response.text}")

    def embed_documents(self, texts):
        return [self.embed(text) for text in texts]

    def embed_query(self, text):
        return self.embed(text)
```

```
llm = Ollama(
    model="llama3.2",
    temperature=0,
    # server="http://localhost:11434"  # Specify the server address
)
```

```
# Loading the document using PyPDF2
def load_pdf(file_path, num_pages=None):
    reader = PdfReader(file_path)
    text = ""
    pages = reader.pages[:num_pages] if num_pages else reader.pages
    for page in pages:
        text += page.extract_text() + "\n"
    return text

pdf_path = "Global Warming.pdf"
document_text = load_pdf(pdf_path, num_pages=5)
```

```
text_splitter = CharacterTextSplitter(separator="\n",
                                      chunk_size=256,
                                      chunk_overlap=32)

text_chunks = text_splitter.split_text(document_text)
```

```
documents = [Document(page_content=chunk) for chunk in text_chunks]
```

```
# Loading the vector embedding model
embeddings = OllamaEmbeddings()
```

```
# Create knowledge base
knowledge_base = FAISS.from_documents(documents, embeddings)
```

```
# Retrieval QA chain
qa_chain = RetrievalQA.from_chain_type(
    llm,
    retriever=knowledge_base.as_retriever()
)
```

```
question = "What is this document about?"
response = qa_chain.invoke({"query": question})
print(response["result"])
```

```
Response JSON: 1
This document appears to be about the consequences of climate change on human migration and biodiversity. It discu
sses the causes and impacts of global warming, including its effects on temperature, industry, human consumption,
loss of biodiversity, and extinction of plant and animal species.
```

```
question_prompt = f"""
    Based on the document provided, perform the following tasks.

    Task:
    1. Summarize the document by providing a concise summary of the main points, causes, effects, Consequences\
    and Solutions to Global Warming.
    2. Extract all the important information that describe the Individual Actions\


    Provide the Understanding the Threats first, followed by the extracted information.

    Summary:
    """
response = qa_chain.invoke({"query": question_prompt})
print(response["result"])
```



```
I'd be happy to help you with summarizing the document and extracting important information about individual actio
ns to mitigate global warming.

**Understanding the Threats:**

Global warming is a pressing issue that poses significant threats to human populations, ecosystems, and economies.
The causes of global warming include industrial activities, human consumption, and other factors that contribute t
o greenhouse gas emissions. If left unchecked, global warming can lead to devastating consequences, including:

* Extreme weather events such as heatwaves, droughts, and heavy rainfall events
* Loss of biodiversity, compromising ecosystem services and human well-being
* Economic impacts estimated in the trillions of dollars annually

**Consequences of Inaction:**

If we fail to take effective solutions to mitigate global warming, the consequences will be severe. The economic c
osts will continue to rise, industry and infrastructure will be severely impacted, and human health will suffer.

**Summary:**

In summary, global warming is a pressing issue that requires immediate attention and action. The causes of global
warming are multifaceted, but industrial activities, human consumption, and other factors contribute significantly
to greenhouse gas emissions. If left unchecked, global warming can lead to devastating consequences, including ext
reme weather events, loss of biodiversity, and economic impacts.

**Extracted Information: Individual Actions**

Unfortunately, I don't have enough information in the provided context to extract specific individual actions that
can be taken to mitigate global warming. The document does not provide detailed information on concrete actions in
dividuals can take to reduce their carbon footprint or contribute to mitigating global warming.

However, based on general knowledge and available resources, some examples of individual actions that can help mit
igate global warming include:

* Reducing energy consumption by using public transport, carpooling, or driving electric vehicles
* Using renewable energy sources like solar or wind power
* Increasing energy efficiency in homes and workplaces
* Reducing meat consumption and adopting a plant-based diet
* Conserving water and reducing waste
* Supporting policies and organizations that promote sustainability and reduce greenhouse gas emissions

Please note that these are general examples, and more specific information on individual actions can be found thro
ugh other resources.
```



```
question_prompt = f"""
    Based on the document provided, perform the following tasks.

    Task:
    1. Summarize the document by providing a concise summary of the main points, causes, effects, Consequences\
    and Solutions to Global Warming.
    2. Extract all the important information that describe the Individual Actions\
    3. Format everything as HTML content which can be used to build a website. Provide the title at the top \
    of the webpage as "Global Warming". Place the summary in <div> tags.
    4. Create a table titled Key Metrics and place the information extracted as rows of data. Use bold tags \
    to highlight crucial elements like names and numbers.

    HTML Code:
    """
response = qa_chain.invoke({"query": question_prompt})
print(response["result"])
```

```
I can help you with that. Here is the summary, extracted information, and formatted HTML content:

**Global Warming**

<div>
<p>Global warming is a pressing issue caused by human activities such as industrialization, deforestation, and car
bon emissions from human consumption. It leads to climate change, which in turn causes displacement of people due
to sea-level rise, drought, or extreme weather events.</p>
<p>The consequences of inaction include loss of biodiversity, extinction of many plant and animal species, comprom
ising ecosystem services, and human well-being.</p>
<p>Solutions to global warming include reducing energy consumption, using renewable energy sources, promoting sust
ainable land use practices like reforestation, agroforestry, and permaculture to sequester carbon dioxide.</p>
</div>
```


I can help you with that. Here is the summary, extracted information, and formatted HTML content: **Global Warming**
Global warming is a pressing issue caused by human activities such as industrialization, deforestation, and carbon emissions from human consumption. It leads to climate change, which in turn causes displacement of people due to sea-level rise, drought, or extreme weather events.

The consequences of inaction include loss of biodiversity, extinction of many plant and animal species, compromising ecosystem services, and human well-being.

Solutions to global warming include reducing energy consumption, using renewable energy sources, promoting sustainable land use practices like reforestation, agroforestry, and permaculture to sequester carbon dioxide.
Individual Actions

Actions	Description
1. Reduce Energy Consumption	Reduce energy consumption by using public transport, carpooling, or driving electric vehicles.
2. Use Renewable Energy	Invest in renewable energy sources for your home or business.

Key Metrics

Category	Description
Solutions to Global Warming	**Reduce Energy Consumption**: Reduce energy consumption by using public transport, carpooling, or driving electric vehicles.
Solutions to Global Warming	**Use Renewable Energy**: Invest in renewable energy sources for your home or business.
Sustainable Land Use	**Reforestation, Agroforestry, and Permaculture**: Promote sustainable land use practices to sequester carbon dioxide.