

Midsem Lab

2019A7PS0136G (31120190136)

7 March 2022

Q1

README

11 Digit Campus ID: 31120190136

Compilation

```
gcc server.c -o server.out
gcc client.c -o client.out
```

Running

```
./server.out 4444
```

```
./client.out 127.0.0.1 4444
```

Screenshots

1.

```
vscode → /workspaces/Lab/Lab07 $ ./server.out 4444
Socket created
Socket bound
Listening on http://localhost:4444
```

2.

```
vscode → /workspaces/Lab/Lab07 $ ./client.out 127.0.0.1 4444
Socket created
Connected to server
campus id (3112xxxxxx):
```

3. After connecting to the server, the client reads your campus id (3112xxxxxx)

```
./server.out
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
[]

./client.out
Socket created
Connected to server
campus id (3112xxxxxx): []
```

4. The server prints the received campus id and then calculates the value of y

```
./server.out
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
C: 31120190136
S: 341/438
Your name (in lowercase): []

./client.out
Socket created
Connected to server
campus id (3112xxxxxx): 31120190136
C: 31120190136
S: 341/438
[]
```

5. extract the equation whose index is y obtained in step 4. SEE CODE

6. The server solves the equation and sends the answer to the client.

```
.server.out ●
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
C: 31120190136
S: 341/438
Your name (in lowercase): 

.client.out ●
Socket created
Connected to server
campus id (3112xxxxxxx): 31120190136
C: 31120190136
S: 341/438
█
```

7. The server takes the student's first name as input. If all alphabets are in lower case, the server sends the name to the client.

```
.server.out ●
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
C: 31120190136
S: 341/438
Your name (in lowercase): ARYAN
Your name (in lowercase): aryan
S: aryan
█

bash ×
Socket created
Connected to server
campus id (3112xxxxxxx): 31120190136
C: 31120190136
S: 341/438
S: aryan
aryan,31120190136,341/438
vscode → /workspaces/Lab/Lab07 $ █
```

8. The client displays the <name>,<campus id>,<y> on its screen and exits.

```
./server.out ●
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
C: 31120190136
S: 341/438
Your name (in lowercase): ARYAN
Your name (in lowercase): aryan
S: aryan
█

bash x
Socket created
Connected to server
campus id (3112xxxxxx): 31120190136
C: 31120190136
S: 341/438
S: aryan
aryan,31120190136,341/438
vscode → /workspaces/Lab/Lab07 $ █
```

9. The server is ready to accept a new client

```
./server.out ●
Socket created
Socket bound
Listening on http://localhost:4444
Connection accepted
C: 31120190136
S: 341/438
Your name (in lowercase): aryan
S: aryan
Connection accepted
█

./client.out ●
Socket created
Connected to server
campus id (3112xxxxxx): 31120190136
C: 31120190136
S: 341/438
S: aryan
aryan,31120190136,341/438
vscode → /workspaces/Lab/Lab07 $ ./client.out 127.0.0.1 4444
Socket created
Connected to server
campus id (3112xxxxxx): █
```

Q2

1.

IP address of local machine (the client) is 10.0.2.15

The client sends 5 http requests (http.request filter used excluding OCSP)

http.request					
No.	Time	Source	Destination	Protocol	Length
32	24.534601624	10.0.2.15	34.107.221...	HTTP	
55	24.606543623	10.0.2.15	34.107.221...	HTTP	
104	24.909040666	10.0.2.15	104.115.39...	OCSP	
256	26.317264599	10.0.2.15	104.115.39...	OCSP	
277	26.374563363	10.0.2.15	117.18.237...	OCSP	
293	26.394266591	10.0.2.15	104.115.39...	OCSP	
518	28.287623920	10.0.2.15	117.18.237...	OCSP	
914	31.110203903	10.0.2.15	172.217.174...	OCSP	
1032	31.537505370	10.0.2.15	172.217.174...	OCSP	
1131	32.366190797	10.0.2.15	35.224.170...	HTTP	
1177	32.672557689	10.0.2.15	172.217.174...	OCSP	
1784	47.701423905	10.0.2.15	3.33.152.147	HTTP	
1825	48.582431528	10.0.2.15	3.33.152.147	HTTP	
2180	55.664753344	10.0.2.15	172.217.174...	OCSP	
2313	58.597779388	10.0.2.15	172.217.174...	OCSP	
3305	62.997940233	10.0.2.15	172.217.174...	OCSP	
4007	65.275550112	10.0.2.15	172.217.174...	OCSP	
4826	68.573154295	10.0.2.15	117.18.237...	OCSP	
5080	69.589209844	10.0.2.15	117.18.237...	OCSP	

2.

The client receives 4 http responses.

http.response					
No.	Time	Source	Destination	Protocol	Length
34	24.592087194	34.107.221.82	10.0.2.15	HTTP	
61	24.643622617	34.107.221.82	10.0.2.15	HTTP	
121	24.947815060	104.115.39.72	10.0.2.15	OCSP	
266	26.341645953	104.115.39.72	10.0.2.15	OCSP	
307	26.408455268	117.18.237.29	10.0.2.15	OCSP	
309	26.428316753	104.115.39.72	10.0.2.15	OCSP	
520	28.309483262	117.18.237.29	10.0.2.15	OCSP	
951	31.232794348	172.217.174.67	10.0.2.15	OCSP	
1054	31.629075090	172.217.174.67	10.0.2.15	OCSP	
1191	32.758474837	172.217.174.67	10.0.2.15	OCSP	
1230	32.924056966	35.224.170.84	10.0.2.15	HTTP	
1798	48.244940909	3.33.152.147	10.0.2.15	HTTP	
2182	55.763421646	172.217.174.67	10.0.2.15	OCSP	
2364	58.753339552	172.217.174.67	10.0.2.15	OCSP	
3327	63.082812961	172.217.174.67	10.0.2.15	OCSP	
4079	65.377670779	172.217.174.67	10.0.2.15	OCSP	
4846	68.648248676	117.18.237.29	10.0.2.15	OCSP	
5085	69.612934169	117.18.237.29	10.0.2.15	OCSP	

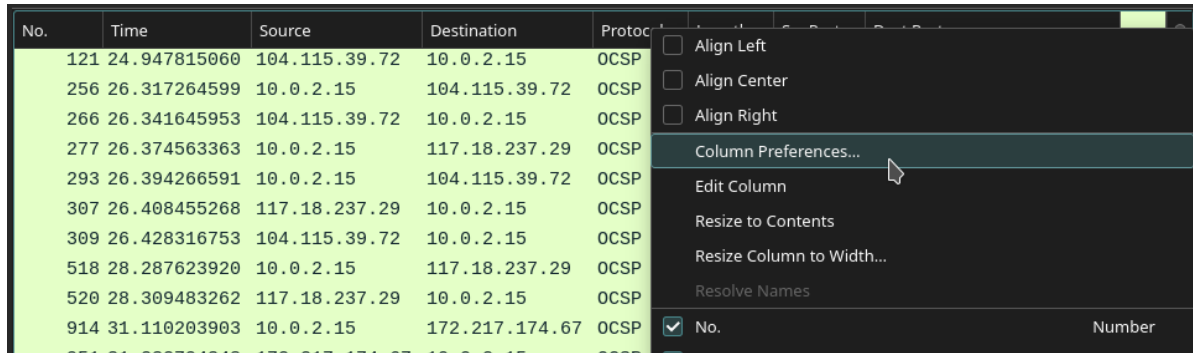
3.

730 bytes

1230	32.924056966	35.224.170.84	10.0.2.15	HTTP	294
1784	47.701423905	10.0.2.15	3.33.152.147	HTTP	405
1798	48.244940909	3.33.152.147	10.0.2.15	HTTP	730
1825	48.582431528	10.0.2.15	3.33.152.147	HTTP	364
2180	55.664753344	10.0.2.15	172.217.174.67	OCSP	480

4.

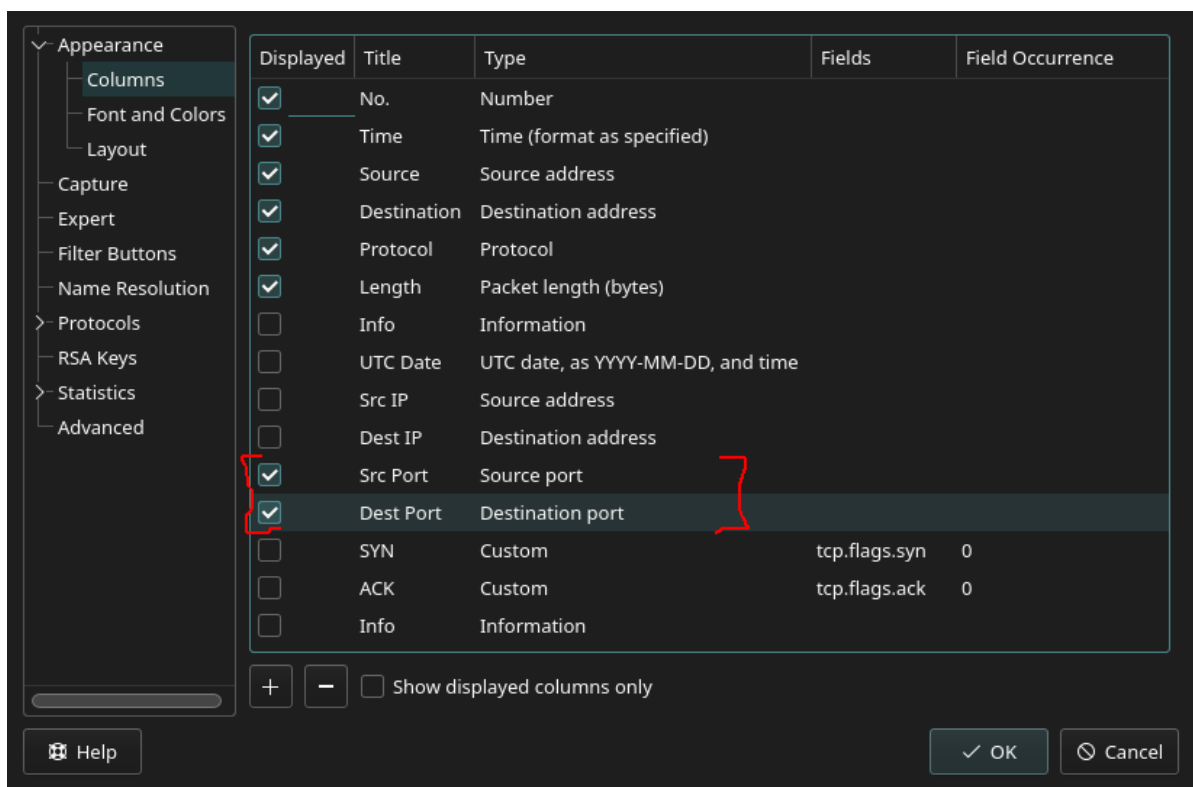
Right click column headers and choose `Column Preferences`



No.	Time	Source	Destination	Protocol
121	24.947815060	104.115.39.72	10.0.2.15	OCSP
256	26.317264599	10.0.2.15	104.115.39.72	OCSP
266	26.341645953	104.115.39.72	10.0.2.15	OCSP
277	26.374563363	10.0.2.15	117.18.237.29	OCSP
293	26.394266591	10.0.2.15	104.115.39.72	OCSP
307	26.408455268	117.18.237.29	10.0.2.15	OCSP
309	26.428316753	104.115.39.72	10.0.2.15	OCSP
518	28.287623920	10.0.2.15	117.18.237.29	OCSP
520	28.309483262	117.18.237.29	10.0.2.15	OCSP
914	31.110203903	10.0.2.15	172.217.174.67	OCSP

Under `Appearance > Column` click `+`

Give appropriate `Title` and `Type` to the columns as shown below and click `OK`



Displayed	Title	Type	Fields	Field Occurrence
<input checked="" type="checkbox"/>	No.	Number		
<input checked="" type="checkbox"/>	Time	Time (format as specified)		
<input checked="" type="checkbox"/>	Source	Source address		
<input checked="" type="checkbox"/>	Destination	Destination address		
<input checked="" type="checkbox"/>	Protocol	Protocol		
<input checked="" type="checkbox"/>	Length	Packet length (bytes)		
<input type="checkbox"/>	Info	Information		
<input type="checkbox"/>	UTC Date	UTC date, as YYYY-MM-DD, and time		
<input type="checkbox"/>	Src IP	Source address		
<input type="checkbox"/>	Dest IP	Destination address		
<input checked="" type="checkbox"/>	Src Port	Source port		
<input checked="" type="checkbox"/>	Dest Port	Destination port		
<input type="checkbox"/>	SYN	Custom	tcp.flags.syn	0
<input type="checkbox"/>	ACK	Custom	tcp.flags.ack	0
<input type="checkbox"/>	Info	Information		

No.	Time	Source	Destination	Protocol	Length	Src Port	Dest Port
121	24.947815060	104.115.39.72	10.0.2.15	OCSP	1005	80	37550
256	26.317264599	10.0.2.15	104.115.39.72	OCSP	477	37550	80
266	26.341645953	104.115.39.72	10.0.2.15	OCSP	1004	80	37550
277	26.374563363	10.0.2.15	117.18.237.29	OCSP	478	44234	80

5.

RTT for the request sent to www.sougata-sen.com is `543.5 ms`

1784	47.701423905	10.0.2.15	3.33.152.147	HTTP	405
1798	48.244940909	3.33.152.147	10.0.2.15	HTTP	730
1825	48.582431528	10.0.2.15	3.33.152.147	HTTP	364
2180	55.664753344	10.0.2.15	172.217.174.67	OCSP	480
2182	55.763421646	172.217.174.67	10.0.2.15	OCSP	841

```

Accept-Ranges: none\r\n
Via: HTTP/1.1 forward.http.proxy:3128\r\n
Connection: keep-alive\r\n
\r\n
[HTTP response 1/2]
[Time since request: 0.543517004 seconds]
[Request in frame: 1784]
[Next request in frame: 1825]
[Request URI: http://www.sougata-sen.com/]
File Data: 381 bytes

```

6.

No.	Time	Source	Destination	Protocol	Length	Src Port	Dest Port
1191	32.758474837	172.217.174.67	10.0.2.15	OCSP	841	80	50516
1230	32.924056966	35.224.170.84	10.0.2.15	HTTP	294	80	43682
1784	47.701423905	10.0.2.15	3.33.152.147	HTTP	405	46674	80
1798	48.244940909	3.33.152.147	10.0.2.15	HTTP	730	80	46674
1825	48.582431528	10.0.2.15	3.33.152.147	HTTP	364	46674	80
2180	55.664753344	10.0.2.15	172.217.174.67	OCSP	480	50518	80
2182	55.763421646	172.217.174.67	10.0.2.15	OCSP	841	80	50518
2313	58.597779388	10.0.2.15	172.217.174.67	OCSP	481	50516	80
2364	58.753339552	172.217.174.67	10.0.2.15	OCSP	842	80	50516
3305	62.997940233	10.0.2.15	172.217.174.67	OCSP	481	50516	80

```

> Frame 1798: 730 bytes on wire (5840 bits), 730 bytes captured (5840 bits) on interface any, id 0
> Linux cooked capture v1
> Internet Protocol Version 4, Src: 3.33.152.147, Dst: 10.0.2.15
> Transmission Control Protocol, Src Port: 80, Dst Port: 46674, Seq: 1, Ack: 350, Len: 674
  Source Port: 80
  Destination Port: 46674
  [Stream index: 57]
  [Conversation completeness: Complete, WITH_DATA (63)]
  [TCP Segment Len: 674]
  Sequence Number: 1 (relative sequence number)
0020 0a 00 02 0f 00 50 b6 52 97 2b 5a 02 2a c6 b8 7b .....P.R...+Z*...{
0030 50 18 ff ff 24 7b 00 00 48 54 54 50 2f 31 2e 31 P...${... HTTP/1.1
0040 20 32 30 30 20 4f 4b 0d 0a 44 61 74 65 3a 20 53 200 OK. Date: S
0050 61 74 2c 20 30 35 20 4d 61 72 20 32 30 32 32 20 at, 05 Mar 2022
0060 31 31 3a 30 38 3a 35 36 20 47 4d 54 0d 0a 43 6f 11:08:56 GMT..Co
0070 6e 74 65 6e 74 2d 54 79 70 65 3a 20 74 65 78 74 ntent-Type: text
0080 2f 68 74 6d 6c 3b 20 63 68 61 72 73 65 74 3d 75 /html; c harset=u
0090 74 66 2d 38 0d 0a 43 6f 6e 74 65 6e 74 2d 4c 65 tf-8..Co ntent-Le
00a0 6e 67 74 68 3a 20 33 38 31 0d 0a 53 65 72 76 65 ngth: 38 1..Serve
00b0 72 3a 20 69 70 2d 31 30 2d 31 32 33 2d 31 32 33 r: ip-10 -123-123
00c0 2d 31 39 30 2e 65 63 32 2e 69 6e 74 65 72 6e 61 -190.ec2 .interna
00d0 6c 0d 0a 58 2d 52 65 71 75 65 73 74 2d 49 64 3a l..X-Req uest-Id:
00e0 20 39 36 36 32 36 62 34 39 2d 33 39 66 32 2d 34 96626b4 9-39f2-4
00f0 37 39 61 2d 61 33 38 36 2d 64 37 34 36 65 35 38 79a-a386 -d746e58
0100 61 30 62 37 34 0d 0a 41 63 63 65 70 74 2d 52 61 a0b74..A ccept-Ra
0110 6e 67 65 73 3a 20 6e 6f 6e 65 0d 0a 56 69 61 3a nges: no ne-Via:
0120 20 48 54 54 50 2f 31 2e 31 20 66 6f 72 77 61 72 HTTP/1. 1 forwar
0130 64 2e 68 74 74 70 2e 70 72 6f 78 79 3a 33 31 32 d.http.p roxy:312
0140 38 0d 0a 43 6f 6e 6e 65 63 74 69 6f 6e 3a 20 6b 8..Conne ction: k
0150 65 65 70 2d 61 6c 69 76 65 0d 0a 0d 0a 3c 21 44 eep-aliv e...<!D
0160 4f 43 54 59 50 45 20 48 54 4d 4c 20 50 55 42 4c OCTYPE H TML PUBL
0170 49 43 20 22 2d 2f 2f 57 33 43 2f 2f 44 54 44 20 IC "-//W 3C//DTD

```

Hex value of the destination port in the TCP header of the response is `b6 52`