R1.

1、指代不同

"终端"一般情况下指用户在网络上所操作的个人电脑，是由最初的计算机网络中产生的术语。严格来说不包括LAN交换机和路由器等中继设备。在很多人使用位于中间位置的一台大型计算机的系统中，把各用户使用的大型计算机的装置称为终端。目前通常把个人电脑称为终端。

"主机"（host computer）是指终端所使用的大型计算机，来自英语单词"host"的原义即"服务提供者"。不过，在互联网世界里不管是大型还是小型，把构成网络的全部计算机称为主机。目前一般把具有IP地址的全部计算机统称为主机。

2、分类不同

主机：分为计算机主机，internet主机，迷你电脑主机。

终端：目前常见的客户端设备分为两类：一类是胖客户端，一类是瘦客户端。那么，把以PC为代表的基于开放性工业标准架构、功能比较强大的设备叫做“胖客户端”，其他归入“瘦客户端”。瘦客户机产业的空间和规模也很大，不会亚于PC现在的规模。

在自顶向下中主机等同于端系统, 两者在概念上是统一的, 没有区别.

生活中与因特网相连的计算机, 智能手机, 游戏机等都属于端系统.

Web服务器也属于端系统.

a. 除非请求的Connect头中包含“close”标记，否则HTTP/1.1服务器始终可以假定HTTP/1.1客户端希望保持持久连接。如果服务器希望在发送响应后立即关闭连接，它应该发送一个包含“close”的连接头字段。

HTTP/1.1客户端可能希望保持连接打开，但这必须基于服务器响应是否包含连接头字段以及头字段是否包含“关闭”。如果客户端不想为更多请求维护连接，则应发送一个值为“close”的连接头字段。

如果客户机或服务器发送带有“close”的连接头，则客户机的请求将成为此连接的最后一个请求。

因此，客户机或服务器都可以发出连接已关闭的信号。

b. HTTP协议本身是不加密的，使用tcp 80端口。  
HTTPS协议使用SSL加密算法，使用tcp 443端口。  
通过和 SSL（Secure Socket Layer，安全套接层）或[TLS](https://so.csdn.net/so/search?q=TLS&spm=1001.2101.3001.7020" \t "_blank)（Transport Layer Security，安全层传输协议）的组合使用，加密 HTTP 的通信内容

https采用 混合加密（公开密钥+共享加密），当密钥能够可靠交换时，使用共享加密。

共享加密

加解密用一个密钥，传递给对方式，密钥有泄露危险，但是速度比公开密钥要快。

c.不行，最多2个。

d. 一端已关闭，另一端无法通过连接传输数据。

因此，要求客户端软件能够重新打开传输层连接，并在无需用户交互的情况下重新传输放弃的请求序列。

为服务器编写一个简单的TCP程序，该程序接受来自客户端的输入行，并将这些行打印到服务器的标准输出上。（可以通过修改文本中的TCPServer.py程序来实现这一点。）编译并执行你的程序。在包含Web浏览器的任何其他计算机上，将浏览器中的代理服务器设置为运行服务器程序的主机；还可以适当配置端口号。浏览器现在应该向服务器发送GET请求消息，服务器应该在其标准输出上显示这些消息。使用此平台确定浏览器是否为本地缓存的对象生成条件GET消息。

ping 192.168.1.1

ping 192.168.1.1

PING 192.168.1.1 (192.168.1.1): 56 data bytes

Request timeout for icmp\_seq 0

Request timeout for icmp\_seq 1

Request timeout for icmp\_seq 2

Request timeout for icmp\_seq 3

^C

--- 192.168.1.1 ping statistics ---

5 packets transmitted, 0 packets received, 100.0% packet loss

ping 127.0.0.1

ping 127.0.0.1

PING 127.0.0.1 (127.0.0.1): 56 data bytes

64 bytes from 127.0.0.1: icmp\_seq=0 ttl=64 time=0.054 ms

64 bytes from 127.0.0.1: icmp\_seq=1 ttl=64 time=0.100 ms

64 bytes from 127.0.0.1: icmp\_seq=2 ttl=64 time=0.119 ms

64 bytes from 127.0.0.1: icmp\_seq=3 ttl=64 time=0.072 ms

^C

--- 127.0.0.1 ping statistics ---

4 packets transmitted, 4 packets received, 0.0% packet loss

round-trip min/avg/max/stddev = 0.054/0.086/0.119/0.025 ms

**实验二**

(base) xuchangqi@xuchangqideMacBook-Pro  ~   main  traceroute 127.0.0.1

traceroute to 127.0.0.1 (127.0.0.1), 64 hops max, 52 byte packets

1 localhost (127.0.0.1) 0.344 ms 0.124 ms 0.105 ms

(base) xuchangqi@xuchangqideMacBook-Pro  ~   main  traceroute 192.8.0.1

traceroute to 192.8.0.1 (192.8.0.1), 64 hops max, 52 byte packets

1 10.133.255.254 (10.133.255.254) 17.666 ms 9.038 ms 9.611 ms

2 172.20.255.250 (172.20.255.250) 10.669 ms 10.159 ms 9.670 ms

3 172.20.255.254 (172.20.255.254) 9.417 ms 9.020 ms 9.542 ms

4 172.17.11.214 (172.17.11.214) 10.714 ms 10.302 ms 9.664 ms

5 172.17.11.254 (172.17.11.254) 9.434 ms 8.914 ms 9.724 ms

6 218.197.158.254 (218.197.158.254) 10.531 ms 9.060 ms 11.303 ms

traceroute www.baidu.com

traceroute: Warning: www.baidu.com has multiple addresses; using 14.215.177.39

traceroute to www.a.shifen.com (14.215.177.39), 64 hops max, 52 byte packets

1 10.133.255.254 (10.133.255.254) 3.826 ms 3.312 ms 3.278 ms

2 172.20.255.250 (172.20.255.250) 3.125 ms 3.969 ms 3.985 ms

3 172.20.255.254 (172.20.255.254) 4.388 ms 4.207 ms 5.871 ms

4 172.18.1.250 (172.18.1.250) 3.162 ms 2.899 ms 5.945 ms

5 localhost (59.172.178.133) 98.977 ms 4.139 ms 3.008 ms

6 111.175.209.65 (111.175.209.65) 6.602 ms 7.209 ms 7.658 ms

7 111.175.225.65 (111.175.225.65) 4.374 ms 16.569 ms 4.331 ms

8 202.97.98.210 (202.97.98.210) 18.953 ms 18.505 ms

202.97.29.65 (202.97.29.65) 21.346 ms

^C

实验三

What is the difference between a host and an end system? List several differ- ent types of end systems. Is a Web server an end system?

There is no difference. Throughout this text, the words "host" and "end system" are used interchangeably.

End systems include PCs, workstations, Web servers, mail servers, PDAs, Internet-connected game consoles, etc.

实验四

R2. The word protocol is often used to describe diplomatic relations. How does Wikipedia describe diplomatic protocol?

From Wikipedia: Diplomatic protocol is commonly described as a set of international courtesy rules. These well-established and time-honored rules have made it easier for nations and people to live and work together. Part of protocol has always been the acknowledgment of the hierarchical standing of all present. Protocol rules are based on the principles of civility.

实验五

Why are standards important for protocols?

Standards are important for protocols so that people can create networking systems and products that interoperate.

实验六

P6. Obtain the HTTP/1.1 specification (RFC 2616). Answer the following questions:

Explain the mechanism used for signaling between the client and server to indicate that a persistent connection is being closed. Can the client, the server, or both signal the close of a connection?

What encryption services are provided by HTTP?

Can a client open three or more simultaneous connections with a given server?

Either a server or a client may close a transport connection between them if either one detects the connection has been idle for some time. Is it possible that one side starts closing a connection while the other side is transmitting data via this connection? Explain.

1. Unless the "close" tag is included in the request's Connect header, an HTTP/1.1 server can always assume that an HTTP/1.1 client wants to maintain a persistent connection. If the server wants to close the connection immediately after sending the response, it SHOULD send a Connect header field containing "close".

An HTTP/1.1 client may expect to keep the connection open, but this must be based on whether the server response contains a Connect header field and whether the header field contains "close". If the client does not want to maintain the connection for more requests, it SHOULD send a Connect header field with a value of "close".

If either the client or the server sends a Connect header with "close", then the client's request will become the last request for this connection.

Therefore, either the client or the server can signal that the connection is closed.

2. The HTTP protocol itself has no encryption service.

3. No, there is a maximum of two concurrent persistent connections.

4. One side has been closed and it is not possible for the other side to transfer data over the connection.

It is therefore required that the client software should be able to reopen the transport layer connection and retransmit the abandoned request sequence without user interaction.

实验七

Problem :

WriteasimpleTCPprogramforaserverthatacceptslinesofinputfromacli- ent and prints the lines onto the server’s standard output. (You can do this by modifying the TCPServer.py program in the text.) Compile and execute your program. On any other machine that contains a Web browser, set the proxy server in the browser to the host that is running your server program; also con- figure the port number appropriately. Your browser should now send its GET request messages to your server, and your server should display the messages on its standard output. Use this platform to determine whether your browser generates conditional GET messages for objects that are locally cached.

from socket import \*

serverPort = 12000

serverSocket = socket(AF\_INET, SOCK\_STREAM)

serverSocket.bind(("", serverPort))

serverSocket.listen(1)

print("The server is ready to receive")

while 1:

connectSocket, addr = serverSocket.accept()

sentence = connectSocket.recv(1024)

print(sentence.decode())

connectSocket.close()

P2.式（1-1）给出了经传输速率为R的N段链路发送长度L的一个分组的端到端时延。对于经过N段链路连续地发送P个这样的分组，一般化地表示出这个公式。

在时间N\*（L / R）的第一分组已到达目的地时，第二分组被存储在最后一个路由器，所述第三分组被存储在未来到最后一个路由器等。在时间N\*（L / R）+ L/ R时，第二分组已到达目的地时，所述第三分组被存储在最后一个路由器等与该逻辑继续，我们看到，在时间N\*（L / R）+（P-1）\*（L / R）=（N + P-1）\*（L / R）的所有分组已到达了目的地。

P3.考虑一个应用程序以稳定的速率传输数据（例如，发送方每k个时间单元产生一个N比特的数据单元，其中k较小且固定）。另外，当这个应用程序启动时，它将连续运行相当长的一段时间。回答下列问题，简要论证你的回答：

a.是分组交换网还是电路交换网更为适合这种应用？为什么？

b.假定使用了分组交换网，并且该网中的所有流量都来自如上所述的这种应用程序。此外，假定该应用程序数据传输速率的总和小于每条链路的各自容量。需要某种形式的拥塞控制吗？为什么？

a）一个电路交换网络将非常适合于应用，因为

应用包括常会话的可预测的平滑带宽要求。

由于传输速率是已知的，而不是突发性的，可保留带宽为每个应用程序会话，而没有显著的浪费。

此外，开销成本建立和拆除连接摊销的漫长时间典型的应用会话。

b）在最坏的情况下，所有的应用程序同时在一个或多个发射

网络链接。然而，由于每个链路具有足够的带宽来处理的总和

所有的应用程序的数据传输速率的，不会发生拥堵（非常少排队）。

鉴于这种慷慨链路容量，网络不需要拥塞控制机制。

P6.这个习题开始探讨传播时延和传输时延，这是数据网络中的两个重要概念。考虑两台主机A和B由一条速率为R bps的链路相连。假定这两台主机相隔m米，沿该链路的传播速率为s m/s。主机A向主机B发送长度L比特的分组。

a.用m和s来表示传播时延dprop。

b.用L和R来确定该分组的传输时间dtrans。

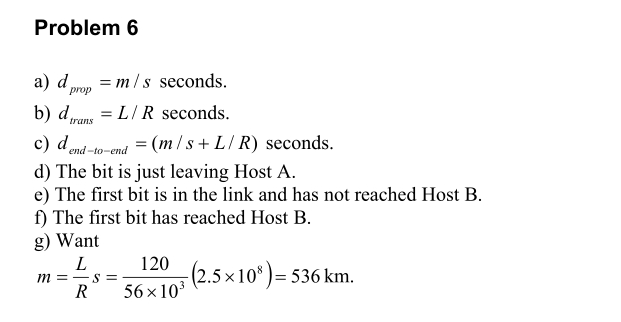
c.忽略处理和排队时延，得出端到端时延的表达式。

d.假定主机A在时刻t=0开始传输该分组。在时刻t=dtrans，该分组的最后一个比特在什么地方？

e.假定dprop大于dtrans。在时刻t=dtrans，该分组的第一个比特在何处？

f.假定dproc小于dtrans。在时刻t=dtrans，该分组的第一个比特在何处？

g.假定s=2.5×108，L=120比特，R=56kbps。求出使dproc等于dtrans的距离m。

[](https://s1.51cto.com/wyfs02/M00/87/C6/wKioL1fhhUqCBwtoAADq3gER7GQ842.jpg)