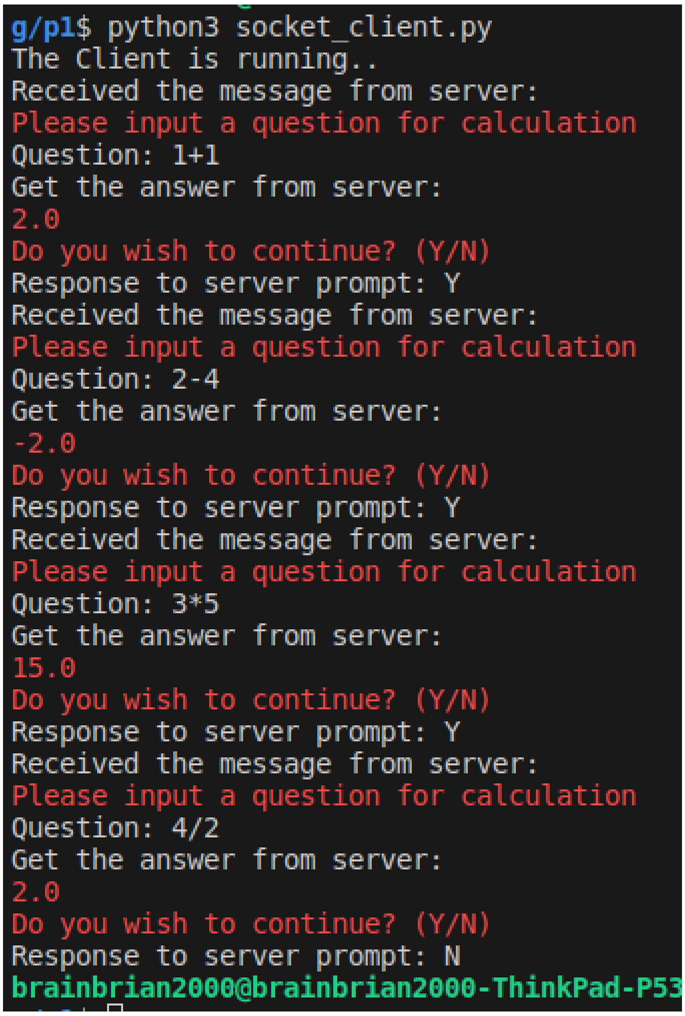
電腦網路導論 hw1

B08209023 范傑翔

p1:

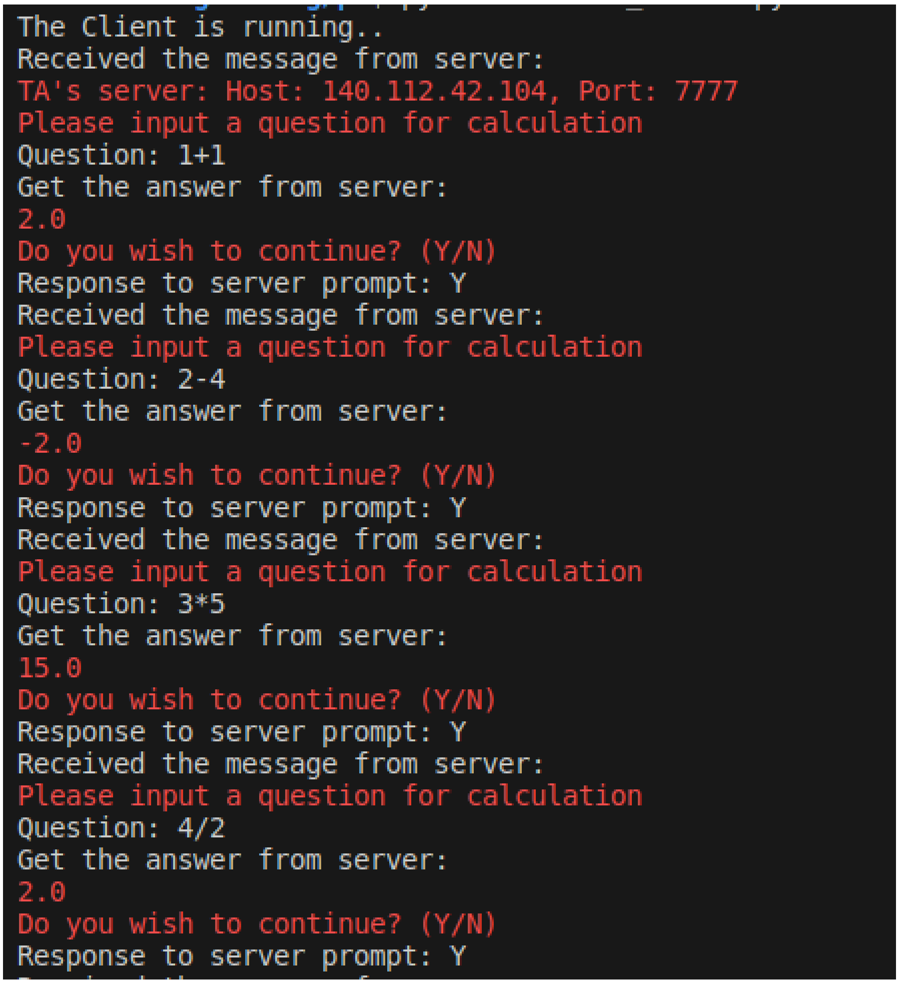


```
g/p1$ python3 socket_client.py
The Client is running..
Received the message from server:
Please input a question for calculation
Question: 1+1
Get the answer from server:
2.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 2-4
Get the answer from server:
-2.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 3*5
Get the answer from server:
15.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 4/2
Get the answer from server:
2.0
Do you wish to continue? (Y/N)
Response to server prompt: N
brainbrian2000@brainbrian2000-ThinkPad-P53
```

socket_client.py
在 TODO 裡面將 socket 宣告後，使用 connect 連線到指定的 host and port
由於助教提供的 todo 好像會讓輸出不全然跟範例相同，因此將 response 調整到 question 前面，在 for 迴圈中讓系統常態監聽來自 server 的回覆，並在順序上優先先顯示其結果，爾後將 quesion 送出並等待 server's answer 回應，監聽後將期 decode，在輸入進 log file。

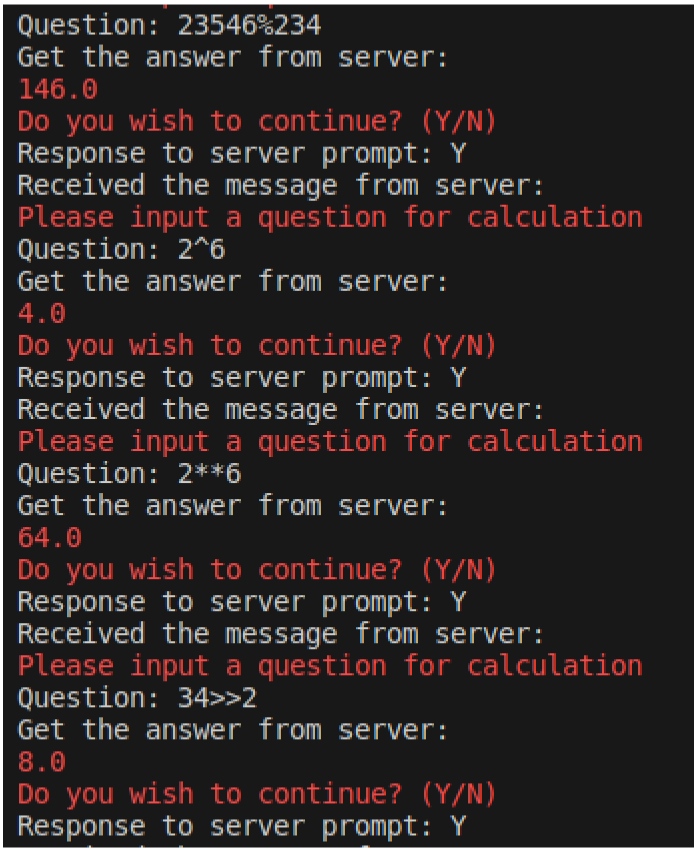
socket_server.py

1.綁定預計的 IP 以及 port 之後， 用 while 迴圈常態執行
送出提示訊息
監聽來自 socket 的訊息回應（問題）
提示是否繼續執行
接收回應
使用 socket.send 以及 socket.recv(1024)實現發送與監聽功能
接收問題之後會將期送入 calculate_expression 中，並使用 sting.find 以及 string.split 函數將問題拆分為左右兩側，並根據 find 所找到的運算子對左右兩側的 int 進行運算，依序判斷（支援以下）運算功能:
加減 次方 乘 除 取餘數 XOR 右移 左移 大於 小於等運算，其中助教並沒有指定輸入數字是否為 float，根據 testcase 判斷為 int 因此該計算功能目前只支援 int。
最後根據是否繼續所得到的 client 回應，判斷迴圈是否該繼續或者斷開
爾後將 socket 關閉結束該功能。

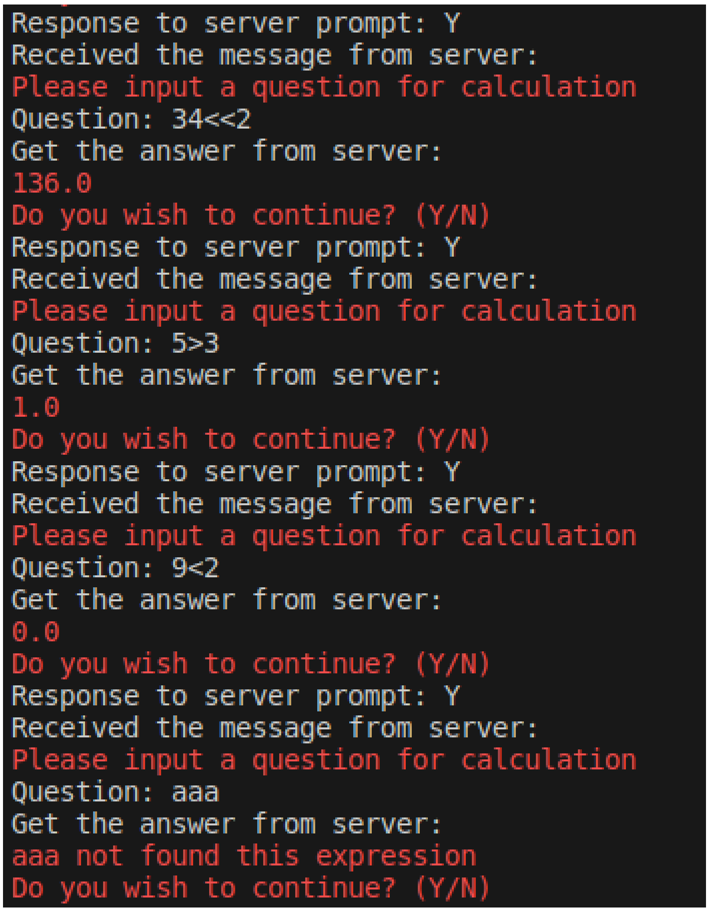


```
The Client is running..
Received the message from server:
TA's server: Host: 140.112.42.104, Port: 7777
Please input a question for calculation
Question: 1+1
Get the answer from server:
2.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 2-4
Get the answer from server:
-2.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 3*5
Get the answer from server:
15.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 4/2
Get the answer from server:
2.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
```

連線到 TA 的 server



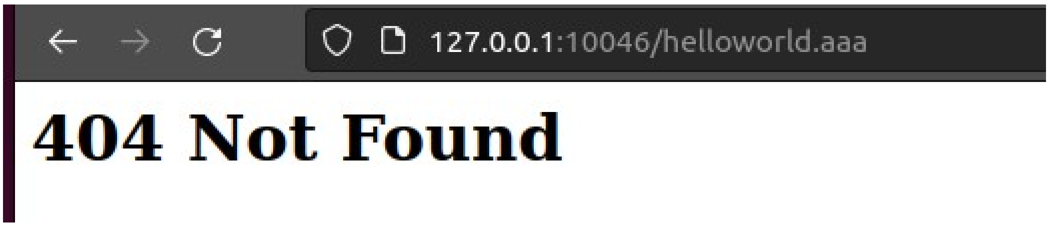
```
Question: 23546%234
Get the answer from server:
146.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 2^6
Get the answer from server:
4.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 2**6
Get the answer from server:
64.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 34>>2
Get the answer from server:
8.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
```



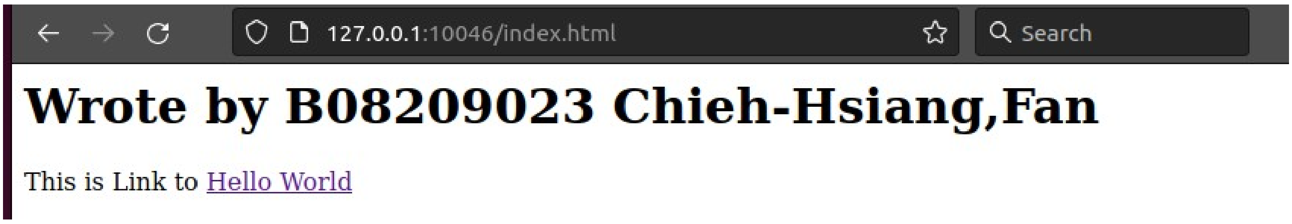
```
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 34<<2
Get the answer from server:
136.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 5>3
Get the answer from server:
1.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: 9<2
Get the answer from server:
0.0
Do you wish to continue? (Y/N)
Response to server prompt: Y
Received the message from server:
Please input a question for calculation
Question: aaa
Get the answer from server:
aaa not found this expression
Do you wish to continue? (Y/N)
```

以上為新增支援之運算子計算功能。

p2:
如 p1 監聽並設定 ip 與 port 並設定一次只可服務一個對象、並設定好 timeout，並將連線進來的 socket 除存至 server 中的 client socket
將來自瀏覽器所發送之文字訊息進行解析，將標準且規則之字串解析並拆分，使用 split 方法將/左右分離，將 filename 查找出來，而倘若為空字串直接回應 404 並且關閉 client socket 連線。
倘若字串不為 null 則對齊進行檔案查找，若有找到檔案則依照標準格式回報 200 並且將檔案讀出後分段寄送至瀏覽器，寄送到瀏覽器後關閉 socket 讓瀏覽器可以顯示讀取結果
倘若沒有 file 則透過 except raise error 並將跳脫出 try 並跳入 OSError（TODO 裡面好像是寫 NameError）區塊，並執行 404 回報（找不到檔案）
新增若使用 test/123 則會回報 123，作為未來測試的 error code 使用，但預設會回報 404。

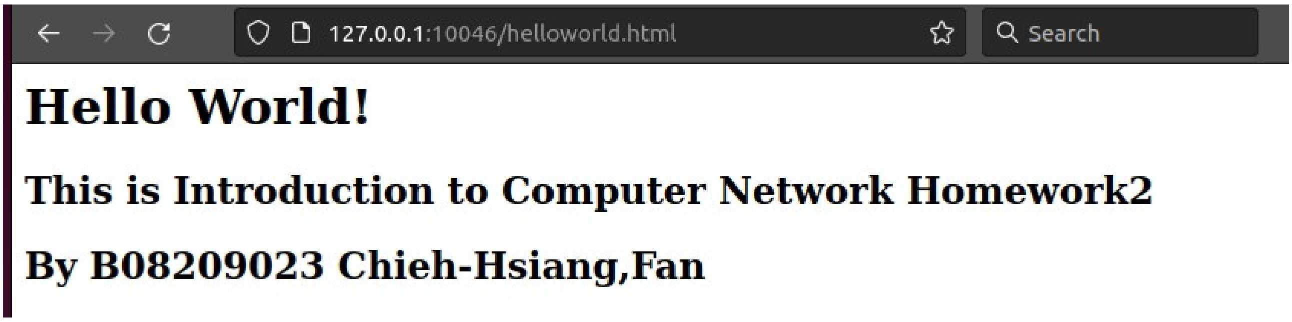


404 Not Found



Wrote by B08209023 Chieh-Hsiang,Fan

This is Link to Hello World



Hello World!

This is Introduction to Computer Network Homework2

By B08209023 Chieh-Hsiang,Fan

爾又 html 的連結也是將網址的連結改變去索取不同檔案，因此不需要特別更改程式結構。

P3:
助教的 TODO 在順序上會讓某些環節出 bug，因此有重新更動
由於瀏覽器傳輸給 proxy 的方法會如同一般的 http 一樣，有 GET http://[hostname:port]/[filename] HTML/1.1 的文字結構，因此一樣做字串解析

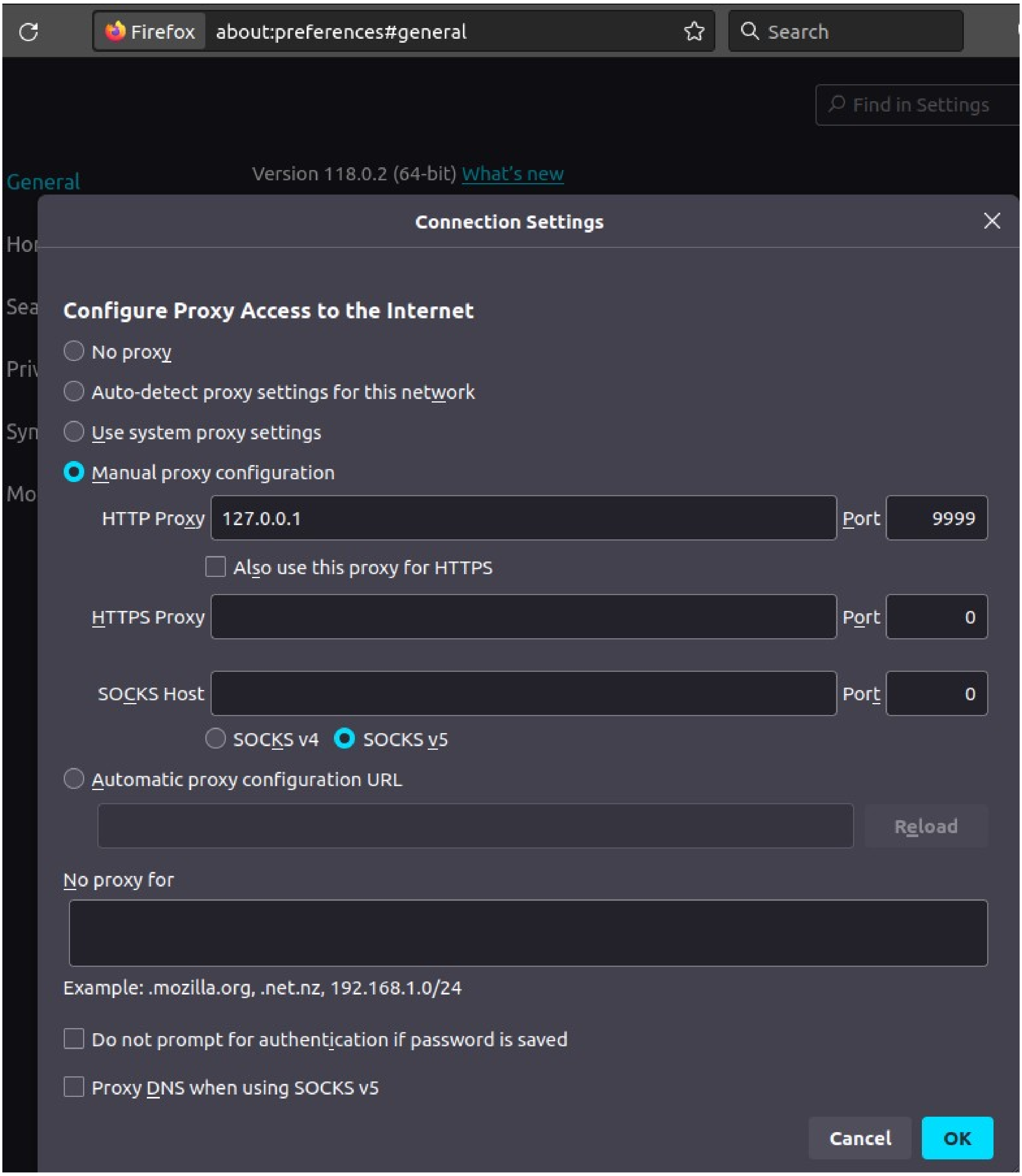
但檔案中並不可以包含:字元，因此將: replace to /將 port 作為一個子資料夾做儲存，主要實做方法為做字串處理以及用 os 套件將資料夾創建與查找，並根據 file_path 內部看是否有相應檔案，若沒有此相應檔案則連線至之前所要求的位置，在此將沒有指定 port 的 http 連線自動轉接至 80，並建立起 socket 與 webserver 的連線。
將連線資料使用 socket 監聽，並且設定在 server 端沒有 close 的狀態下持續監聽，避免直接斷開連線導致資料沒有完整傳輸。
爾後對標頭字串進行 http 解析，若為 200 則將資料儲存至檔案，並將資料拔除 http 標頭訊息後轉送至瀏覽器的 client，若街收到得標頭檔為 404 則直接瀏覽器回報 404 並顯示 not found。

若一開始在檔案資料結構中有找到相應位置的相應檔案則直接將該檔案資料讀出，並送至瀏覽器。

爾後將瀏覽器的 socket_client 關閉並繼續監聽。

透過此檔案結構方法可將此 proxy 在未來倘若要給其他網頁使用，不須大幅更改結構，可以直接去資料夾結構下進行查找。

以下圖片為結果顯示，前半部份為 firefox 瀏覽器（ubuntu）以及 proxy server console output



Firefox about:preferences#general

Version 118.0.2 (64-bit) What's new

Connection Settings

Configure Proxy Access to the Internet

○ No proxy

○ Auto-detect proxy settings for this network

○ Use system proxy settings

● Manual proxy configuration

HTTP Proxy 127.0.0.1 Port 9999

□ Also use this proxy for HTTPS

HTTPS Proxy Port 0

SOCKS Host Port 0

○ SOCKS v4 ● SOCKS v5

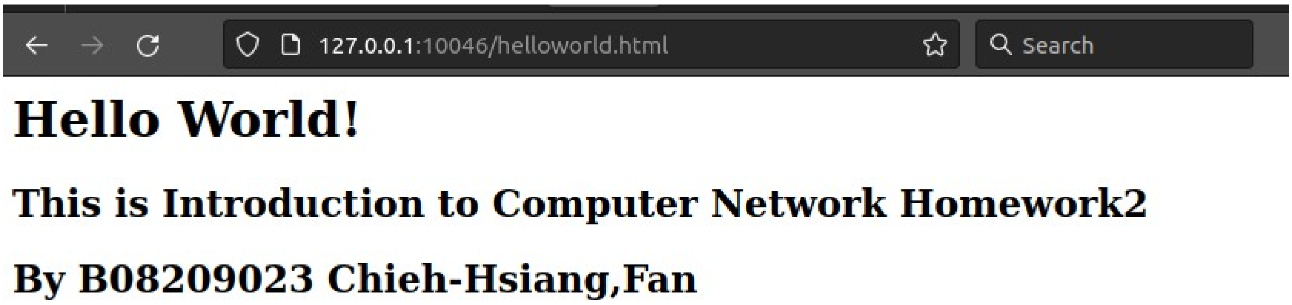
○ Automatic proxy configuration URL

No proxy for

Example: .mozilla.org, .net.nz, 192.168.1.0/24

□ Do not prompt for authentication if password is saved

□ Proxy DNS when using SOCKS v5

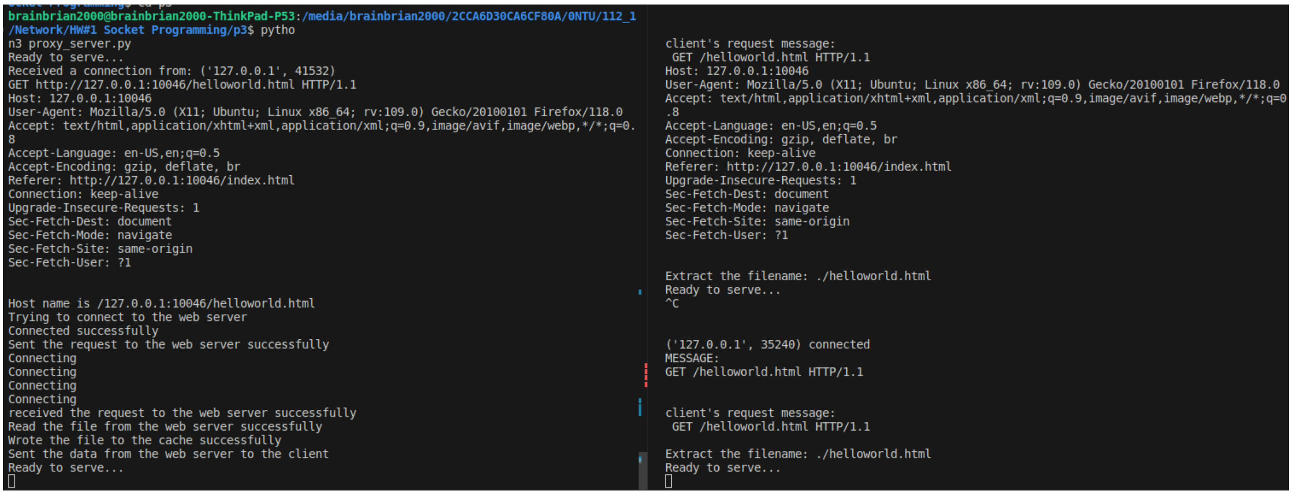


127.0.0.1:10046/helloworld.html

Hello World!

This is Introduction to Computer Network Homework2

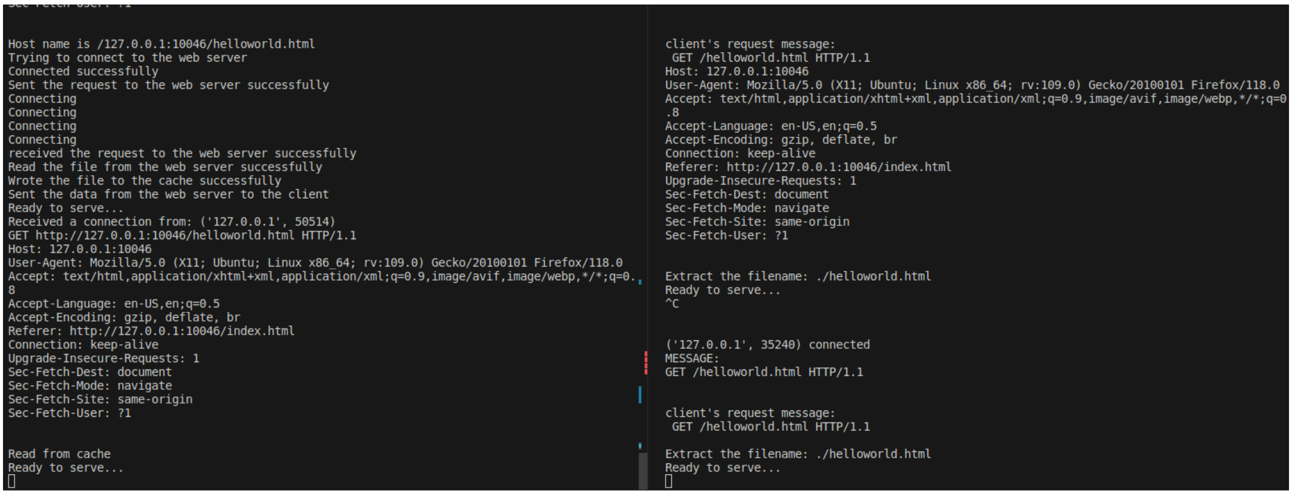
By B08209023 Chieh-Hsiang,Fan



```
brainbrian2000@brainbrian2000-ThinkPad-P53:/media/brainbrian2000/2CCA6D30CA6CF80A/0NTU/112_1
/Network/HW#1 Socket Programming/p3$ pytho
n3 proxy_server.py
Ready to serve...
Received a connection from: ('127.0.0.1', 41532)
GET http://127.0.0.1:10046/helloworld.html HTTP/1.1
Host: 127.0.0.1:10046
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/118.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.
8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
Referer: http://127.0.0.1:10046/index.html
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1


Host name is /127.0.0.1:10046/helloworld.html
Trying to connect to the web server
Connected successfully
Sent the request to the web server successfully
Connecting
Connecting
Connecting
Connecting
received the request to the web server successfully
Read the file from the web server successfully
Wrote the file to the cache successfully
Sent the data from the web server to the client
Ready to serve...
```

```
client's request message:
 GET /helloworld.html HTTP/1.1
Host: 127.0.0.1:10046
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/118.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0
.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
Connection: keep-alive
Referer: http://127.0.0.1:10046/index.html
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1


Extract the filename: ./helloworld.html
Ready to serve...
^C


('127.0.0.1', 35240) connected
MESSAGE:
GET /helloworld.html HTTP/1.1


client's request message:
 GET /helloworld.html HTTP/1.1

Extract the filename: ./helloworld.html
Ready to serve...
```

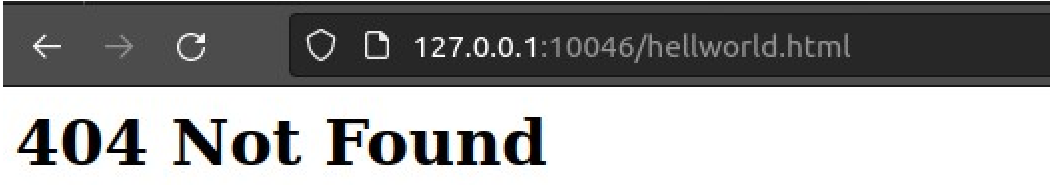
left side: proxy_server
right side:web_server
first connection.



```
Host name is /127.0.0.1:10046/helloworld.html
Trying to connect to the web server
Connected successfully
Sent the request to the web server successfully
Connecting
Connecting
Connecting
Connecting
received the request to the web server successfully
Read the file from the web server successfully
Wrote the file to the cache successfully
Sent the data from the web server to the client
Ready to serve...
Received a connection from: ('127.0.0.1', 50514)
GET http://127.0.0.1:10046/helloworld.html HTTP/1.1
Host: 127.0.0.1:10046
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/118.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.
8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
Referer: http://127.0.0.1:10046/index.html
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1


Read from cache
Ready to serve...
```

```
client's request message:
 GET /helloworld.html HTTP/1.1
Host: 127.0.0.1:10046
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/118.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0
.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
Connection: keep-alive
Referer: http://127.0.0.1:10046/index.html
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1


Extract the filename: ./helloworld.html
Ready to serve...
^C


('127.0.0.1', 35240) connected
MESSAGE:
GET /helloworld.html HTTP/1.1


client's request message:
 GET /helloworld.html HTTP/1.1

Extract the filename: ./helloworld.html
Ready to serve...
```

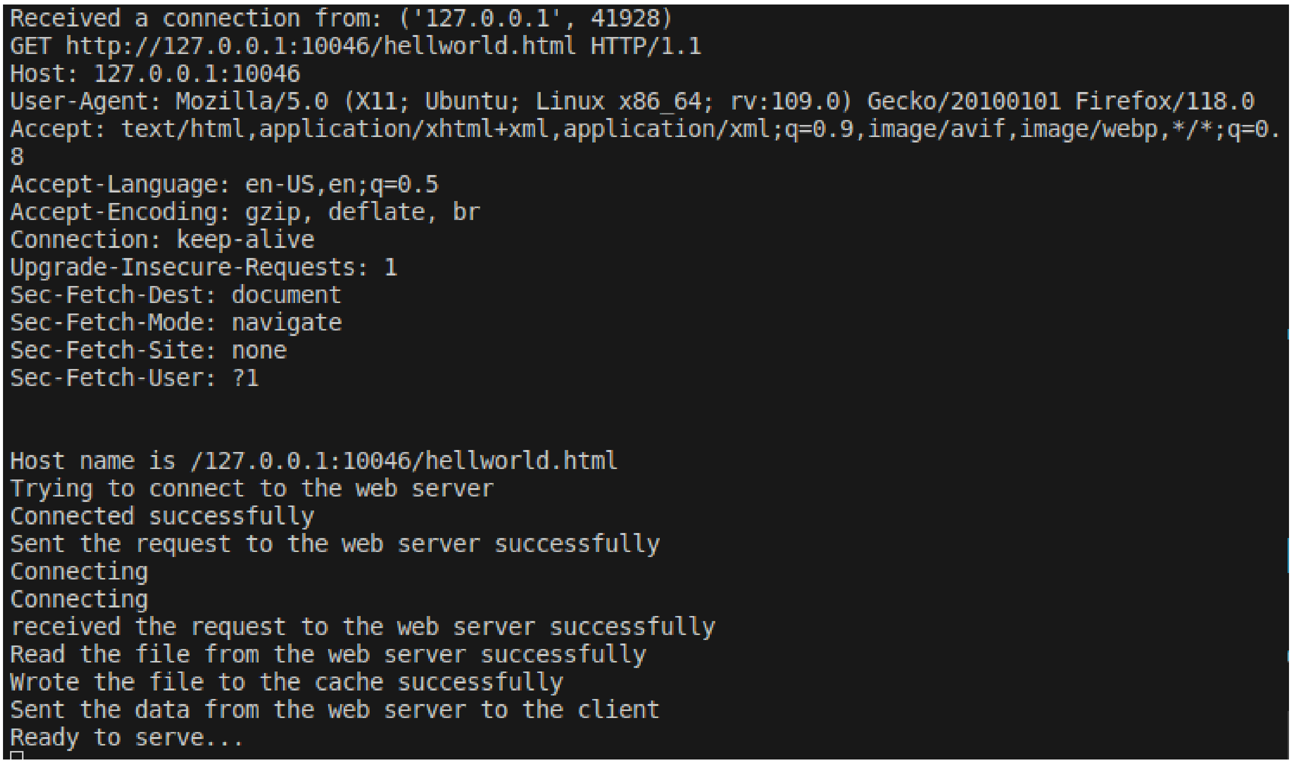
left side: proxy_server
right side:web_server
second connection.
可以看到右側的 log 沒變，左側顯示直接從 cache 直接抓資料。



127.0.0.1:10046/hellworld.html

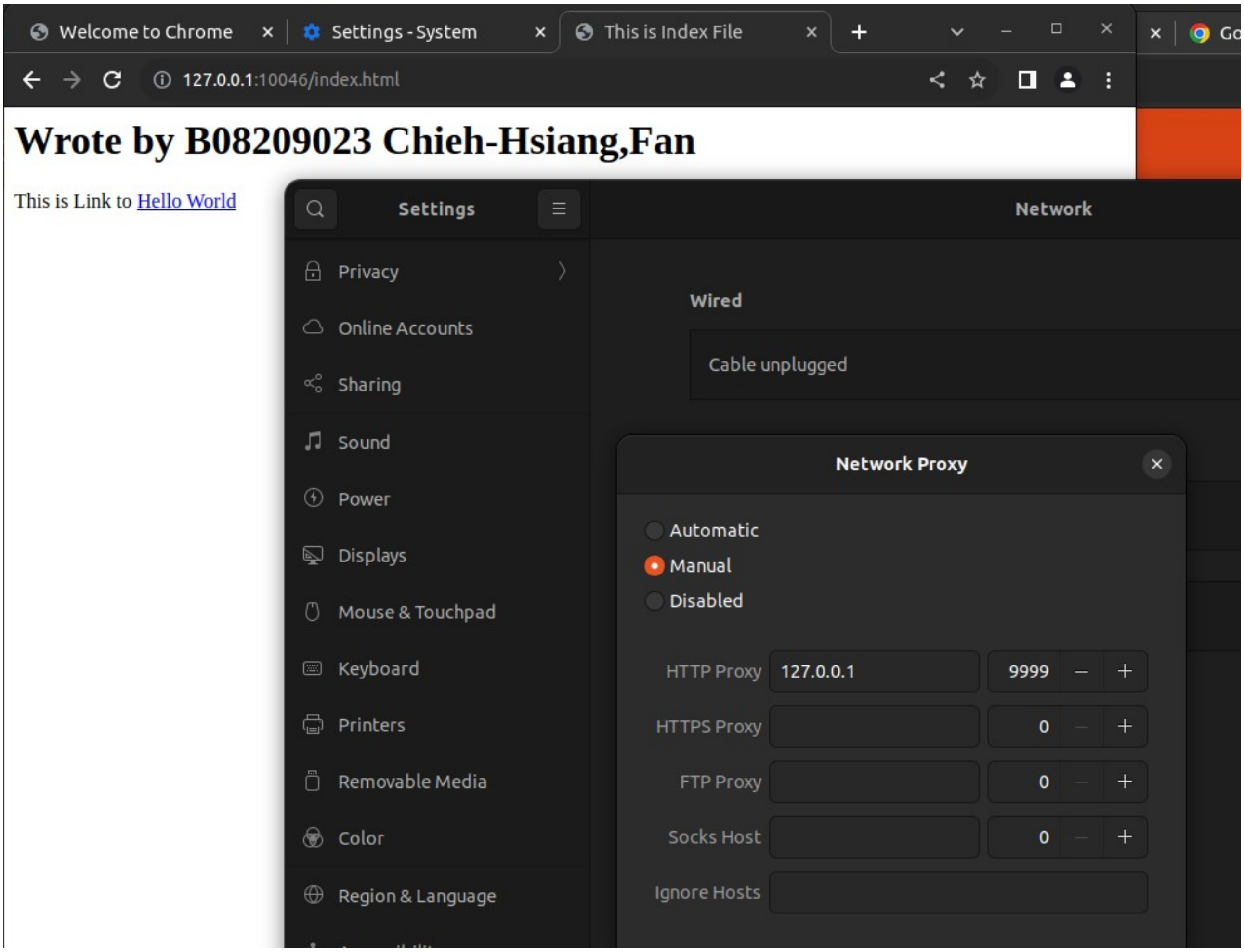
404 Not Found

可看到可以順利顯示 404 在網頁上



```
Received a connection from: ('127.0.0.1', 41928)
GET http://127.0.0.1:10046/hellworld.html HTTP/1.1
Host: 127.0.0.1:10046
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/118.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.
8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: none
Sec-Fetch-User: ?1


Host name is /127.0.0.1:10046/hellworld.html
Trying to connect to the web server
Connected successfully
Sent the request to the web server successfully
Connecting
Connecting
received the request to the web server successfully
Read the file from the web server successfully
Wrote the file to the cache successfully
Sent the data from the web server to the client
Ready to serve...
```

log 也顯示沒有找到相應的檔案，因此直接從母 server 抓取 404 回覆轉送。



Wrote by B08209023 Chieh-Hsiang,Fan

This is Link to Hello World

Network Proxy

○ Automatic
● Manual
○ Disabled

HTTP Proxy 127.0.0.1 9999

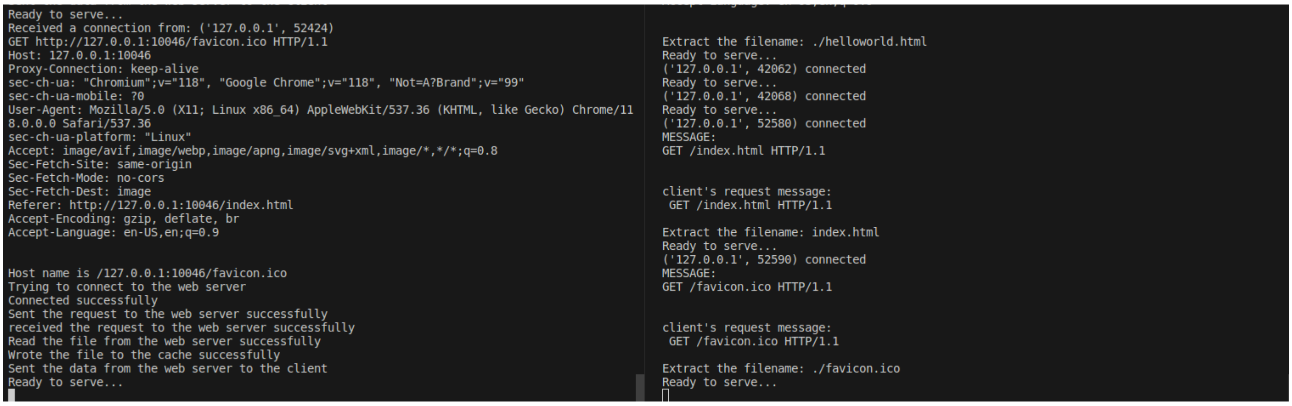
HTTPS Proxy 0

FTP Proxy 0

Socks Host 0

Ignore Hosts

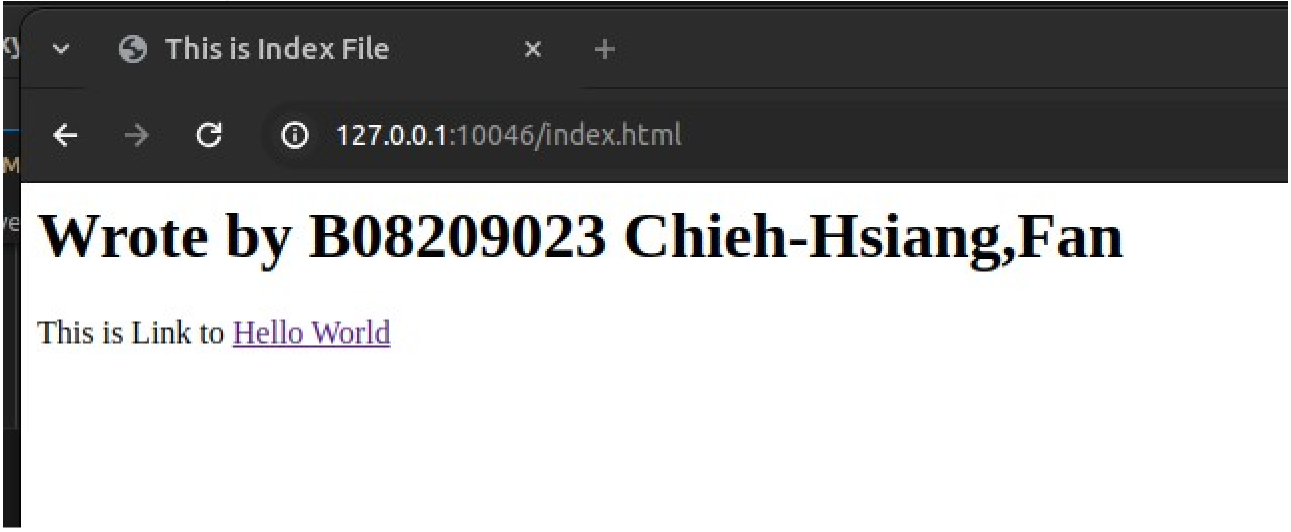
chrome 的設定檔



```
Ready to serve...
Received a connection from: ('127.0.0.1', 52424)
GET http://127.0.0.1:10046/favicon.ico HTTP/1.1
Host: 127.0.0.1:10046
Proxy-Connection: keep-alive
sec-ch-ua: "Chromium";v="118", "Google Chrome";v="118", "Not=A?Brand";v="99"
sec-ch-ua-mobile: ?0
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/11
8.0.0.0 Safari/537.36
sec-ch-ua-platform: "Linux"
Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Sec-Fetch-Site: same-origin
Sec-Fetch-Mode: no-cors
Sec-Fetch-Dest: image
Referer: http://127.0.0.1:10046/index.html
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9


Host name is /127.0.0.1:10046/favicon.ico
Trying to connect to the web server
Connected successfully
Sent the request to the web server successfully
received the request to the web server successfully
Read the file from the web server successfully
Wrote the file to the cache successfully
Sent the data from the web server to the client
Ready to serve...
```

```

Extract the filename: ./helloworld.html
Ready to serve...
('127.0.0.1', 42062) connected
Ready to serve...
('127.0.0.1', 42068) connected
Ready to serve...
('127.0.0.1', 52580) connected
MESSAGE:
GET /index.html HTTP/1.1


client's request message:
 GET /index.html HTTP/1.1

Extract the filename: index.html
Ready to serve...
('127.0.0.1', 52590) connected
MESSAGE:
GET /favicon.ico HTTP/1.1


client's request message:
 GET /favicon.ico HTTP/1.1

Extract the filename: ./favicon.ico
Ready to serve...
```

chrome 連線的 log



Wrote by B08209023 Chieh-Hsiang,Fan

This is Link to Hello World

連線結果-google chrome