Assignment 2: Understanding the Protocols of Application Layer

By:
Member 1 - Ayush Bansal, Roll No - 15CS30006
Member 2 - Krushna Gaurkar, Roll No - 15CS30018

1)
a)

Port	Type of HTTP Connection
8111	HTTP 1.1 with persistent connection
8110	HTTP 1.1 with non-persistent connection
8100	HTTP 1.0

Justification -
We came to our conclusions based on the content of response headers -
For Port 8111, we received HTTP/1.1 and Connection: keep-alive thus HTTP 1.1 with persistent connection.
For Port 8110, we received HTTP/1.1 and Connection: close thus HTTP 1.1 with non-persistent connection.
For Port 8100, we received HTTP/1.0 thus HTTP 1.0

b)

Port	No. of GET Requests
8111	17
8110	17
8100	18

c)

Port No.	Packet No.	Time
8111	1	0.008743305
	2	0.006982827
	3	0.007172844
	4	0.005053683
	5	0.028747431
	6	0.056613582
	7	0.054169535
	8	0.056305747
	9	0.083803793
	10	0.057849979
	11	0.032968266
	12	0.031296893
	13	0.020167933
	14	0.020622097
	15	0.129971799
	16	0.156900618
	17	0.010143506
8110	1	0.035866793
	2	0.010866241
	3	0.012042253
	4	0.011637728
	5	0.019090065
	6	0.024209787
	7	0.033840627
	8	0.05678728
	9	0.075731013
	10	0.076761111
	11	0.055103923
	12	0.135705658
	13	0.067764591

	14	0.075903306
	15	0.077262473
	16	0.116275385
	17	0.227803629
8100	1	0.007665
	2	0.00667387
	3	0.005940054
	4	0.00737717
	5	0.009778843
	6	0.066724234
	7	0.100741118
	8	0.129721349
	9	0.143584697
	10	0.160056326
	11	0.069086219
	12	0.052707222
	13	0.046636693
	14	0.279639685
	15	0.049930958
	16	0.307373083
	17	0.19850915
	18	0.002583959

d)

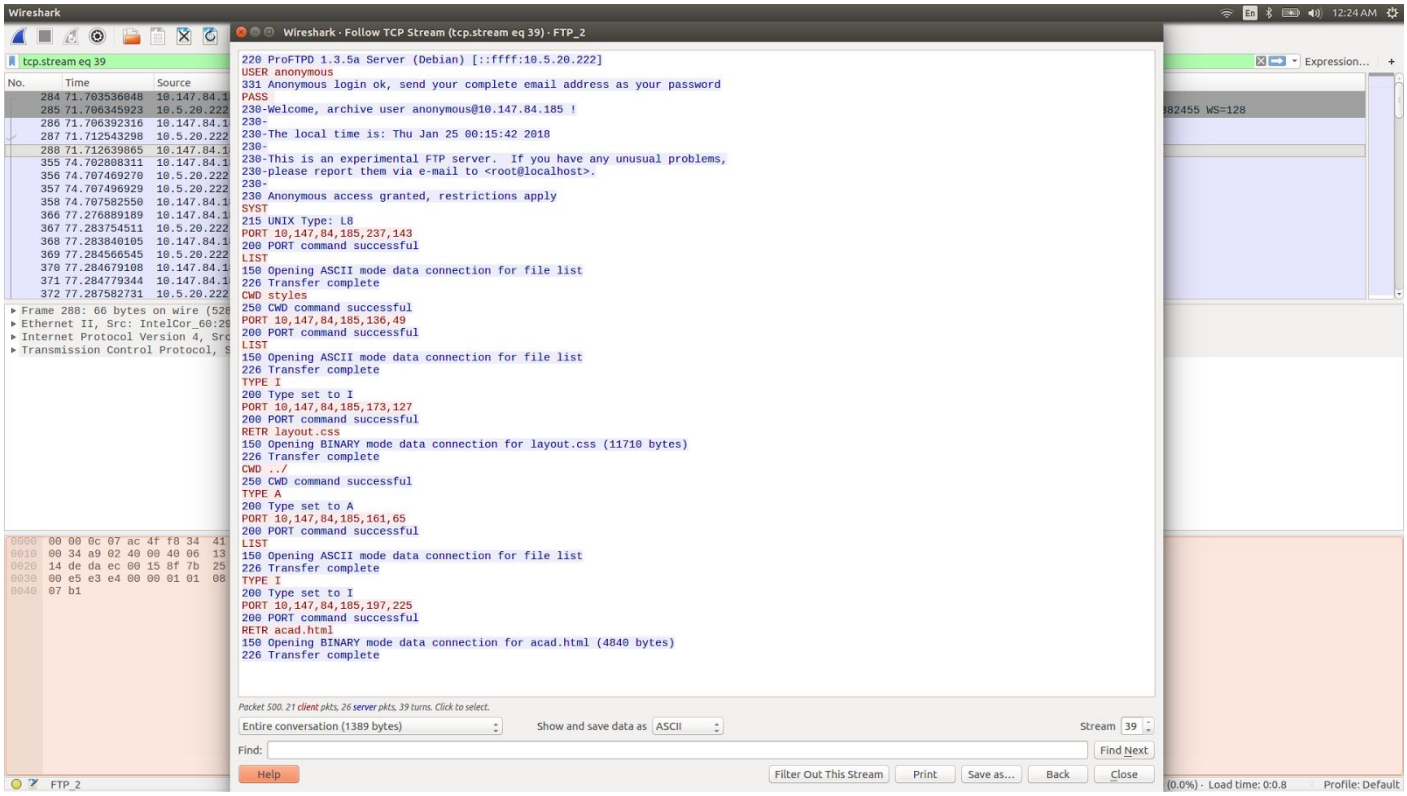
Port No.	Time of Last Response	Time of first GET request	Total page download time
8111	18.5451	18.205	0.3401
8110	34.7486	34.387	0.3616
8100	2.9032	2.2759	0.6273

e)
User Agent Field contains the following for every hit -
Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/63.0.3239.132 Safari/537.36
We conclude the following information regarding the OS and browser
OS - Linux x86-64
Browser - Chrome 63.0

2)

a)

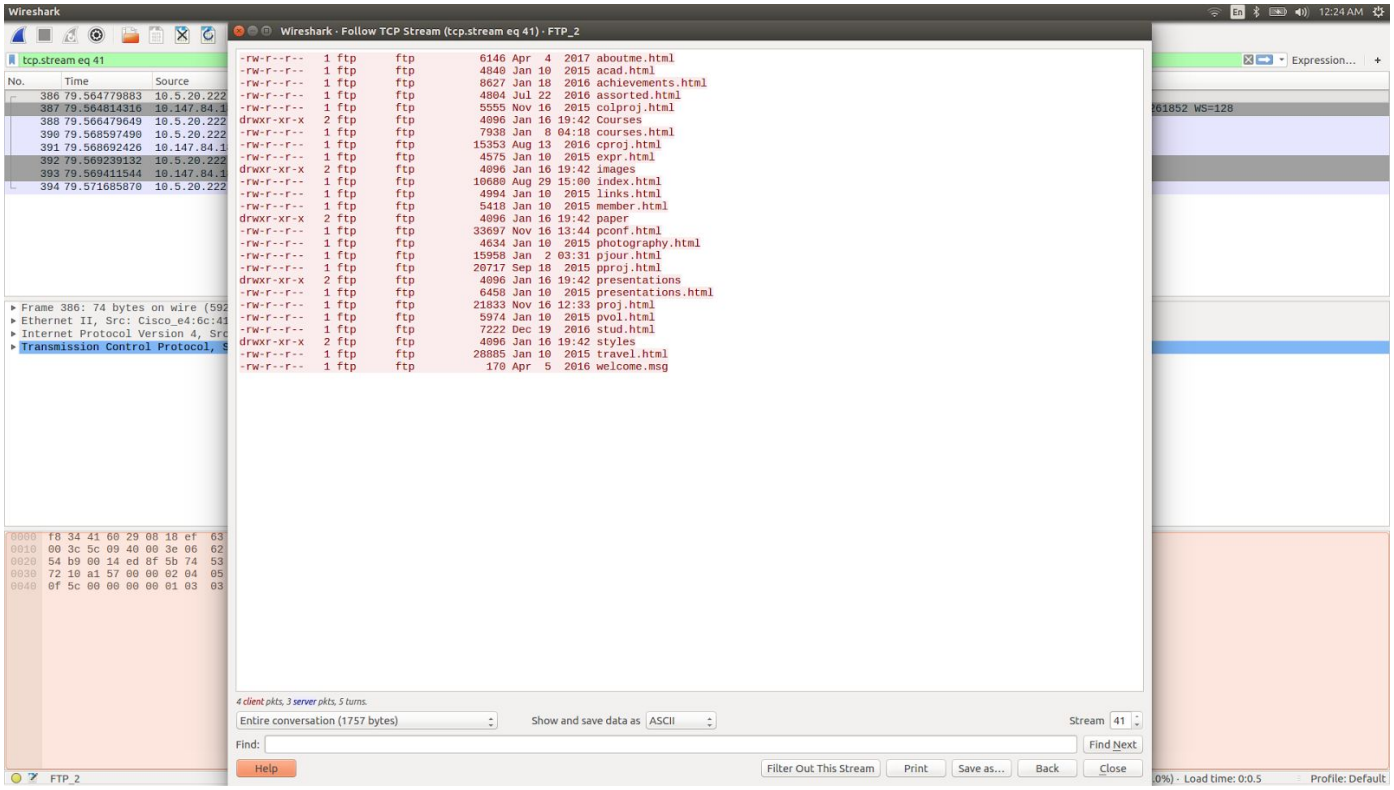
i) Active Mode -



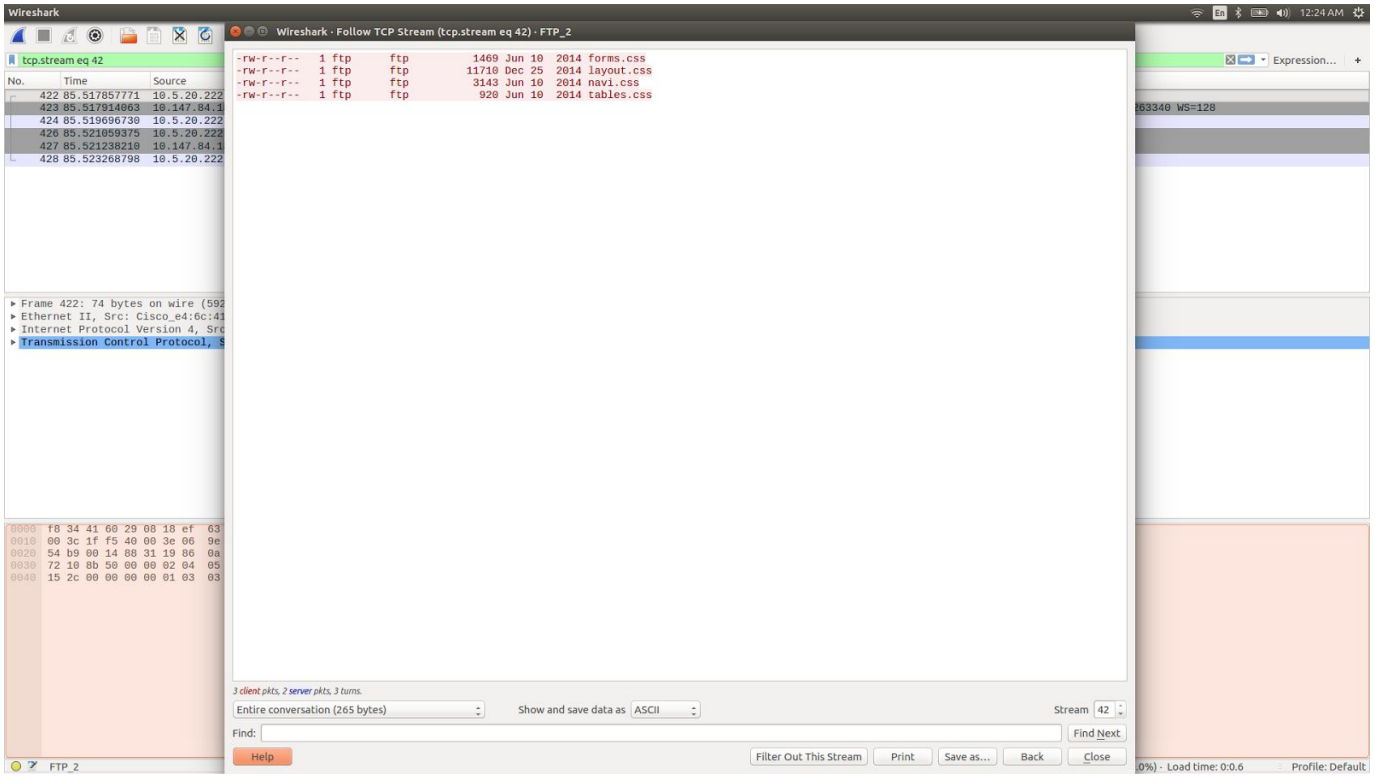
Command - open 10.5.20.222, followed by username and password.

Observed FTP Headers - 1. Response 2. Request

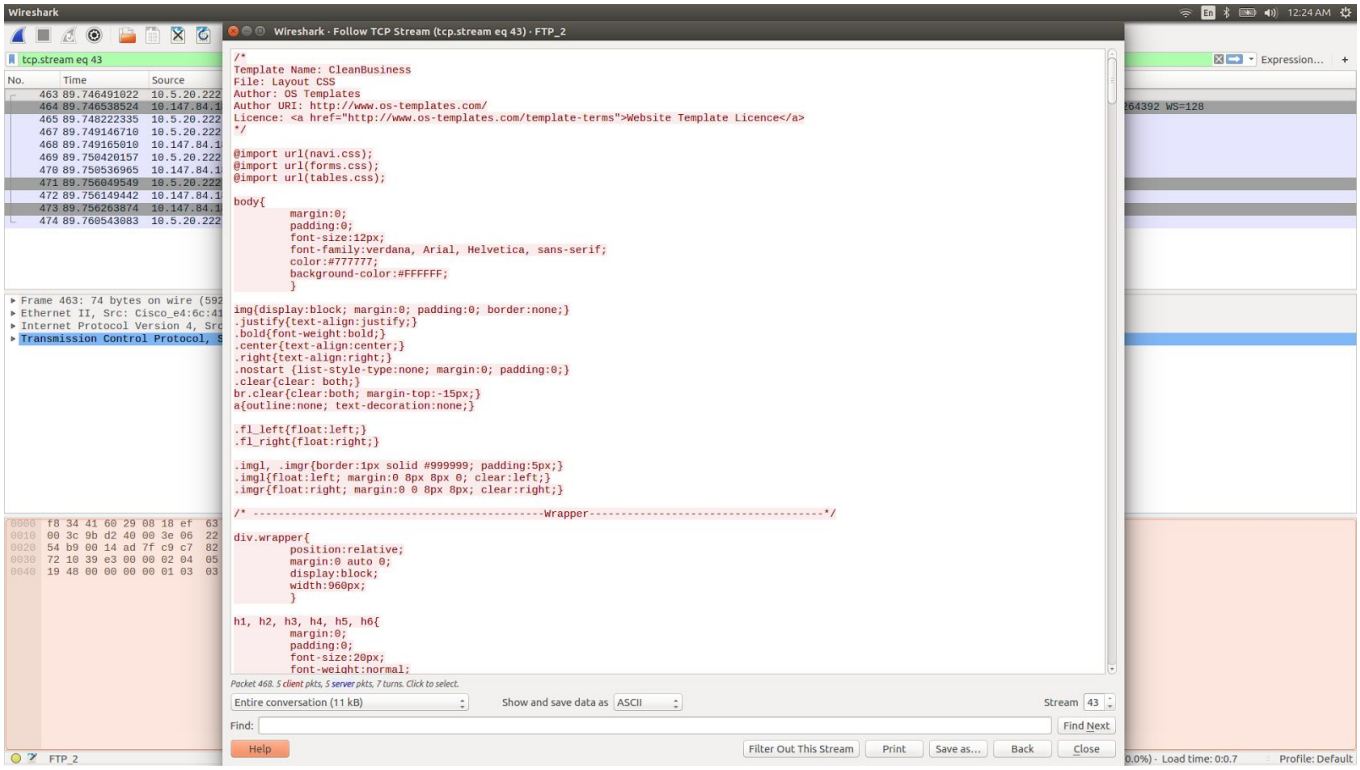
Source IP -	For Request -	10.147.84.185	For Response - 10.5.20.222
Destination IP -	For Request -	10.5.20.222	For Response - 10.147.84.185
Source port -	For Request -	56044	For Response - 21
Destination port -	For Request -	21	For Response - 56044



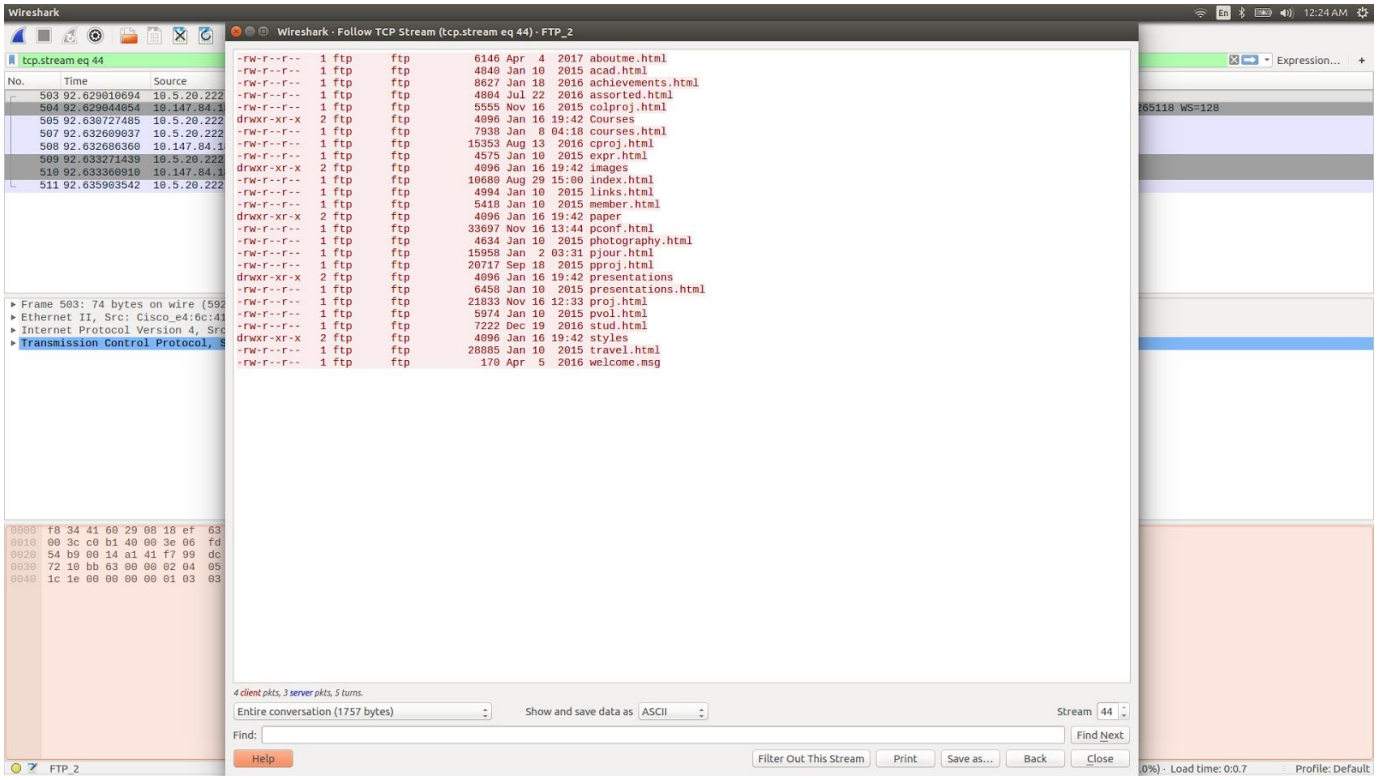
Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 20
Destination port - 60815



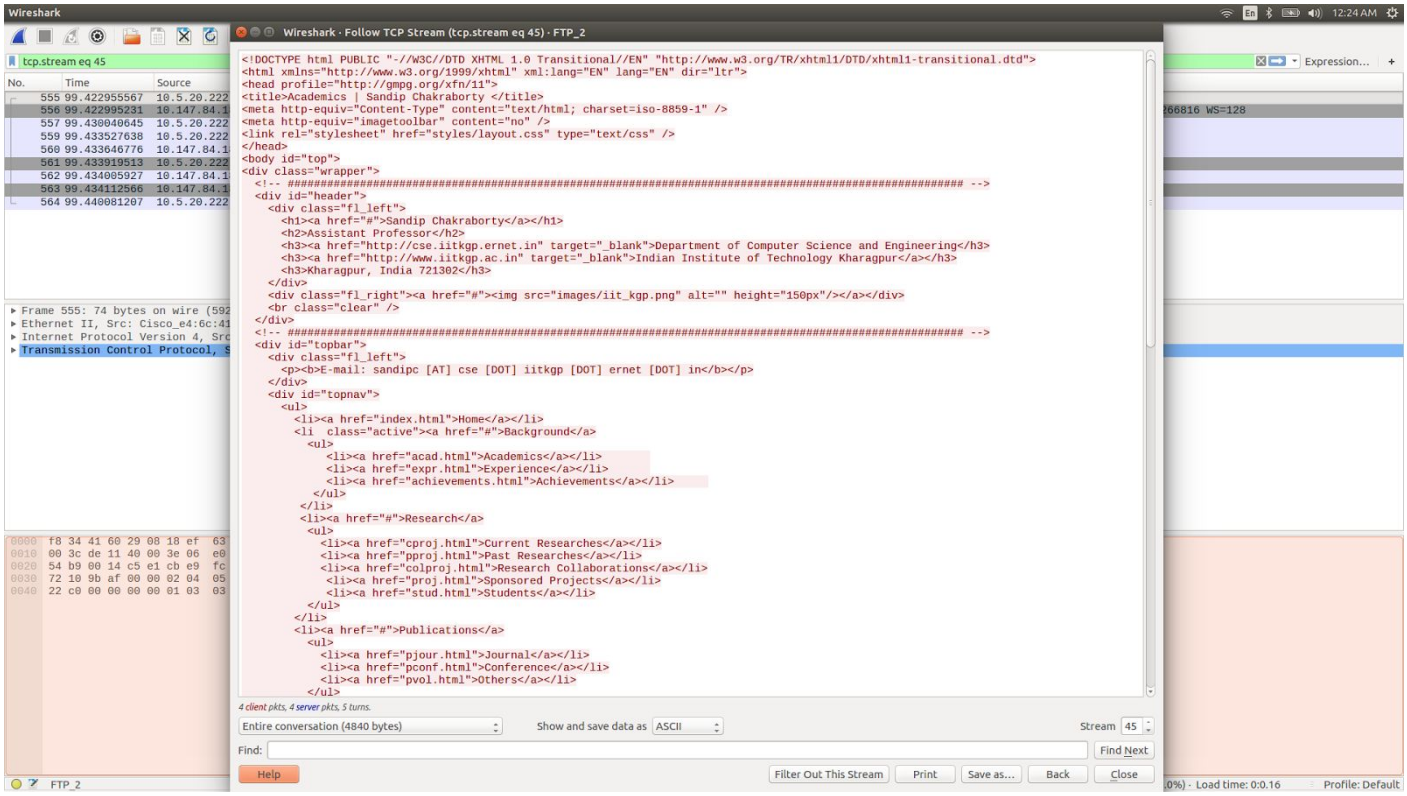
Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 20
Destination port - 34865



Command - get layout.css
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 20
Destination port - 44415

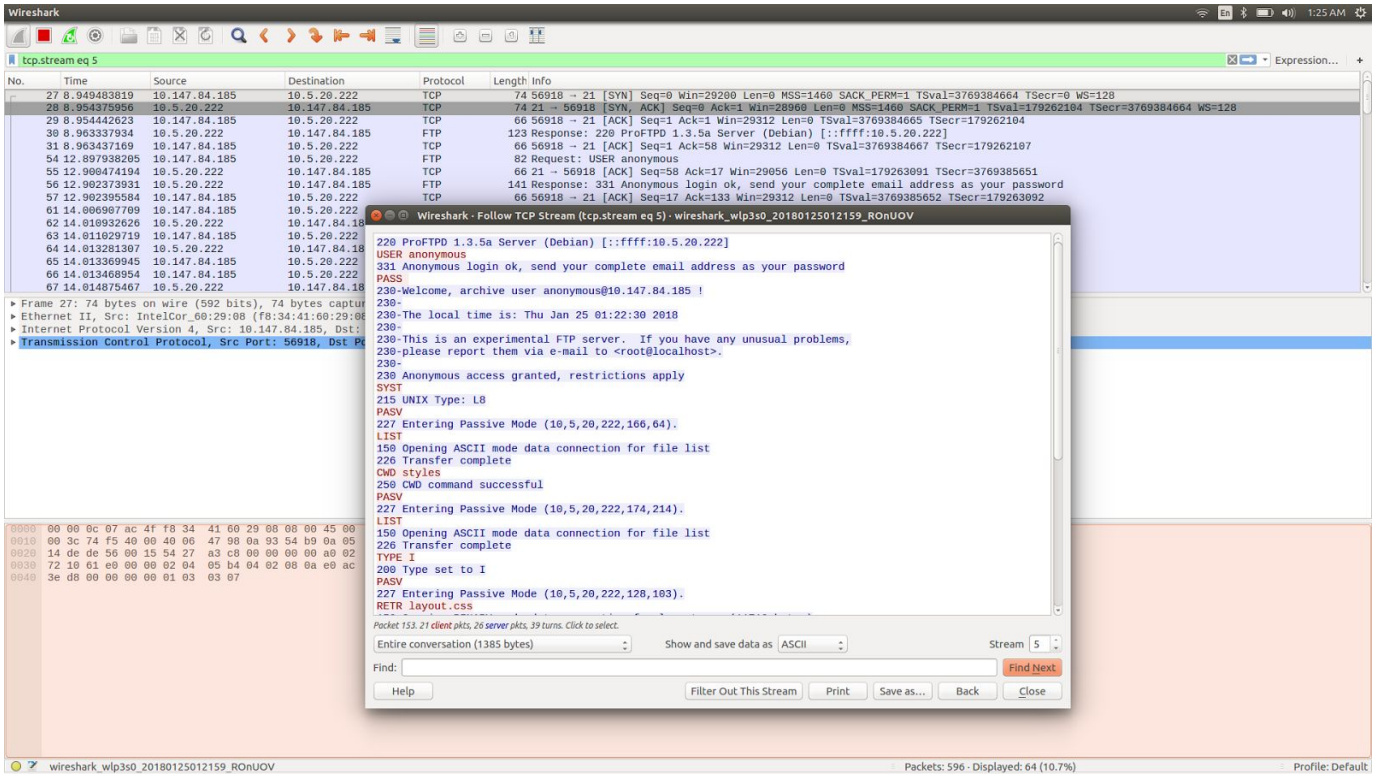


Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 20
Destination port - 41281



Command - get acad.html
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 20
Destination port - 50657

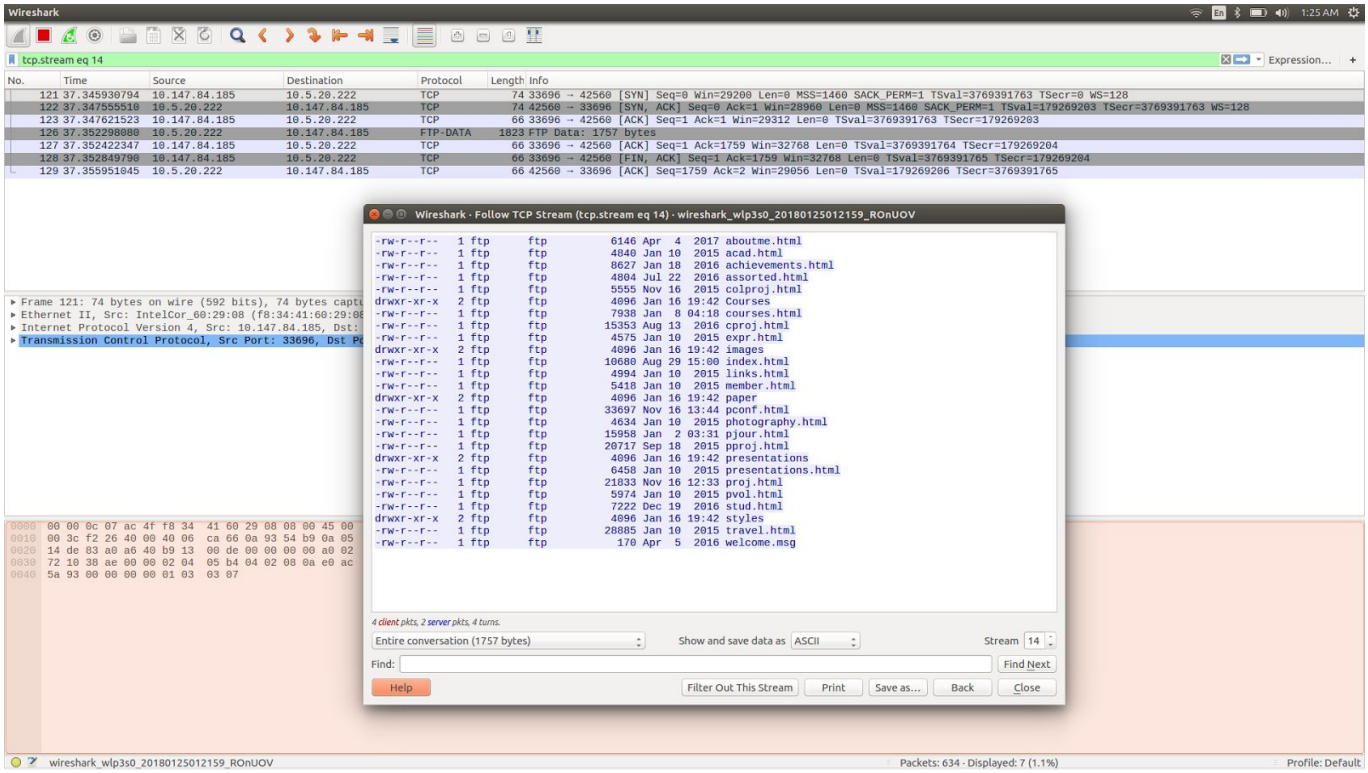
ii) Passive Mode -



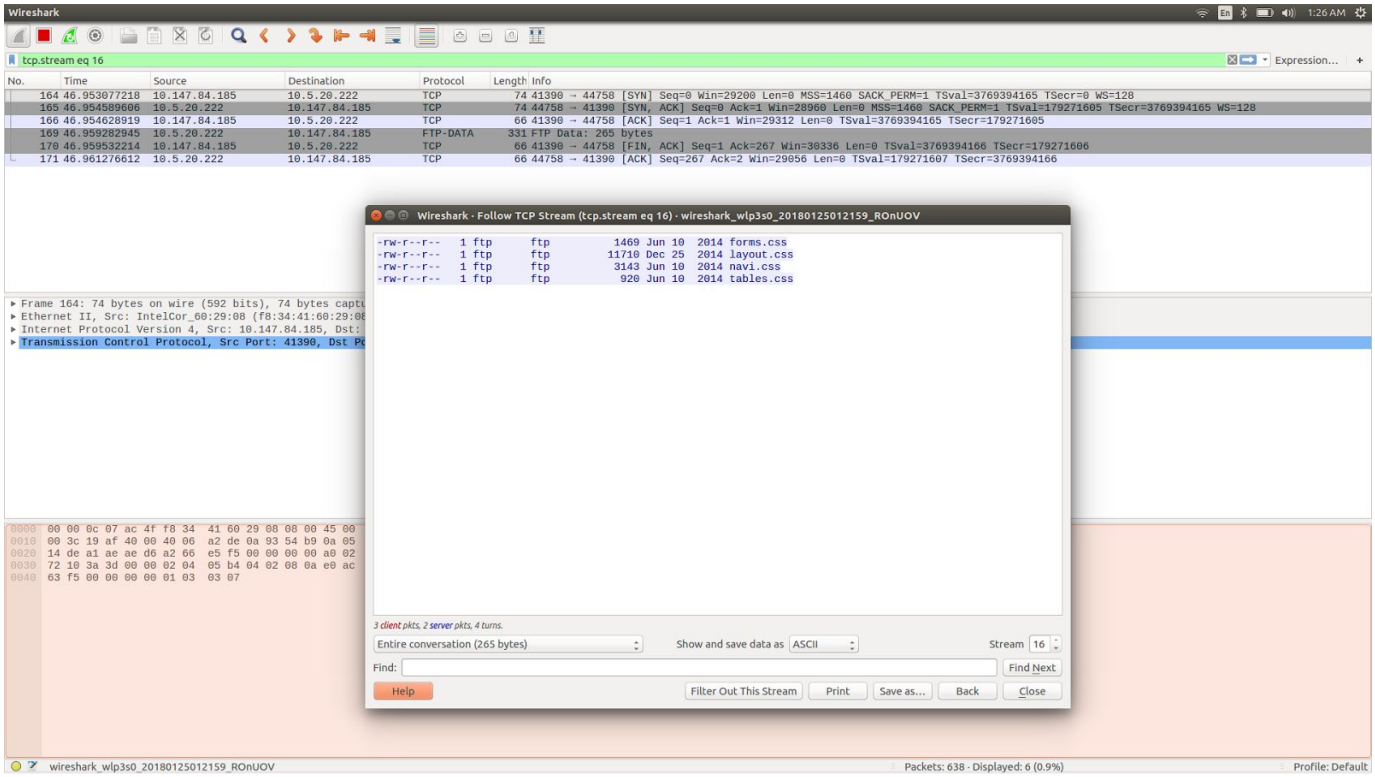
Command - open 10.5.20.222, followed by username and password, passive

Observed FTP Headers - 1. Response 2. Request

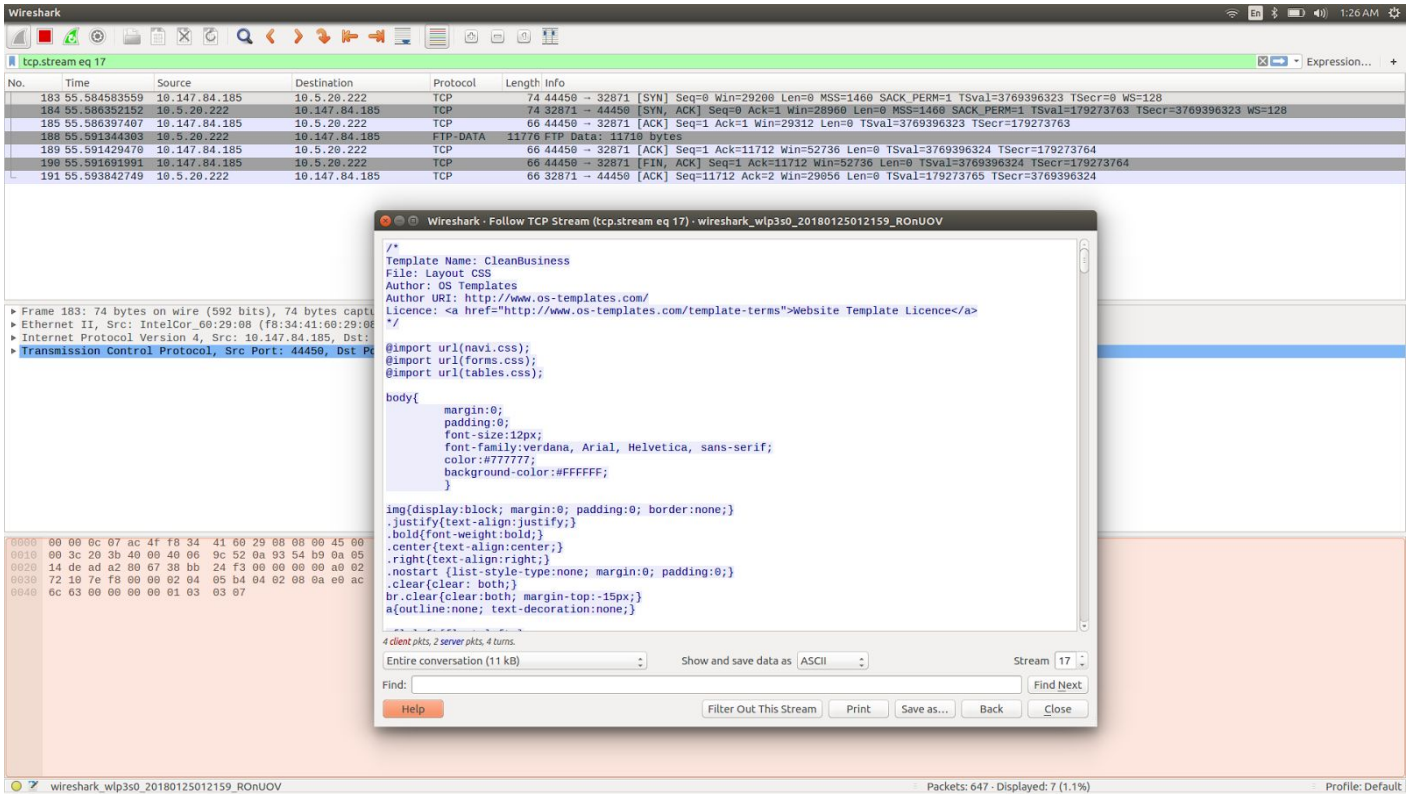
Source IP -	For Request - 10.147.84.185	For Response - 10.5.20.222
Destination IP -	For Request - 10.5.20.222	For Response - 10.147.84.185
Source port -	For Request - 56918	For Response - 21
Destination port -	For Request - 21	For Response - 56918



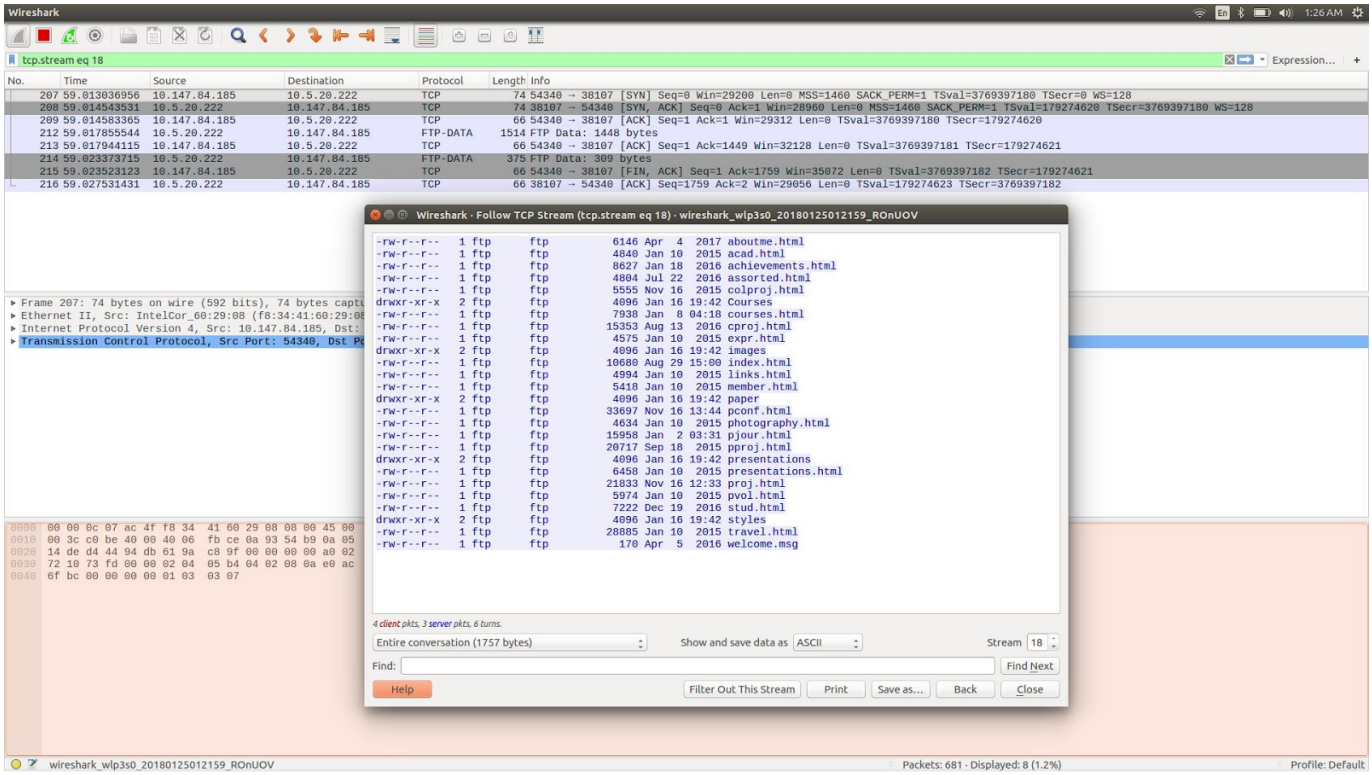
Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 42560
Destination port - 33696



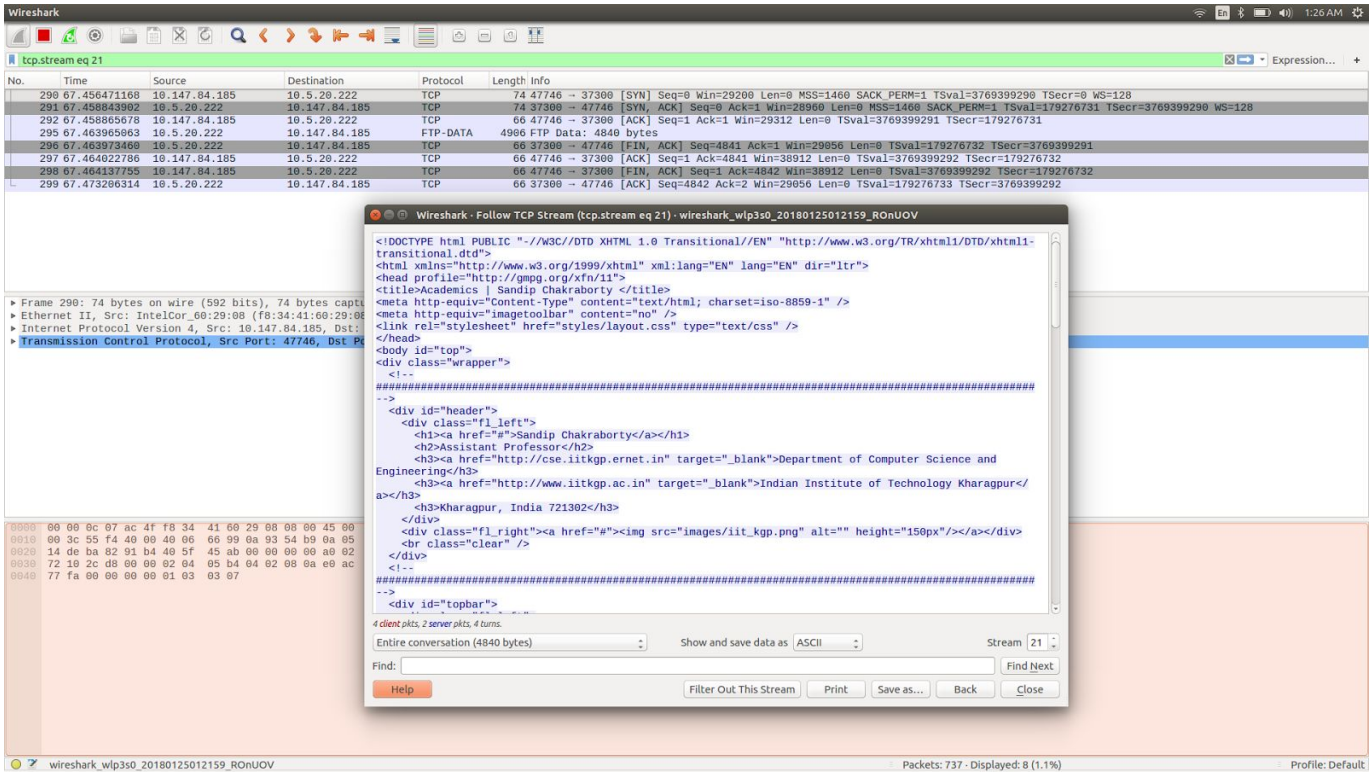
Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 44758
Destination port - 41390



Command - get layout.css
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 32871
Destination port - 44450



Command - ls
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 38107
Destination port - 54340



Command - get acad.html
Source IP - 10.5.20.222
Destination IP - 10.147.84.185
Source port - 37300
Destination port - 47746

b)
i) Active Mode -
Command Channel - 10.147.84.185:56044 - 10.5.20.222:21
Data Channels -
10.5.20.222:20 (Source) - 10.147.84.185:60815 (Destination)
10.5.20.222:20 (Source) - 10.147.84.185:34865 (Destination)
10.5.20.222:20 (Source) - 10.147.84.185:44415 (Destination)
10.5.20.222:20 (Source) - 10.147.84.185:41281 (Destination)
10.5.20.222:20 (Source) - 10.147.84.185:50657 (Destination)

In case of Active mode, the client exposes his data port to server and the Server initiates the data channel connection.

ii) Passive Mode -
Command Channel - 10.147.84.185:56918 - 10.5.20.222:21
Data Channels -
10.5.20.222:42560 (Source) - 10.147.84.185:33696 (Destination)
10.5.20.222:44758 (Source) - 10.147.84.185:41390 (Destination)
10.5.20.222:32871 (Source) - 10.147.84.185:44450 (Destination)
10.5.20.222:38107 (Source) - 10.147.84.185:54340 (Destination)
10.5.20.222:37300 (Source) - 10.147.84.185:47746 (Destination)

In case of Passive mode, the client sends a PASSIVE signal to server and then the client initiates the data channel connection.

c)
For Active mode, the port used for data communication is always port 20 over the FTP server (10.5.20.222) while the port over the client side (10.147.84.185) changes for each stream.
For Passive Mode, the port for data communication changes for each stream for both server and client.
In active mode, the client sends its port number to the server and the server then establishes a connection from its Port 20 to client's specific port.
But during the passive mode, the client sends a Passive message to the Server and the Server responds by exposing its Port to the Client, the connection to which is made by the client using one of its empty Port and the Server's Specified Port.