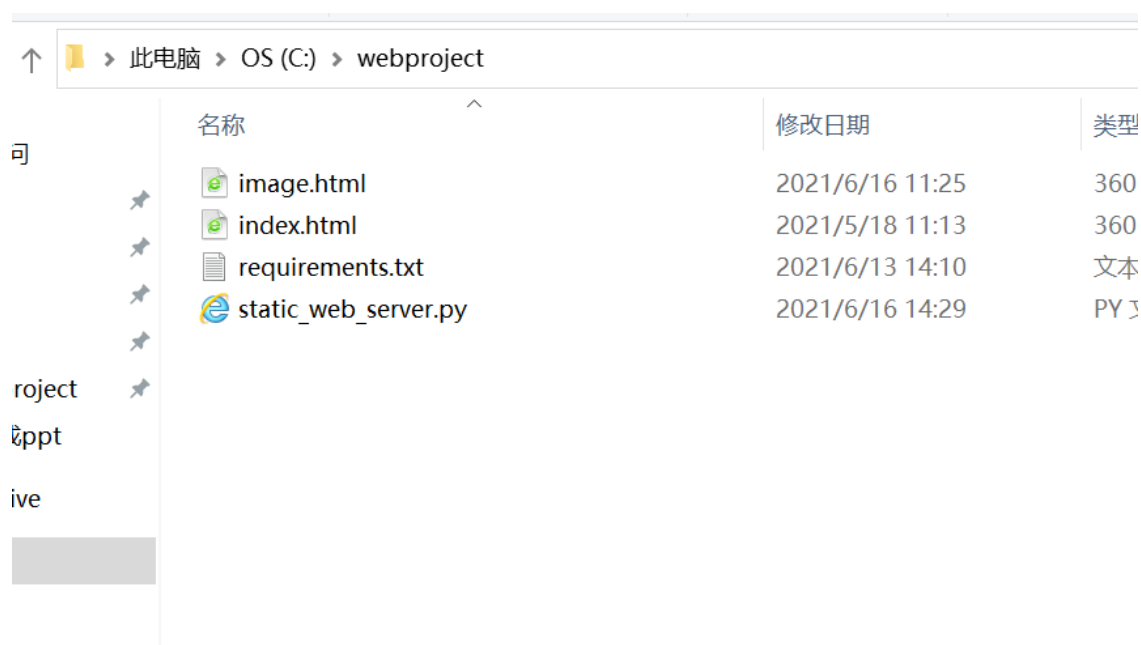


多线程 Web 服务器

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●实现功能：该项目是编写一个简单的多线程 Web 服务器。

(1) 因为在测试 html 文件时，在 server 代码内将其路径指定为 "C:\webproject\index.html"，所以麻烦主教小哥哥如果要进行代码测试，请在 C 盘目录下创建文件夹 webproject，并将 index.html 和 image.html 放进去；如下图所示：



(2) 测试时，在运行该多线程 Web 服务器的代码后，请在浏览器键入 "localhost:8000/index.html"（文字文件）或者是 "localhost:8000/image.html"（图片文件）

(3) 另外，该项目代码只象征性 import 了标准库中的 re，socket，multiprocassing 包，未导入第三方库，所以在用 pipreqs 来生成 requiments.txt 文件时，为空。理论上不存在依赖包，此外 python 版本确实是 3.6，所以环境配置方面应该没问题，可直接用。

●操作步骤：

1：单个请求：向服务器请求 Index.html 文件，从服务器文件系统读取请求的文件，并创建一个由请求的文件的 html 内容组成的 HTTP 响应报文反馈给浏览器并显示出来：

```
<> index.html > html > body > p
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4      <meta charset="UTF-8">
5      <title>My Web</title>
6  </head>
7  <body>
8      <h1>Hello</h1>
9      <p>My name is Wu WenHan--Student.id:2019141490105</p>
10     <p>this is my web project: Multi-thread Web Server</p>
11
12 </body>
13 </html>
```

(请求的 index.html 文件内容)



Hello

My name is Wu WenHan--Student.id:2019141490105

this is my web project: Multi-thread Web Server

(浏览器具体显示情况)

```

PS C:\webproject> & "C:\Users\Peter.Taylor\Anaconda3\python.exe" "c:\Users\Peter.Taylor\vscode\extensions\ms-python.python.python-2021.5.84\292332a\python\lib\python\debugpy\launcher" "54565" "--" "c:\webproject\static_web_server.py"
[127.0.0.1:54565]用户已连接上
[127.0.0.1:54565]用户已连接上
request data: b'GET /index.html HTTP/1.1\r\nHost: 127.0.0.1:8000\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36\r\nSec-Fetch-Dest: document\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9\r\nSec-Fetch-Site: none\r\nSec-Fetch-Mode: navigate\r\nSec-Fetch-User: ?1\r\nAccept-Encoding: gzip, deflate, br\r\nAccept-Language: zh-CN,zh;q=0.9\r\n\r\n'
b'GET /index.html HTTP/1.1' b'Host: 127.0.0.1:8000' b'Connection: keep-alive' b'Upgrade-Insecure-Requests: 1' b'User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36' b'Sec-Fetch-Dest: document' b'Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9' b'Sec-Fetch-Site: none' b'Sec-Fetch-Mode: navigate' b'Sec-Fetch-User: ?1' b'Accept-Encoding: gzip, deflate, br' b'Accept-Language: zh-CN,zh;q=0.9' b'
b'GET /index.html HTTP/1.1'
b'Host: 127.0.0.1:8000'
b'Connection: keep-alive'
b'Upgrade-Insecure-Requests: 1'
b'User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36'
b'Sec-Fetch-Dest: document'
b'Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9'
b'Sec-Fetch-Site: none'
b'Sec-Fetch-Mode: navigate'
b'Sec-Fetch-User: ?1'
b'Accept-Encoding: gzip, deflate, br'
b'Accept-Language: zh-CN,zh;q=0.9'
b'
=====
GET /index.html HTTP/1.1
=====
response data: HTTP/1.1 200 OK
Server:My server

<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>My Web</title>
</head>
<body>
<h1>Hello</h1>
<p>My name is Wu WenHan--Student.id:2019141490105</p>
<p>this is my web project: Multi-thread Web Server</p>
</body>
</html>
=====
request data: b'GET /favicon.ico HTTP/1.1\r\nHost: 127.0.0.1:8000\r\nConnection: keep-alive\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36\r\nSec-Fetch-Dest: image\r\nAccept: image/webp,image/apng,image/*,*/*;q=0.8\r\nSec-Fetch-Site: same-origin\r\nSec-Fetch-Mode: no-cors\r\nReferer: http://127.0.0.1:8000/index.html\r\nAccept-Encoding: gzip, deflate, br\r\nAccept-Language: zh-CN,zh;q=0.9\r\n\r\n'
b'GET /favicon.ico HTTP/1.1'
b'Host: 127.0.0.1:8000'
b'Connection: keep-alive'
b'User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36'
b'Sec-Fetch-Dest: image'
b'Accept: image/webp,image/apng,image/*,*/*;q=0.8'
b'Sec-Fetch-Site: same-origin'
b'Sec-Fetch-Mode: no-cors'
b'Referer: http://127.0.0.1:8000/index.html'
b'Accept-Encoding: gzip, deflate, br'
b'Accept-Language: zh-CN,zh;q=0.9'
b'
=====
GET /favicon.ico HTTP/1.1
=====
response data: HTTP/1.1 404 Not Found
Server:My server

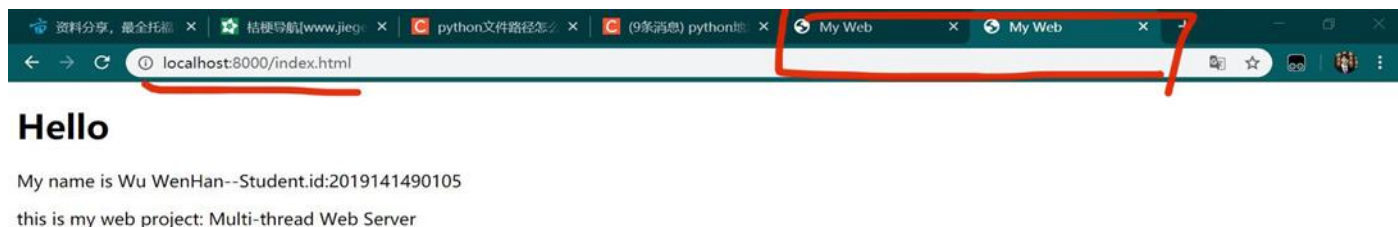
The file is not found
=====
[127.0.0.1:54565]连接上
[127.0.0.1:54565]用户已连接上

```

(此时服务器端显示的信息)

2: 多线程:

多个客户端访问服务器时，都可以并发地访问，通过后台观察打印出的地址可以发现服务器已经接收到了多个客户端的访问，并且服务器为每个客户端联系时均建立了连接套接字，截图如下：



(从浏览器访问可以看出，可以同时打开两个页面访问本地服务器，这里请求同一个 index.html)



Show the image of SCU!



(同时请求 index.html 和 image.html, image.html 显示如上)

```
[127.0.0.1,54604]用户连接上
[127.0.0.1,54605]用户连接上
request_data: b'GET /index.html HTTP/1.1\r\nHost: 127.0.0.1:8000\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36\r\nSec-Fetch-Dest: document\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9\r\nSec-Fetch-Site: none\r\nSec-Fetch-Mode: navigate\r\nSec-Fetch-User: ?1\r\nAccept-Encoding: gzip, deflate, b\r\nAccept-Language: zh-CN,zh;q=0.9\r\n\r\n'
=====
[b'GET /index.html HTTP/1.1', b'Host: 127.0.0.1:8000', b'Connection: keep-alive', b'Upgrade-Insecure-Requests: 1', b'User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36', b'Sec-Fetch-Dest: document', b'Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9', b'Sec-Fetch-Site: none', b'Sec-Fetch-Mode: navigate', b'Sec-Fetch-User: ?1', b'Accept-Encoding: gzip, deflate, br', b'Accept-Language: zh-CN,zh;q=0.9', b'']
=====
b'GET /index.html HTTP/1.1'
b'Host: 127.0.0.1:8000'
b'Connection: keep-alive'
b'Upgrade-Insecure-Requests: 1'
b'User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Safari/537.36'
b'Sec-Fetch-Dest: document'
b'Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9'
b'Sec-Fetch-Site: none'
b'Sec-Fetch-Mode: navigate'
b'Sec-Fetch-User: ?1'
b'Accept-Encoding: gzip, deflate, br'
b'Accept-Language: zh-CN,zh;q=0.9'
b''
*****
GET /index.html HTTP/1.1
#####
response data: HTTP/1.1 200 OK
Server:My server

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>My Web</title>
</head>
<body>
  <h1>Hello</h1>
  <p>My name is Wu WenHan--Student.id:2019141490105</p>
  <p>this is my web project: Multi-thread Web Server</p>
</body>
</html>
#####
request_data: b''
=====
[]
=====
Process Process-4:
Traceback (most recent call last):
  File "C:\Users\Peter Tylor\Anaconda3\lib\multiprocessing\process.py", line 297, in _bootstrap
    self.run()
  File "C:\Users\Peter Tylor\Anaconda3\lib\multiprocessing\process.py", line 99, in run
    self._target(*self._args, **self._kwargs)
  File "c:\webproject\static web server.py", line 33, in handle_client
```

(此时服务器端显示的信息)

3: 异常检测:

访问服务器中不存在的文件路径时，后台会返回访问失败的页面，此时浏览器端会返回访问失败的页面，截图如下：



```
except IOError:
    response_start_line = "HTTP/1.1 404 Not Found\r\n"
    response_headers = "Server:My server\r\n"
    response_body = "The file is not found"
else:
    file_data = file.read()
    file.close()
```

(异常处理相应代码)