1.

Application layer protocols: DNS and HTTP

Transport layer protocols: UDP for DNS, TCP for HTTP

2.

Code:

from socket import \*  
def run\_server():  
 serverPort = 4200  
 host = '127.0.0.1'  
 serverSocket = socket(AF\_INET, SOCK\_STREAM)  
 serverSocket.bind((host, serverPort))  
 serverSocket.listen(1)  
 print("The server is ready to receive")  
  
 while 1:  
 connectionSocket, addr = serverSocket.accept()  
 sentence = connectionSocket.recv(1024)  
 capitalizedSentence = sentence.upper()  
 print(capitalizedSentence.decode())  
 connectionSocket.send(capitalizedSentence)  
 connectionSocket.close()  
  
if \_\_name\_\_ == '\_\_main\_\_':  
 run\_server()

output:

The server is ready to receive

CONNECT DOCINFO.KR:443 HTTP/1.1

HOST: DOCINFO.KR:443

PROXY-CONNECTION: KEEP-ALIVE

USER-AGENT: MOZILLA/5.0 (WINDOWS NT 10.0; WIN64; X64) APPLEWEBKIT/537.36 (KHTML, LIKE GECKO) CHROME/78.0.3904.87 SAFARI/537.36

CONNECT FONTS.GOOGLEAPIS.COM:443 HTTP/1.1

HOST: FONTS.GOOGLEAPIS.COM:443

PROXY-CONNECTION: KEEP-ALIVE

USER-AGENT: MOZILLA/5.0 (WINDOWS NT 10.0; WIN64; X64) APPLEWEBKIT/537.36 (KHTML, LIKE GECKO) CHROME/78.0.3904.87 SAFARI/537.36

CONNECT FONTS.GSTATIC.COM:443 HTTP/1.1

HOST: FONTS.GSTATIC.COM:443

PROXY-CONNECTION: KEEP-ALIVE

USER-AGENT: MOZILLA/5.0 (WINDOWS NT 10.0; WIN64; X64) APPLEWEBKIT/537.36 (KHTML, LIKE GECKO) CHROME/78.0.3904.87 SAFARI/537.36

CONNECT DOCINFO.KR:443 HTTP/1.1

HOST: DOCINFO.KR:443

PROXY-CONNECTION: KEEP-ALIVE

USER-AGENT: MOZILLA/5.0 (WINDOWS NT 10.0; WIN64; X64) APPLEWEBKIT/537.36 (KHTML, LIKE GECKO) CHROME/78.0.3904.87 SAFARI/537.36

3.

True. Suppose the sender has a window size of 3 and sends packets 1, 2, 3 at t0. At t1 (t1 > t 0) the receiver ACKS 1, 2, 3. At t 2 (t 2 > t1) the sender times out and resends 1, 2,