

I 简介

Python是一种高级的、面向对象的解释型编程语言。它最初由Guido van Rossum于1989年创建，现在已经成为一种流行的编程语言，用于开发Web应用程序、数据分析、人工智能、科学计算、网络编程等等。Python是一种简单易学、易读、易编写的语言，因此也被广泛用于教学和入门级编程。

Python38Env是一个基于Python 3.8 [1] 编程语言的虚拟环境（不同的项目可以拥有各自独立的库版本和设置，而不会相互干扰）。Python38Env包含了多个特定的Python库，如numpy、pymavlink、OpenCV、pyulog、torchvision、pyyaml、utils、open3d、pytorch、tensorflow、gym等在无人系统的算法开发中常用的库。

由于Python38Env已经集成了所需的运行环境和库（无人系统算法开发所需的大部分依赖库），用户可以直接在这个环境中进行开发，无需单独安装Python或相关库。

如果想在VScode和Pycharm等编辑器中配置并启用平台自带的Python环境，可参考文档：
*:\\PX4PSP\\RflySimAPIs\\1.RflySimIntro\\2.AdvExps\\e3.PythonConfig\\Readme.pdf

下面是平台提供环境中所安装的库：

Python库名称	描述	离线包位置	包大小	学习文档位置
pymavlink	用于通过Mavlink和PX4飞控通信，实现Python的无人机控制	https://pypi.org/project/pymavlink/	11.3MB	https://mavlink.io/en/mavgen_python/
pyserial	pymavlink的依赖包，用飞控串口连接	https://pypi.org/project/pyserial/	90.6kB	http://pyserial.readthedocs.io/en/latest/

Python库名称	描述	离线包位置	包大小	学习文档位置
opencv-python	图像处理依赖包		92.1MB	https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html
numpy	矩阵向量运算库		15.7MB	
matplotlib	画图		35.9MB	
ulog	将ulog转为csv文件		4.3kB	
redis	分布式组网通信时需要		2.0kB	
d3dshot	采用屏幕截图方式，获取屏幕图像的取图方式，能获取到最终的渲染效果图		24.4kB	
pywin32	提供了丰富的接口以便访问Windows操作系统下的各种原生API		25.4kB	
mavsdk	用于通过Mavlink和PX4飞控通信，实现Python的无人机控制		296.5kB	https://mavsdk.mavlink.io/main/en/python/quickstart.html
pandas	用于对数据进行处理		10.5MB	
pillow	用于图像处理		2.6MB	

Python库名称	描述	离线包位置	包大小	学习文档位置
scipy	用于部分计算		43.7MB	

安装与卸载

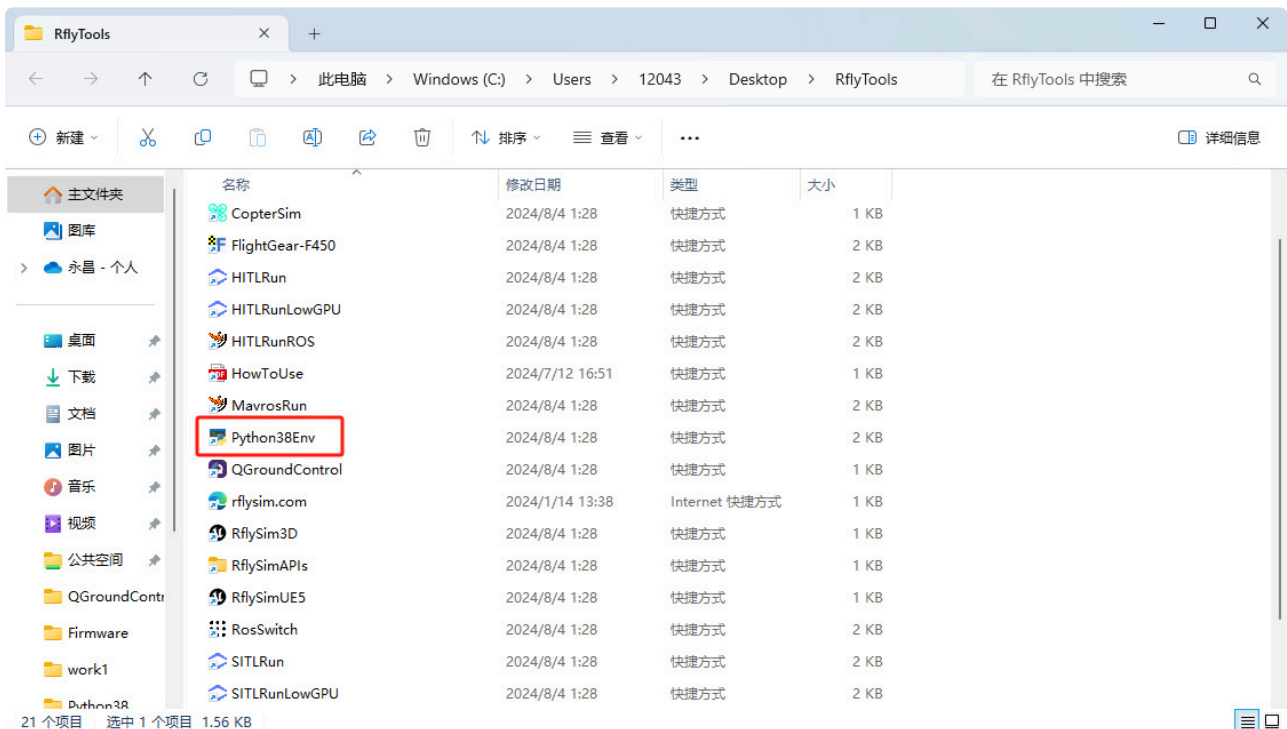
详见：[HowToInstall.pdf](#)

使用流程

打开与关闭

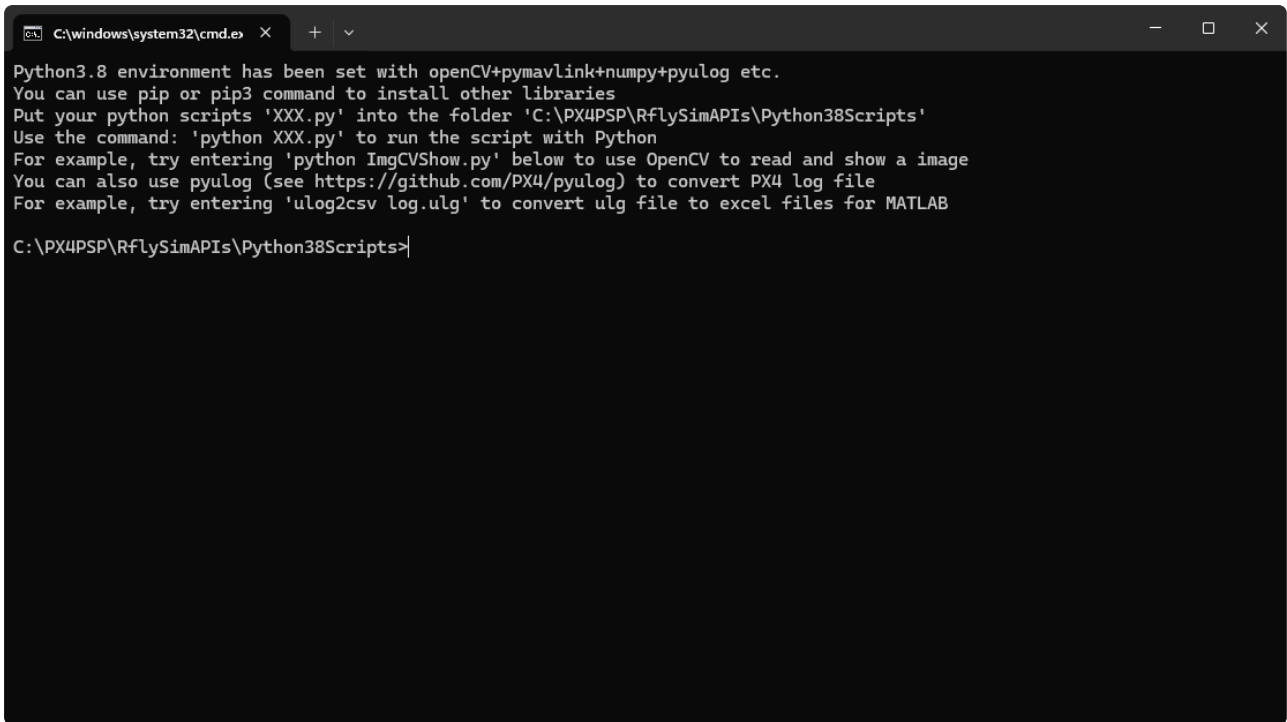
Step1:

打开“桌面/RflyTools/Python38Env”文件。



Step2:

打开之后，可以发现已经将目录切换至“*:\PX4PSP\RflySimAPIs\Python38Scripts”。

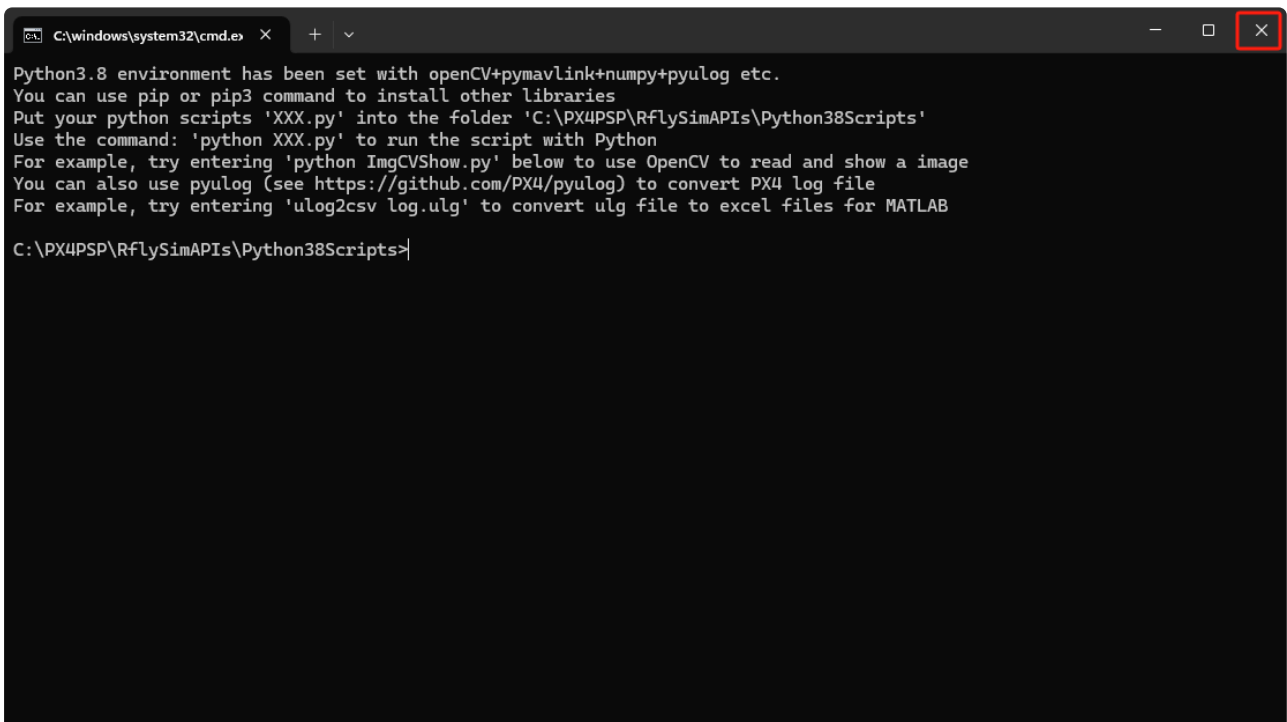


```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>
```

Step3:

点击右上角的“×”，即可关闭。



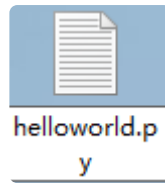
```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
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You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>
```

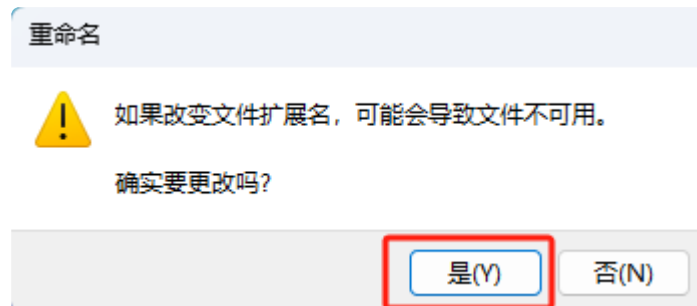
创建python文件

Step1:

编写一个可以运行的python文件。在桌面创建一个文本文件，重命名为“helloworld.py”。

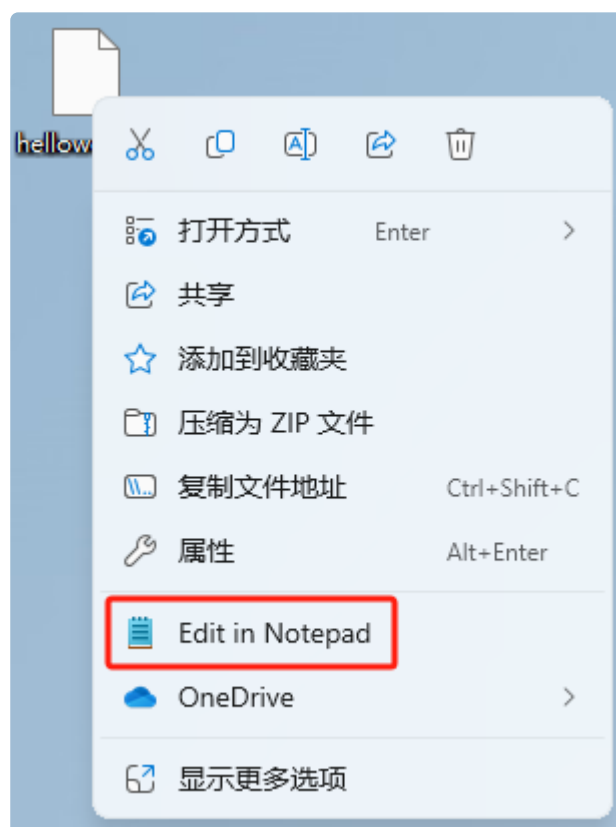


按回车进行保存，会弹出一个提示框，选择“是”。



Step2:

右键该文件，选择“用记事本编辑”。

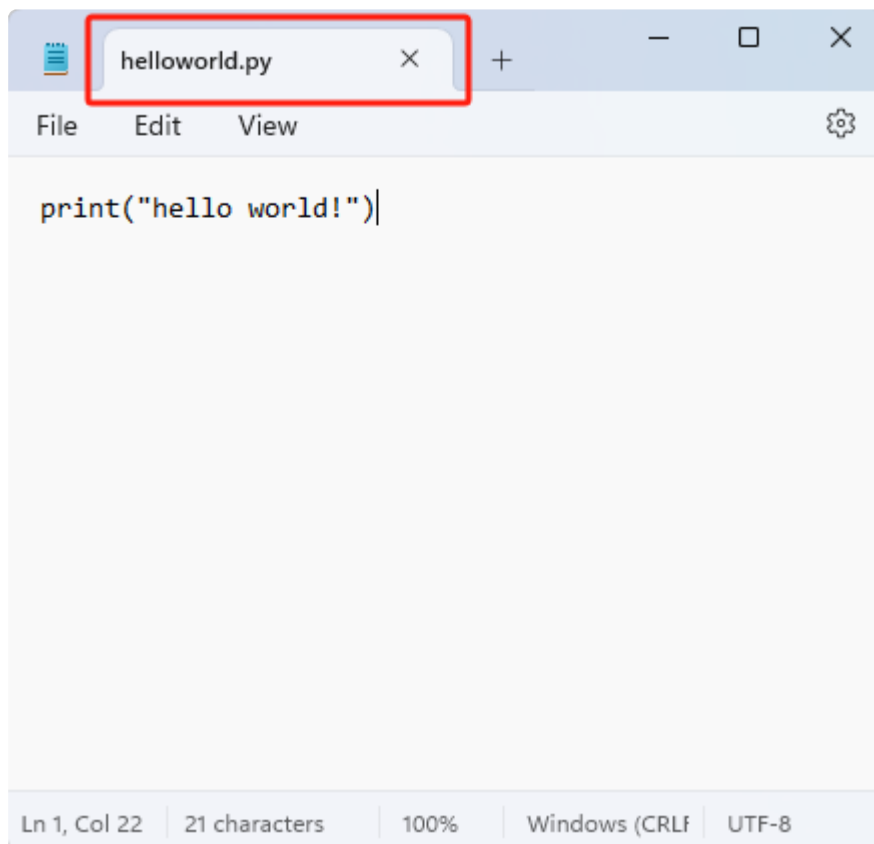
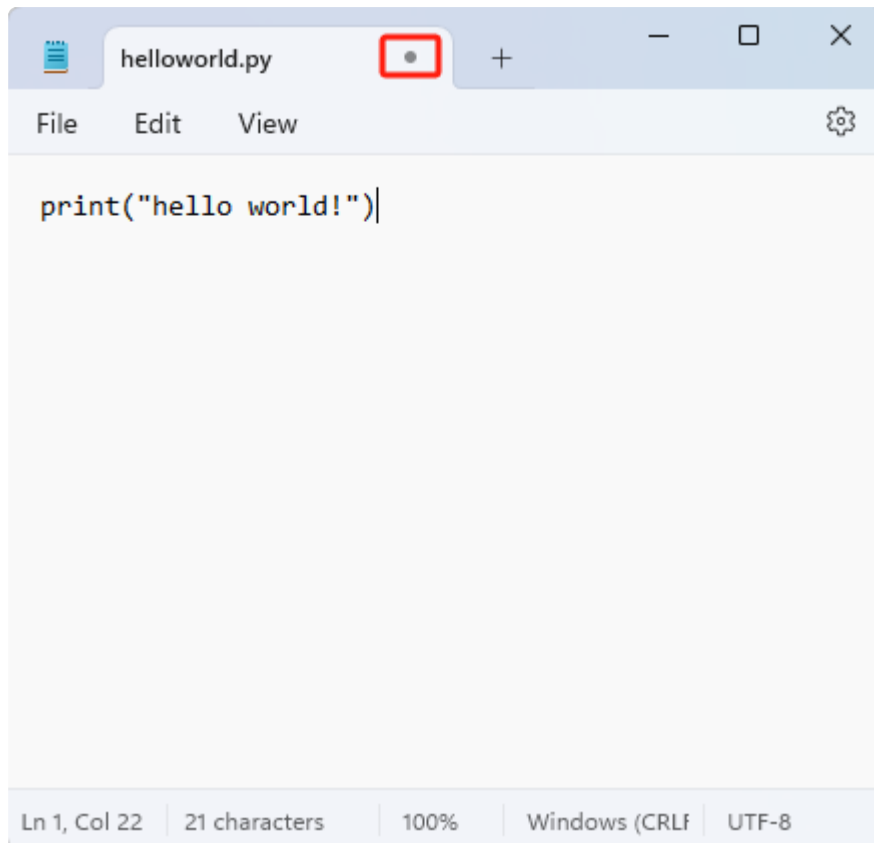


Step3:

在记事本中，写入如下的代码，注意不要使用中文的括号和引号。这行代码的含义是输出一行带有回车的字符串。

```
print("hello world!")
```

写入后如下图所示，若上面的文件名旁边带有一个灰色的小圆圈，说明没有对文件保存，需要按“Ctrl+S”进行保存。

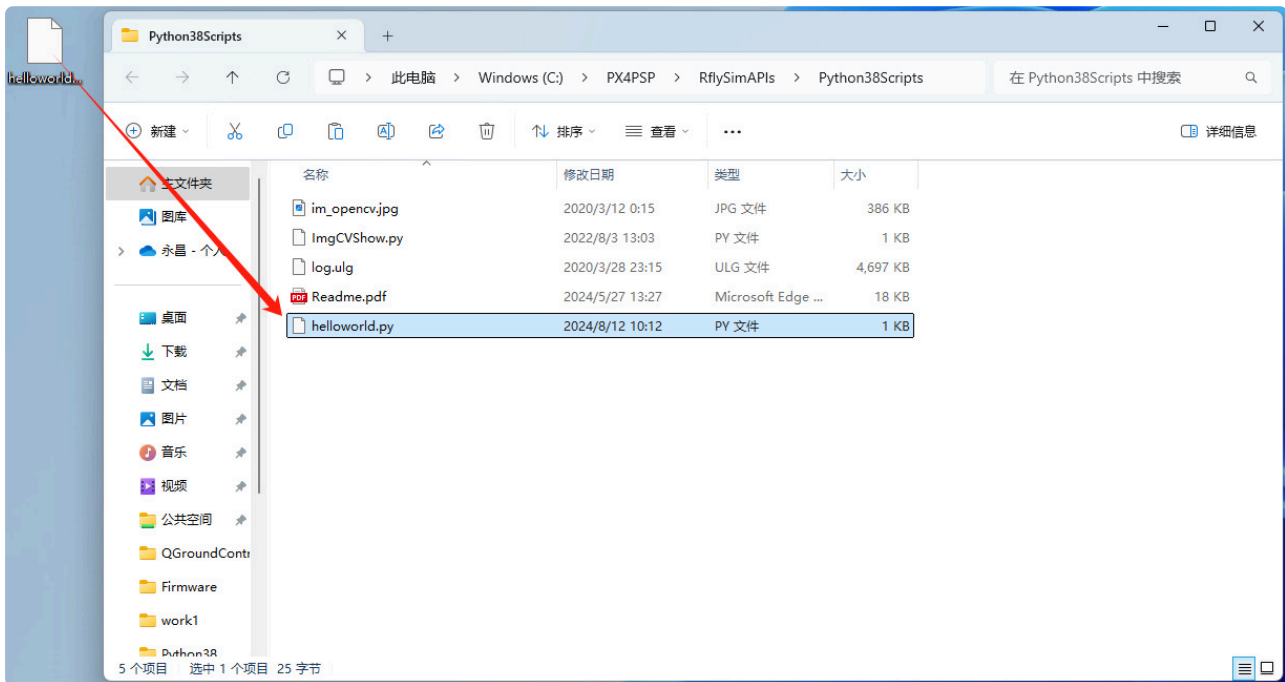


运行python文件（默认目录）

默认目录是指在黑框中默认的目录下运行python文件，所以需要将想要运行的python文件移动到默认目录下。如果你还没有创建python文件，请按照3.2节的步骤进行操作。

Step1:

将桌面中创建的“`helloworld.py`”文件复制到“`*:\PX4PSP\RflySimAPIs\Python38Scripts`”目录中。



Step2:

打开平台的python环境，输入下面这行代码，文件名可以用Table键进行补全。这行代码的意思是，使用python解释器运行helloworld.py文件。

```
python helloworld.py
```

```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>python helloworld.py
```

Step3:

按回车键。可以看到下一行中，输出了字符串“hello world!”。

```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>python helloworld.py
hello world!

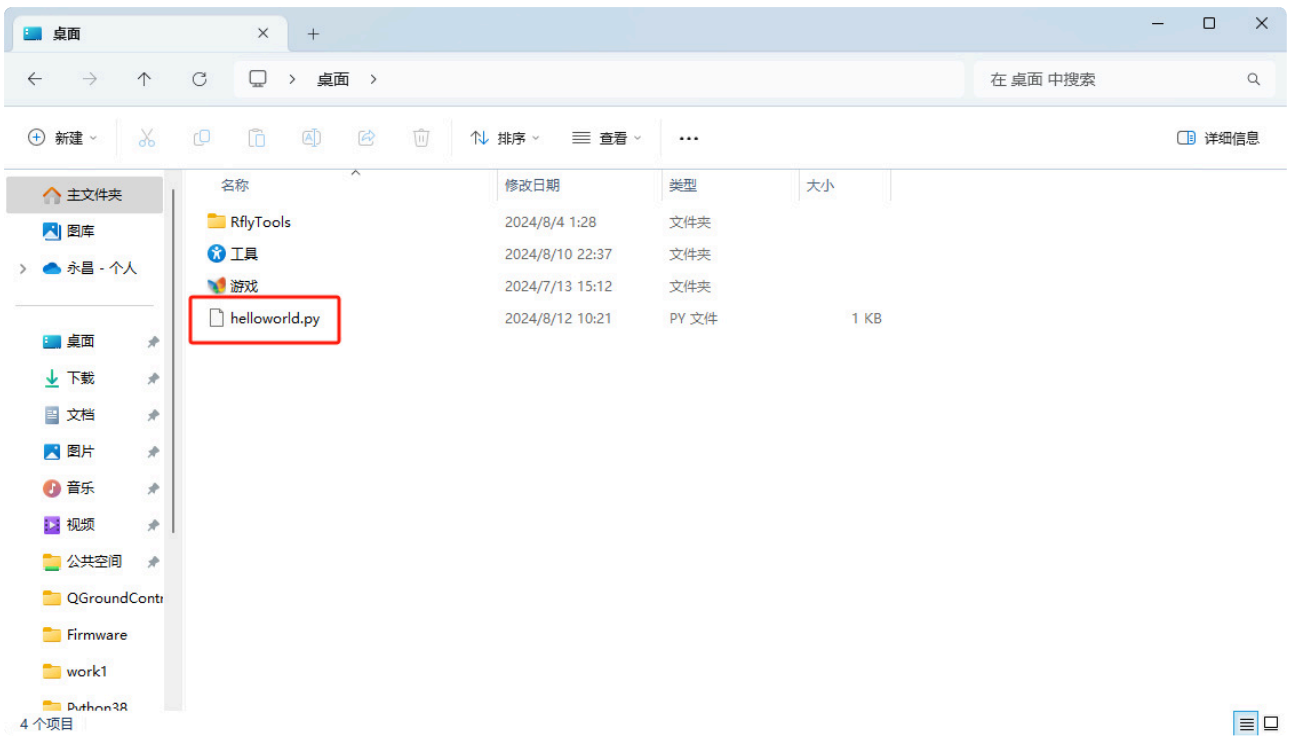
C:\PX4PSP\RfLySimAPIs\Python38Scripts>
```

运行python文件（非默认目录1）

这一节讲的切换到python文件的目录下运行python文件。

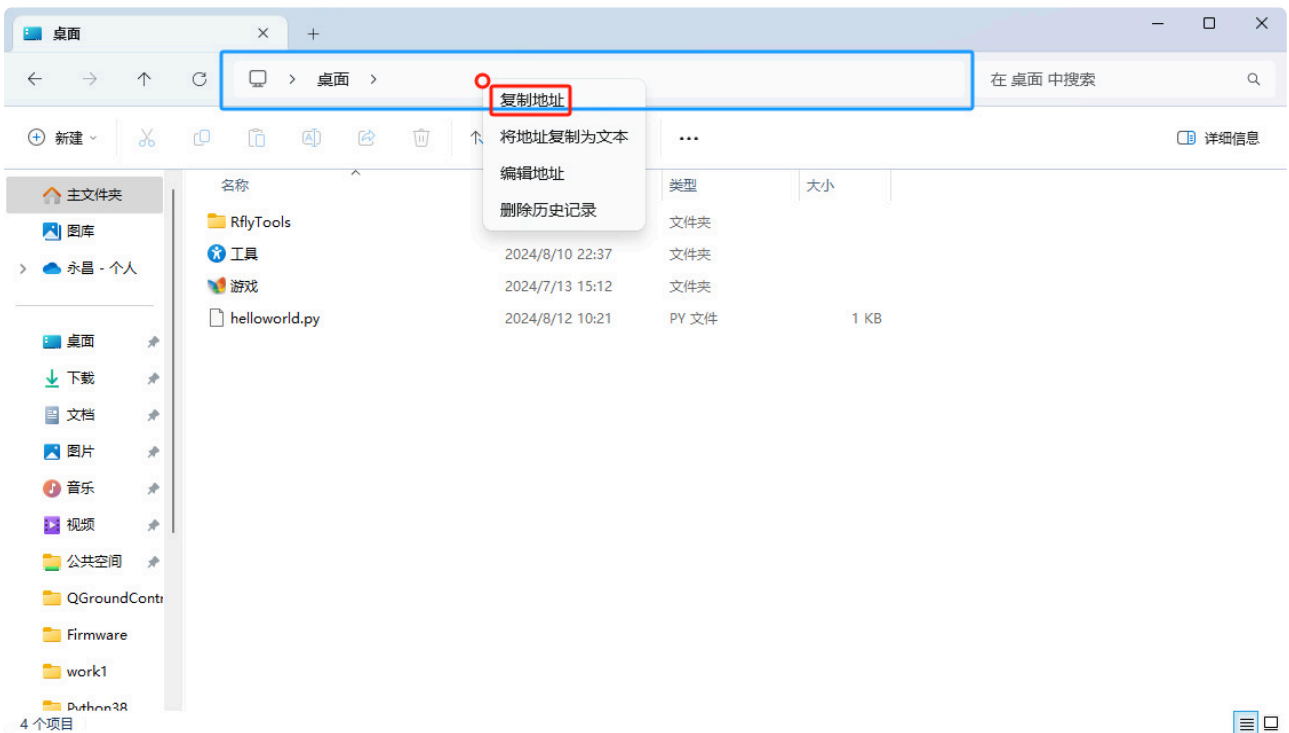
Step1:

使用文件资源管理器，进入已经编写好的python文件的目录下。如果您按照3.2节的步骤进行创建，那么该文件在桌面目录中。



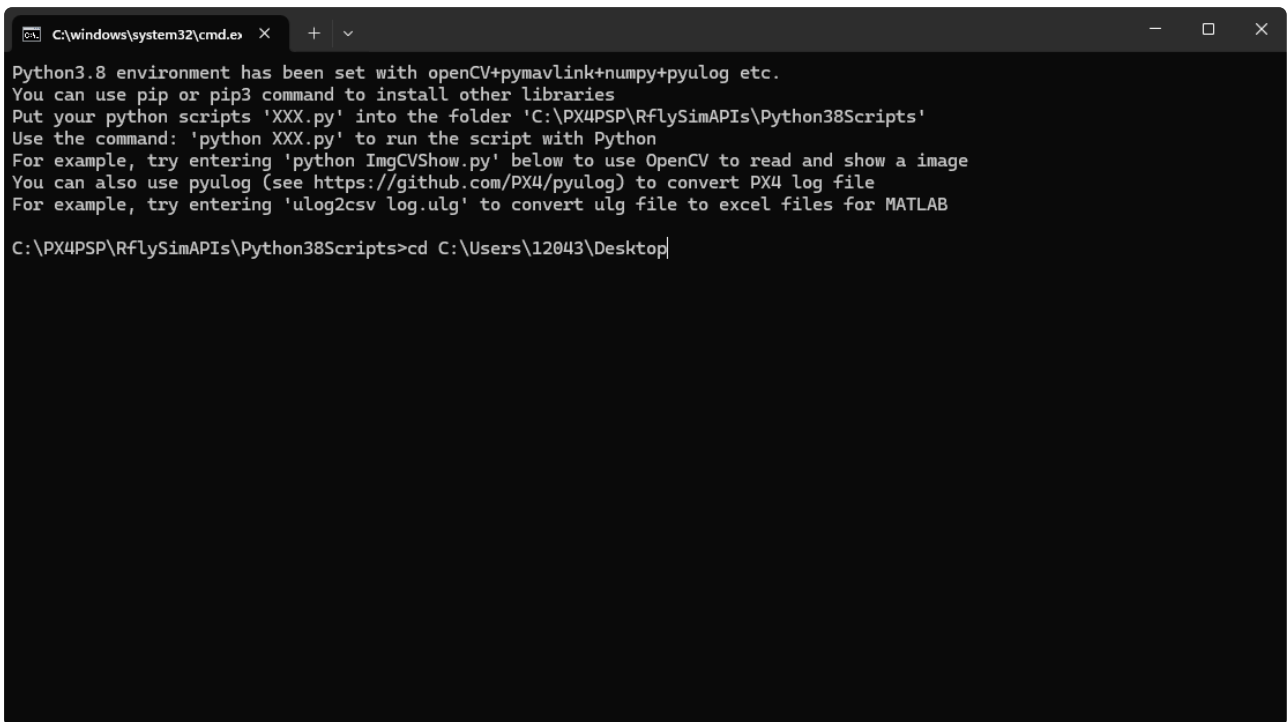
Step2:

下图中的蓝色方框是路径栏的区域，红色圆圈是鼠标右键的区域。在上方路径栏中右键鼠标，会弹出一个选择框，选择第一个“复制地址”。



Step3:

打开平台的python环境，输入“cd”，然后空一格，将复制的路径粘贴进去。粘贴可以使用“Ctrl+V”组合键，或者直接右键一下鼠标即可。

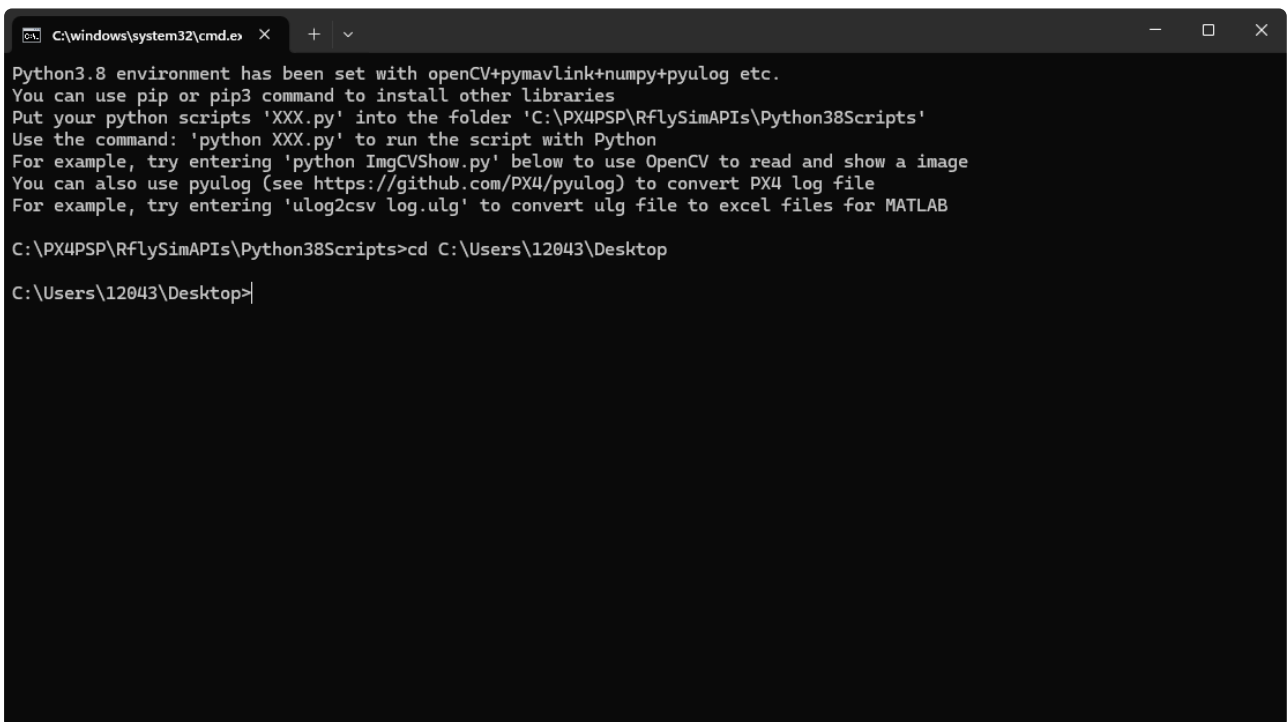


```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfFlySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfFlySimAPIs\Python38Scripts>cd C:\Users\12043\Desktop|
```

Step4:

按回车键。然后，会将目录切换至所复制的目录中。



```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfFlySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfFlySimAPIs\Python38Scripts>cd C:\Users\12043\Desktop
C:\Users\12043\Desktop>|
```

Step5:

输入下面这行代码，文件名可以用Tab键进行补全。这行代码的意思是，使用python解释器运行helloworld.py文件。

python helloworld.py

```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>cd C:\Users\12043\Desktop
C:\Users\12043\Desktop>python helloworld.py|
```

Step6:

按回车键。然后，可以看到输出了字符串“hello world!”。

```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>cd C:\Users\12043\Desktop
C:\Users\12043\Desktop>python helloworld.py
hello world!

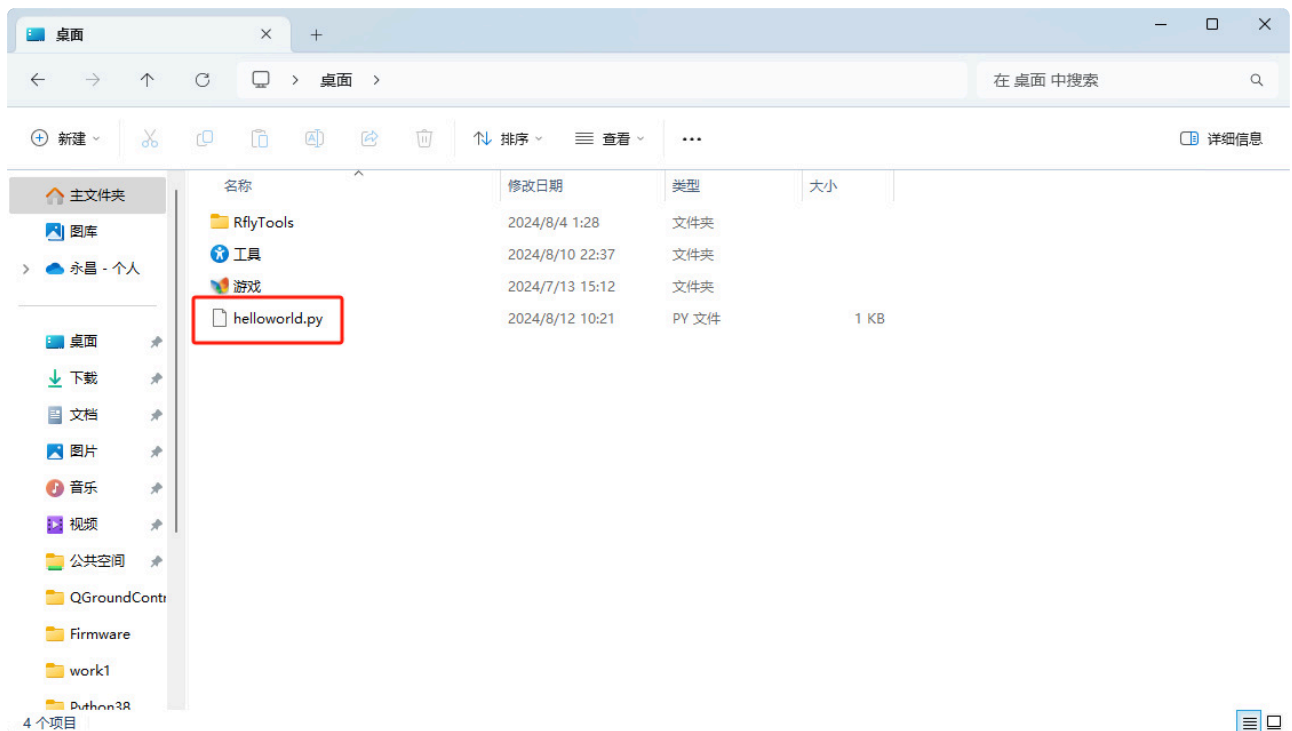
C:\Users\12043\Desktop>|
```

运行python文件（非默认目录2）

这一节讲的使用python文件的绝对路径运行python文件。

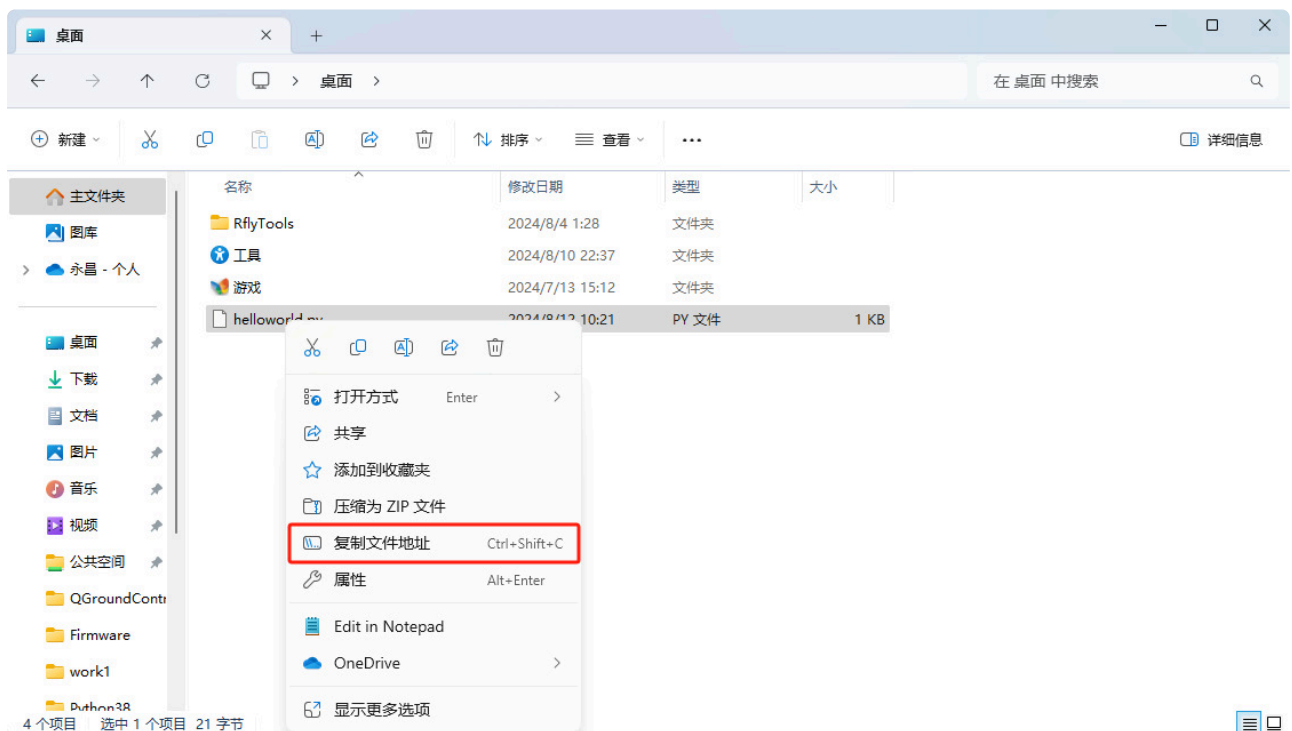
Step1:

使用文件资源管理器，进入已经编写好的python文件的目录下。如果您按照3.2节的步骤进行创建，那么该文件在桌面目录中。



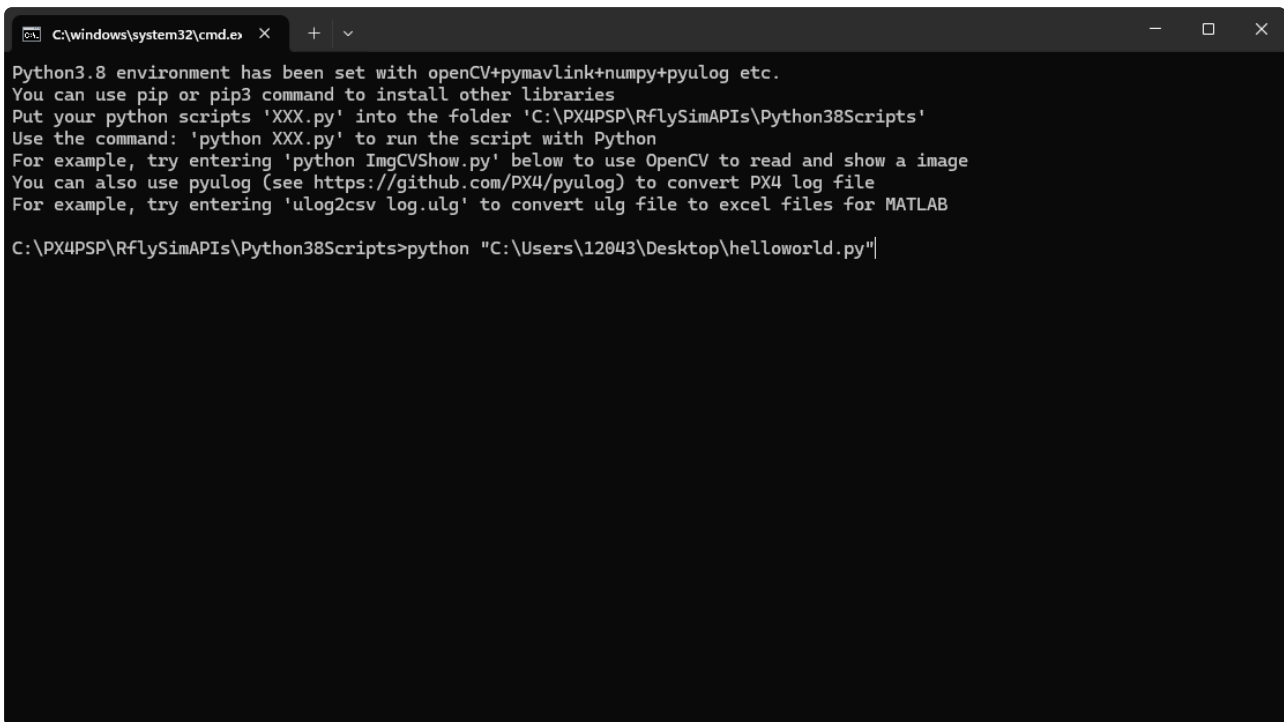
Step2:

右键想要运行的文件，在弹出的选择框中，选择“复制文件地址”。根据该选项旁边提示的快捷键，也可以在选中该文件之后，使用“Ctrl+Shift+C”组合键复制文件地址。



Step3:

打开平台的python环境，输入“python”，然后空一格，将复制的文件路径粘贴进去。粘贴可以使用“Ctrl+V”组合键，或者直接右键一下鼠标即可。

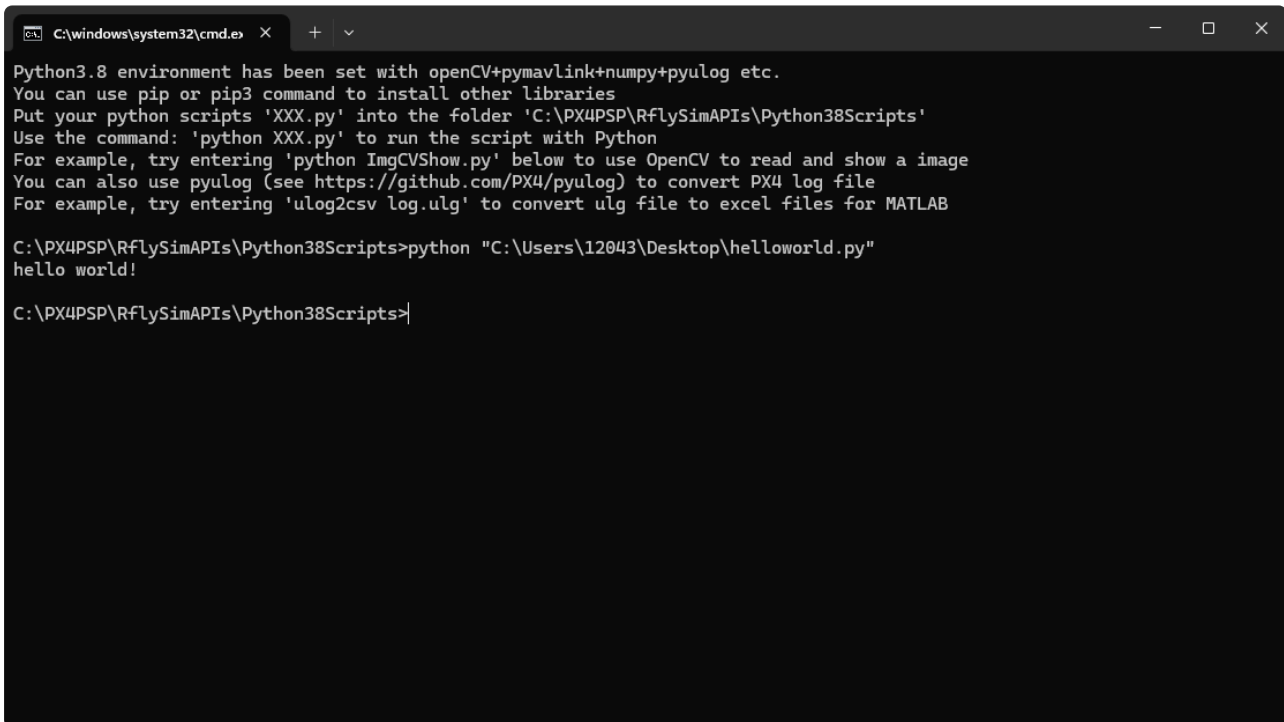


```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>python "C:\Users\12043\Desktop\helloworld.py"
```

Step4:

按回车键。然后，可以看到输出了字符串“hello world!”。



```
C:\windows\system32\cmd.exe x + v
Python3.8 environment has been set with openCV+pymavlink+numpy+pyulog etc.
You can use pip or pip3 command to install other libraries
Put your python scripts 'XXX.py' into the folder 'C:\PX4PSP\RfLySimAPIs\Python38Scripts'
Use the command: 'python XXX.py' to run the script with Python
For example, try entering 'python ImgCVShow.py' below to use OpenCV to read and show a image
You can also use pyulog (see https://github.com/PX4/pyulog) to convert PX4 log file
For example, try entering 'ulog2csv log.ulg' to convert ulg file to excel files for MATLAB

C:\PX4PSP\RfLySimAPIs\Python38Scripts>python "C:\Users\12043\Desktop\helloworld.py"
hello world!

C:\PX4PSP\RfLySimAPIs\Python38Scripts>
```

在其他编辑器中配置环境

如果想在VScode和Pycharm等编辑器中配置并启用平台自带的Python环境，可参考文档：

[*:\PX4PSP\RflySimAPIs\1.RflySimIntro\2.AdvExps\e3.PythonConfig\Readme.pdf](*\PX4PSP\RflySimAPIs\1.RflySimIntro\2.AdvExps\e3.PythonConfig\Readme.pdf)