Matplotlib setup: Installation and compilation walkthrough in C++:

For Windows Users:

This youtube video walks you through all the steps for setting up matplotlib environment in c++.

https://youtu.be/7eeyZQPd-kk?list=PLpuSZdJt0dKW8Rk0OPca3TXvAxd7bwJwq

Requirements:

To be able to run C++ programs that are dependent to the python's matplotlib library, you need to have these dependencies pre-installed:

Python: Here is a **link** from where to download python (3.12.1 for windows (**3.12.1 is the latest version for Python when this document was written)**

https://www.python.org/downloads/

After installing Python, you can make sure that the installation went successfully by pressing the following command on windows command prompt (cmd):

python --version

The expected output are some pieces of information related to the version of python which you have installed on your system

Then, you need to update the PATH environment variable:

1. open the Environment variables on your system
2. In the system variables, select the "Path" variable and click "Edit"
3. Click "New" and add the path to the "Scripts" subdirectory within the Python installation directory

Mingw: Here is a **link** from where you can download the mingw compiler, if you don't have it already installed on your system

https://winlibs.com/

After installing the mingw compiler, you should add it to the system environment variables in the same way as we have previously shown how to add python to the system's environment variables

Matplotlib: type the following command to get matplotlib on your system:

pip install matplotlib

Numpy: Type the following command to download numpy on your system

pip install numpy

Now, everything is set up. We can now start compiling the program and running it:

Compilation:

To compile the main file in our project, you will need to link the C++ program to the python libraries which are used in it. So the command to compile the main would be a little bit different, here is how you should compile it through the command line:

Part1:

```
g++ main.cpp APMS.cpp bst_Year.cpp winnertree.cpp SalesHashTable.cpp -o main -w -std=c++11 -I {C:\Path\to\Python\include} -I {C:\path\to\the\numpy\library} -L {C:\Path\to\Python\libs} -l{python version}
```

Part2:

```
g++ main.cpp APMS.cpp avl_Year.cpp winnertree.cpp SalesHashTable.cpp -o main -w -std=c++11 -I {C:\Path\to\Python\include} -I {C:\path\to\the\numpy\library} -L {C:\Path\to\Python\libs} -l{python version}
```

Example:

```
g++ main.cpp APMS.cpp bst_Year.cpp winnertree.cpp SalesHashTable.cpp -o main -w -std=c++11 -I D:\Python\Python311\include -I D:\Python\Python311\Lib\site-packages\numpy -L D:\Python\Python311\libs -lpython311
```

GUIDE:

- You can obtain the path to the numpy library in your system by running the following command

  pip show numpy

- The previous command is used to display information related to the numpy library installed on your system including the path where this library was installed

- If the version of python on your system is python3.10 for example, replace the -l{python version} in the previous command with -lpython3.10

Running the program:

The previous command will generate an executable file named main.exe or main (depending on your system)
Run the file using ./main.exe or ./main

For Unix-like and Linux Users:

Here is a step-by-step **video** tutorial to set up matplotlib for C++

https://youtu.be/OlbtdOAWNf8?si=mNRORnHrPf8Hg1OF

- Open the terminal
- Run the following commands:

```
sudo apt update
sudo apt upgrade
sudo apt-get install python3 # in case python is not already installed on your system
sudo apt-get install python3-dev  # For Python 3
sudo apt-get install python3-numpy
sudo apt-get install python3-matplotlib
```

Now, everything is set up

Compilation:

Navigate to the directory where our project is located, open the terminal and type the following command

Part 1:

```
g++ -o main APMS.cpp bst_Year.cpp main.cpp SalesHashTable.cpp winnertree.cpp -std=c++11 -I/usr/include/python{python's version} -lpython{python's version} -w
```

Part 2:

```
g++ -o main APMS.cpp avl_Year.cpp main.cpp SalesHashTable.cpp winnertree_avl.cpp -std=c++11 -I/usr/include/python{python's version} -lpython{python's version} -w
```

Example:

Part 1:

```
g++ -o main APMS.cpp bst_Year.cpp main.cpp SalesHashTable.cpp
winnertree.cpp -std=c++11 -I/usr/include/python3.10 -lpython3.10 -w
```

Part 1:

```
g++ -o main APMS.cpp avl_Year.cpp main.cpp SalesHashTable.cpp
winnertree_avl.cpp -std=c++11 -I/usr/include/python3.10 -lpython3.10
-w
```

GUIDE:

- To determine which python version you have installed on your system, run the following command

  `python --version or python3 --version`

List of references:

Youtube videos:
https://youtu.be/OlbtdOAWNf8?si=mNRORnHrPf8Hg1OF
https://youtu.be/7eeyZQPd-kk?list=PLpuSZdJt0dKW8Rk0OPca3TXvAxd7bwJwq
Matplotlib cpp source code on github:
https://github.com/lava/matplotlib-cpp/tree/master

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