

NAMA : Candra Eko Agustinus

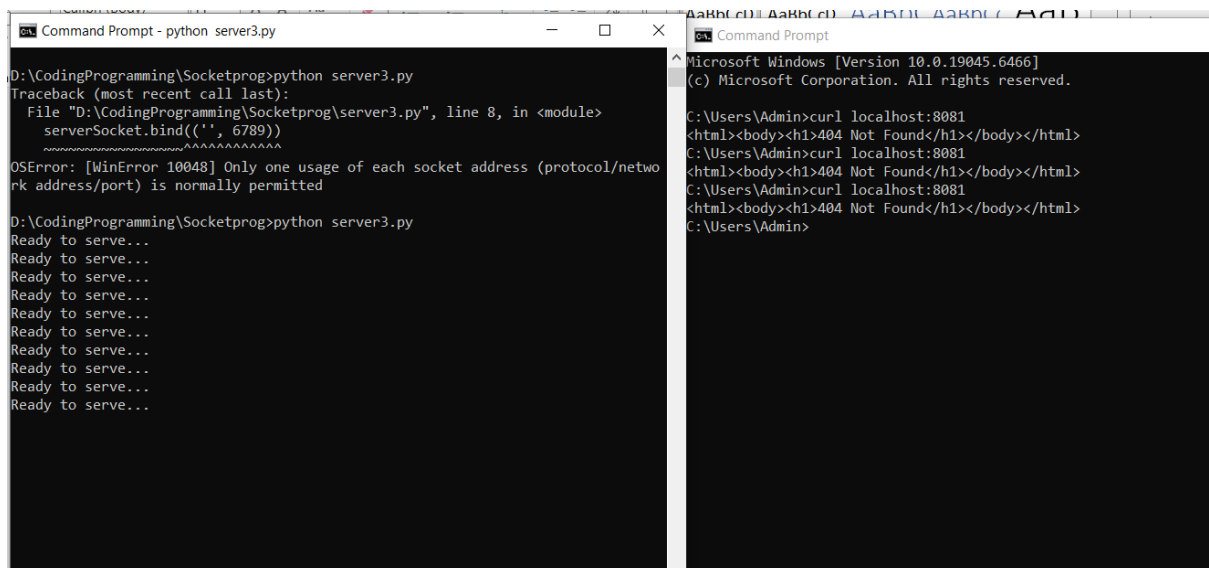
NRP : 1225800007

Jurusan : S2 TIK by Riset

1.a. Create a web server application that can serve a single client request first

File name server3.py

Menggunakan port 8081



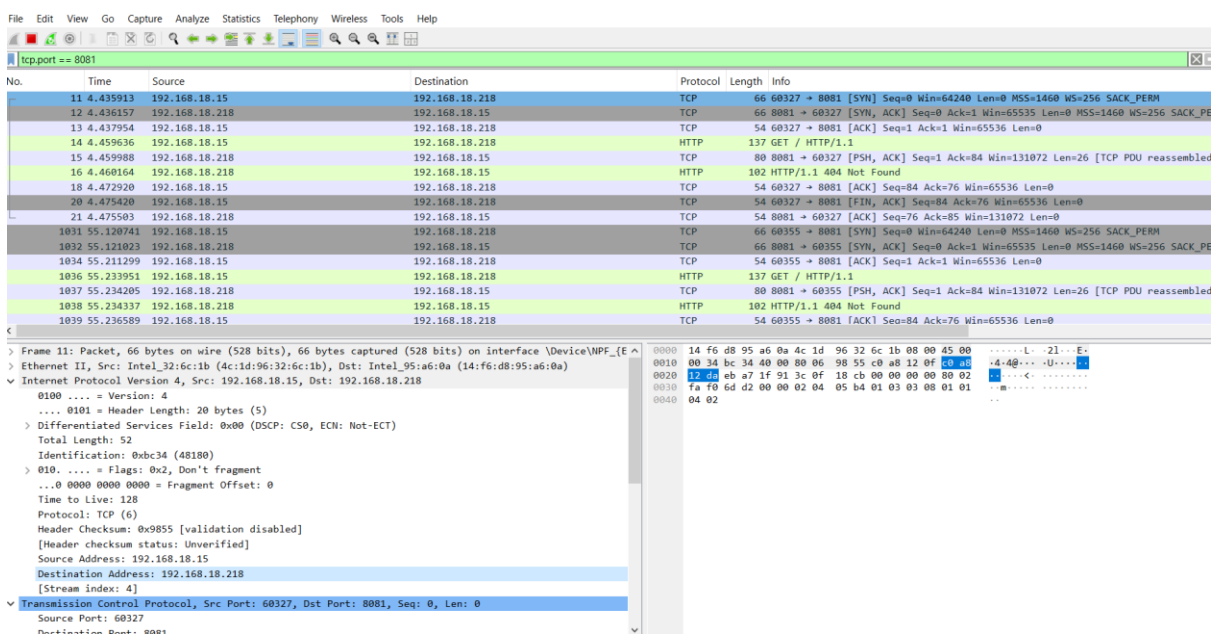
```
Command Prompt - python server3.py
D:\CodingProgramming\Socketprog>python server3.py
Traceback (most recent call last):
  File "D:\CodingProgramming\Socketprog\server3.py", line 8, in <module>
    serverSocket.bind(('', 6789))
    ~~~~~^~~~~~
PermissionError: [WinError 10048] Only one usage of each socket address (protocol/network address/port) is normally permitted

D:\CodingProgramming\Socketprog>python server3.py
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...
Ready to serve...

Microsoft Windows [Version 10.0.19045.6466]
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C:\Users\Admin>curl localhost:8081
<html><body><h1>404 Not Found</h1></body></html>
C:\Users\Admin>curl localhost:8081
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C:\Users\Admin>curl localhost:8081
<html><body><h1>404 Not Found</h1></body></html>
C:\Users\Admin>
```

Tampak packets melalui wireshark



1b. modify your web server application to serve multiple (concurrent) requests.

Menggunakan port 8085

```
Command Prompt - python server4.py
O:\CodingProgramming>cd Socketprog
O:\CodingProgramming\Socketprog>python server4.py
[2025-12-02 16:01:23] Multithreaded Web Server is ready...
[2025-12-02 16:01:31] Thread started for ('192.168.18.15', 60779)
[2025-12-02 16:01:31] New connection from ('192.168.18.15', 60779) handled in thread Thread-1 (handle_client)
[2025-12-02 16:01:31] 404 Not Found for ('192.168.18.15', 60779) (//)
[2025-12-02 16:01:31] Connection closed for ('192.168.18.15', 60779)
[2025-12-02 16:01:37] Thread started for ('192.168.18.15', 60783)
[2025-12-02 16:01:37] New connection from ('192.168.18.15', 60783) handled in thread Thread-2 (handle_client)
[2025-12-02 16:01:37] 404 Not Found for ('192.168.18.15', 60783) (//)
[2025-12-02 16:01:37] Connection closed for ('192.168.18.15', 60783)
[2025-12-02 16:01:39] Thread started for ('192.168.18.15', 60785)
[2025-12-02 16:01:39] New connection from ('192.168.18.15', 60785) handled in thread Thread-3 (handle_client)
[2025-12-02 16:01:39] 404 Not Found for ('192.168.18.15', 60785) (//)
[2025-12-02 16:01:39] Connection closed for ('192.168.18.15', 60785)
[2025-12-02 16:01:40] Thread started for ('127.0.0.1', 54355)
[2025-12-02 16:01:40] New connection from ('127.0.0.1', 54355) handled in thread Thread-4 (handle_client)
[2025-12-02 16:01:40] 404 Not Found for ('127.0.0.1', 54355) (//)
[2025-12-02 16:01:40] Connection closed for ('127.0.0.1', 54355)
[2025-12-02 16:02:46] Thread started for ('192.168.18.15', 60828)
[2025-12-02 16:02:46] New connection from ('192.168.18.15', 60828) handled in thread Thread-5 (handle_client)
[2025-12-02 16:02:46] 404 Not Found for ('192.168.18.15', 60828) (/?param=tes)
[2025-12-02 16:02:46] Connection closed for ('192.168.18.15', 60828)

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C:\Users\Admin>curl localhost:8085
<html><body><h1>404 Not Found</h1></body></html>
C:\Users\Admin>
```

No.	Time	Source	Destination	Protocol	Length	Info
16125	696.868423	192.168.18.15	192.168.18.218	TCP	54	60785 → 8085 [ACK] Seq=1 Ack=1 Win=65536 Len=0
16126	696.868702	192.168.18.15	192.168.18.218	HTTP	237	POST / HTTP/1.1 (application/x-www-form-urlencoded)
16127	696.870277	192.168.18.218	192.168.18.15	TCP	80	8085 → 60785 [PSH, ACK] Seq=1 Ack=184 Win=131072 Len=26 [TCP PDU reass
16128	696.870923	192.168.18.218	192.168.18.15	HTTP	102	HTTP/1.1 404 Not Found
16129	696.873209	192.168.18.15	192.168.18.218	TCP	54	60785 → 8085 [ACK] Seq=184 Ack=76 Win=65536 Len=0
16130	696.873478	192.168.18.15	192.168.18.218	TCP	54	60785 → 8085 [FIN, ACK] Seq=184 Ack=76 Win=65536 Len=0
16131	696.873546	192.168.18.218	192.168.18.15	TCP	54	8085 → 60785 [ACK] Seq=76 Ack=185 Win=131072 Len=0
16957	763.939802	192.168.18.15	192.168.18.218	TCP	66	60828 → 8085 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
16958	763.940062	192.168.18.218	192.168.18.15	TCP	66	8085 → 60828 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=256 S
16959	763.942777	192.168.18.15	192.168.18.218	TCP	54	60828 → 8085 [ACK] Seq=1 Ack=1 Win=65536 Len=0
16960	763.954109	192.168.18.15	192.168.18.218	HTTP	147	GET /?param=tes HTTP/1.1
16961	763.954604	192.168.18.218	192.168.18.15	TCP	80	8085 → 60828 [PSH, ACK] Seq=1 Ack=94 Win=65536 Len=26 [TCP PDU reass
16962	763.955445	192.168.18.218	192.168.18.15	HTTP	102	HTTP/1.1 404 Not Found
16963	763.958124	192.168.18.15	192.168.18.218	TCP	54	60828 → 8085 [ACK] Seq=94 Ack=76 Win=65536 Len=0
16964	763.958925	192.168.18.15	192.168.18.218	TCP	54	60828 → 8085 [FIN, ACK] Seq=94 Ack=76 Win=65536 Len=0
16965	763.958986	192.168.18.218	192.168.18.15	TCP	54	8085 → 60828 [ACK] Seq=76 Ack=95 Win=65536 Len=0

Details
[Calculated window size: 65536] [Window size scaling factor: 256] Checksum: 0xdc86 [Unverified] [Checksum Status: Unverified] Urgent Pointer: 0 > [Timestamps] > [SEQ/ACK analysis] [Client Contiguous Streams: 1] [Server Contiguous Streams: 1] TCP payload (93 bytes) Hypertext Transfer Protocol GET /?param=tes HTTP/1.1\r\n Request Method: GET Request URI: /?param=tes Request Version: HTTP/1.1 Host: 192.168.18.218:8085\r\n User-Agent: curl/8.13.0\r\n Accept: */*\r\n\r\n

Bytes
0000 14 f6 d8 95 a6 0a 4c 1d 96 32 6c 1b 08 00 45 00L..21...E. 0010 00 85 bc 7b 40 00 80 06 97 bd c0 a8 12 0f c0 a8 ...(@..... 0020 12 da ed 9c 1f 95 7b ac e6 8e 73 c2 e3 13 50 18[...s...P 0030 01 00 dc 86 00 00 77 65 32 30 2f 3f 70 61 72 61GET /?para 0040 6d 3d 74 65 73 20 48 54 54 50 2f 31 2e 31 0d 0a mtes HT TP/1.1. 0050 48 6f 73 74 3a 20 31 39 32 2e 31 36 38 2e 31 38 Host: 19 2.168.18 0060 2e 32 31 38 3a 38 30 38 35 0d 0a 55 73 65 72 2d .218:808 5--User- 0070 41 67 65 6e 74 3a 20 63 75 72 6c 2f 38 2e 31 33 Agent: c url/8.13 0080 2e 30 0d 0a 41 63 63 65 70 74 3a 20 2f 2a 0d .0--Acce pt: */* 0090 0a 0d 0a ...

2. membuat aplikasi Client, mengirim file ke server

Menggunakan port 8085, Melakukan test dengan mengirim sebuah file ke server

```
Command Prompt - python server4.py
IndexError: list index out of range
File "C:\Users\Admin\AppData\Local\Programs\Python\Python313\Lib\threading.py", line 1041, in _bootstrap
    self.run()
File "C:\Users\Admin\AppData\Local\Programs\Python\Python313\Lib\threading.py", line 992, in run
    self._target(*self._args, **self._kwargs)
File "D:\CodingProgramming\Socketprog\server4.py", line 15, in handle_client
    filename = message.split()[1]
IndexError: list index out of range
[2025-12-02 16:24:02] Thread started for ('127.0.0.1', 54690)
[2025-12-02 16:24:02] New connection from ('127.0.0.1', 54690) handled in thread Thread-17 (handle_client)
[2025-12-02 16:24:02] 404 Not Found for ('127.0.0.1', 54690) (/)
[2025-12-02 16:24:02] Connection closed for ('127.0.0.1', 54690)
[2025-12-02 16:24:10] Thread started for ('127.0.0.1', 54700)
[2025-12-02 16:24:10] New connection from ('127.0.0.1', 54700) handled in thread Thread-18 (handle_client)
[2025-12-02 16:24:10] 404 Not Found for ('127.0.0.1', 54700) (/)
[2025-12-02 16:24:10] Connection closed for ('127.0.0.1', 54700)
[2025-12-02 16:26:28] Thread started for ('127.0.0.1', 54718)
[2025-12-02 16:26:28] New connection from ('127.0.0.1', 54718) handled in thread Thread-19 (handle_client)
[2025-12-02 16:26:28] Served file 'testkirim.txt' to ('127.0.0.1', 54718)
[2025-12-02 16:26:28] Connection closed for ('127.0.0.1', 54718)

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C:\Users\Admin>
D:\>cd CodingProgramming
D:\CodingProgramming>cd Socketprog
D:\CodingProgramming\Socketprog>python client.py localhost 8085 testkirim.txt
HTTP/1.1 200 OK
test kirim ke web server
D:\CodingProgramming\Socketprog>
```

tcp.port == 8085					
No.	Time	Source	Destination	Protocol	Length Info
181	21.715277	192.168.18.15	192.168.18.218	TCP	54 61673 → 8085 [ACK] Seq=1 Ack=1 Win=65536 Len=0
182	21.715554	192.168.18.15	192.168.18.218	HTTP	137 GET / HTTP/1.1
183	21.717212	192.168.18.218	192.168.18.15	TCP	80 8085 → 61673 [PSH, ACK] Seq=1 Ack=84 Win=65536 Len=26 [TCP PDU reas
184	21.721733	192.168.18.218	192.168.18.15	HTTP	102 HTTP/1.1 404 Not Found
185	21.729208	192.168.18.15	192.168.18.218	TCP	54 61673 → 8085 [ACK] Seq=84 Ack=76 Win=65536 Len=0
186	21.729478	192.168.18.15	192.168.18.218	TCP	54 61673 → 8085 [FIN, ACK] Seq=84 Ack=76 Win=65536 Len=0
187	21.729562	192.168.18.218	192.168.18.15	TCP	54 8085 → 61673 [ACK] Seq=76 Ack=85 Win=65536 Len=0
274	26.305470	192.168.18.15	192.168.18.218	TCP	66 61676 → 8085 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
275	26.305596	192.168.18.218	192.168.18.15	TCP	66 8085 → 61676 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=25
276	26.307364	192.168.18.15	192.168.18.218	TCP	54 61676 → 8085 [ACK] Seq=1 Ack=1 Win=65536 Len=0
277	26.308010	192.168.18.15	192.168.18.218	HTTP	101 GET /tes.txt HTTP/1.1
278	26.308311	192.168.18.218	192.168.18.15	TCP	80 8085 → 61676 [PSH, ACK] Seq=1 Ack=48 Win=65536 Len=26 [TCP PDU reas
279	26.312572	192.168.18.218	192.168.18.15	HTTP	102 HTTP/1.1 404 Not Found
280	26.330347	192.168.18.15	192.168.18.218	TCP	54 61676 → 8085 [ACK] Seq=48 Ack=76 Win=65536 Len=0
281	26.330347	192.168.18.15	192.168.18.218	TCP	54 61676 → 8085 [FIN, ACK] Seq=48 Ack=76 Win=65536 Len=0
282	26.330406	192.168.18.218	192.168.18.15	TCP	54 8085 → 61676 [ACK] Seq=76 Ack=49 Win=65536 Len=0

> Frame 277: Packet, 101 bytes on wire (808 bits), 101 bytes captured (808 bits) on interface \Device\NPF_{...}

> Ethernet II, Src: Intel_32:6c:1b (4c:1d:96:32:6c:1b), Dst: Intel_95:a6:0a (14:f6:d8:95:a6:0a)

> Internet Protocol Version 4, Src: 192.168.18.15, Dst: 192.168.18.218

> Transmission Control Protocol, Src Port: 61676, Dst Port: 8085, Seq: 1, Ack: 1, Len: 47

▼ Hypertext Transfer Protocol

GET /tes.txt HTTP/1.1\r\nRequest Method: GETRequest URI: /tes.txtRequest Version: HTTP/1.1Host: 192.168.18.218\r\n\r\n[Response in frame: 279][Full request URI: http://192.168.18.218/tes.txt]

0000 14 f6 d8 95 a6 0a 4c 1d 96 32 6c 1b 08 00 45 00L...21...E-
0010 00 57 bc a3 40 00 80 06 97 c3 c0 a8 12 0f c0 a8W...@.....
0020 12 da f0 ec 1f 95 9a f3 e5 3d 51 f2 4e f8 50 18da...f...N P-
0030 01 00 48 1b 00 00 47 45 54 20 1f 74 65 72 27 78H...GE T [tes.txt]
0040 18 26 20 48 54 54 50 2f 31 2e 31 0d 0a 45 6f 73 HTTP/ 1.1--Host
0050 74 3a 20 31 39 32 2e 31 36 38 2e 31 38 2e 32 31 t: 192.1 68.18.21
0060 38 0d 0a 0d 0a 8....