

Install per-requisite packages

Please ensure that this cell is run, to install all per-requisite packages needed for subsequent code examples.

```
!pip install python-dotenv
!pip install llama-index
!pip install llama-index-llms-openai
!pip install llama-index-embeddings-openai
!pip install llama-index-llms-azure-openai
!pip install llama-index-embeddings-azure-openai
!pip install llama-index-agent-introspective
!pip install llama-index-program-openai
!pip install llama-index-readers-file
!pip install pydantic
!pip install llama-index-core
!pip install llama-index-utils-workflow
!pip install llama-index-tools-wikipedia
!pip install llama-index-readers-json
!pip install llama-index-readers-file
!pip install pymupdf
!pip install llama-index-tools-google
!pip install nbformat

2.0/2.0 MB 118.7 MB/s eta 0:00:00
Collecting typing-inspection>=0.4.0
  Downloading typing_inspection-0.4.0-py3-none-any.whl (14 kB)
Collecting annotated-types>=0.6.0
  Downloading annotated_types-0.7.0-py3-none-any.whl (13 kB)
Requirement already satisfied: charset-normalizer<4,>=2 in /root/venv/lib/python3.10/site-packages (from requests>=2.31.0->llama-index-core<0.13.0)
Requirement already satisfied: greenlet>=1 in /toolkit-cache/0.2.12/python3.10/kernel-libs/lib/python3.10/site-packages (from SQLAlchemy[asyn
Collecting mpyy-extensions>=0.3.0
  Downloading mpyy_extensions-1.0.0-py3-none-any.whl (4.7 kB)
Collecting marshmallow<4.0.0,>=3.18.0
  Downloading marshmallow-3.26.1-py3-none-any.whl (50 kB)
50.9/50.9 kB 9.8 MB/s eta 0:00:00
Requirement already satisfied: python-dateutil>=2.8.2 in /root/venv/lib/python3.10/site-packages (from pandas->llama-index-readers-file<0.5.0)
Requirement already satisfied: tzdata>=2022.1 in /root/venv/lib/python3.10/site-packages (from pandas->llama-index-readers-file<0.5.0,>=0.4.0)
Requirement already satisfied: pytz>=2020.1 in /root/venv/lib/python3.10/site-packages (from pandas->llama-index-readers-file<0.5.0,>=0.4.0->
Requirement already satisfied: exceptiongroup>=1.0.2 in /root/venv/lib/python3.10/site-packages (from anyio->httpx->llama-index-core<0.13.0,>
Requirement already satisfied: python-dotenv<2.0.0,>=1.0.1 in /root/venv/lib/python3.10/site-packages (from llama-cloud-services>=0.6.4->llam
Collecting platformdirs
  Downloading platformdirs-4.3.7-py3-none-any.whl (18 kB)
Requirement already satisfied: packaging>=17.0 in /root/venv/lib/python3.10/site-packages (from marshmallow<4.0.0,>=3.18.0->dataclasses-json-
Requirement already satisfied: six>=1.5 in /root/venv/lib/python3.10/site-packages (from python-dateutil>=2.8.2->pandas->llama-index-readers-
Collecting colorama>=0.4
  Downloading colorama-0.4.6-py2.py3-none-any.whl (25 kB)
Requirement already satisfied: MarkupSafe>=2.0 in /root/venv/lib/python3.10/site-packages (from jinja2->banks<3.0.0,>=2.0.0->llama-index-core
Installing collected packages: striptrf, filetype, dirtyjson, typing-inspection, SQLAlchemy, soupsieve, sniffio, pypdf, pydantic-core, propca
Attempting uninstall: SQLAlchemy
  Found existing installation: SQLAlchemy 1.4.42
  Not uninstalling sqlalchemy at /toolkit-cache/0.2.12/python3.10/kernel-libs/lib/python3.10/site-packages, outside environment /root/venv
  Can't uninstall 'SQLAlchemy'. No files were found to uninstall.
```

Setup LLM and Tools in LlamaIndex

```
#Using AzureOpenAI as LLM. Other LLM options are available in LlamaIndex
from llama_index.llms.azure_openai import AzureOpenAI
from llama_index.core import Settings
import os
import nest_asyncio

#Used by LlamaIndex
nest_asyncio.apply()

#API key for AzureOpenAI.
api_key = "dcd072b0bb0486ea8aa3cf56f3c936c"
#Azure Endpoint URL.
azure_endpoint = "https://hb-aoai-eus2.openai.azure.com/"

#Note : Function calling support only available in GPT-4+
#Create the LLM object
llm=AzureOpenAI(
    model="gpt-4o",
    deployment_name="gpt-4o",
    api_key=api_key,
    azure_endpoint=azure_endpoint,
    api_version="2025-01-01-preview",
)
```

Set up the functions:

```
#Define a couple of functions
def sum(x:int, y:int) -> int:
    #The docstring comment describes the capabilities of the function
    #It is used by the agent to discover the function's inputs, outputs and capabilities
    """
    This function is used to add two numbers and return their sum.
    It takes two integers as inputs and returns an integer as output.
    """
    return x + y
```

```
def subtract(x:int, y:int) -> int:
    """
    This function is used to subtract two numbers and return their difference.
    It takes two integers as inputs and returns an integer as output.
    """
    return x - y

def multiply(x:int, y:int) -> int:
    """
    This function is used to multiply two numbers and return their product.
    It takes two integers as inputs and returns an integer as output.
    """
    return x * y

def divide(x:int, y:int) -> int:
    """
    This function is used to divide two numbers and return their quotient.
    It takes two integers as inputs and returns an integer as output.
    """
    return x / y
```

Execute the Agent:

```
from llama_index.core.tools import FunctionTool
from llama_index.core.agent.react.base import ReActAgent

#Create function tools
sum = FunctionTool.from_defaults(sum)
subtract = FunctionTool.from_defaults(subtract)
multiply = FunctionTool.from_defaults(multiply)
divide = FunctionTool.from_defaults(divide)

#Create a pre-built ReAct agent
simple_agent=ReActAgent.from_tools([sum, subtract, multiply, divide], llm=llm, verbose=True)
```

Execute the agent:

```
response = simple_agent.chat("What is 2 + 2? ")

> Running step 8c57cbef-eb05-470d-8b65-e8ec035aca0b. Step input: What is 2 + 2?
Thought: The current language of the user is: English. I need to use a tool to help me answer the question.
Action: sum
Action Input: {'x': 2, 'y': 2}
Observation: 4
> Running step 315b0677-7c51-476d-bd60-785decab8dc0. Step input: None
Thought: I can answer without using any more tools. I'll use the user's language to answer.
Answer: 2 + 2 equals 4.
```

```
response = simple_agent.chat("Multiple 2 by 3 and then add 4")

> Running step cd275908-e3f0-4e8d-b0ef-9f3b3b867f72. Step input: Multiple 2 by 3 and then add 4
Thought: The current language of the user is English. I need to use a tool to help me answer the question.
Action: multiply
Action Input: {'x': 2, 'y': 3}
Observation: 6
> Running step 37661e30-3e73-48aa-85f1-7c7fe58c3975. Step input: None
Thought: I have the result of the multiplication. Now I need to add 4 to it.
Action: sum
Action Input: {'x': 6, 'y': 4}
Observation: 10
> Running step ebf0bfal-7463-43f1-ae4f-a95efef9d75e. Step input: None
Thought: I can answer without using any more tools. I'll use the user's language to answer.
Answer: The result of multiplying 2 by 3 and then adding 4 is 10.
```