1. **chapter 1**
   1. **Homework**
2. No. 10--10

What are two reasons for using layered protocols? What is one possible disadvantage of using layered protocols?

1. No. 11--17

What is the principal difference between connectionless communication and connection-oriented communication? Give one example of a protocol that uses (i) connectionless communication; (ii) connection-oriented communication.

1. No. 19--

List two ways in which the OSI reference model and the TCP/IP reference model are the same. Now list two ways in which they differ.

1. No. 37--35

The Internet is made up of a large number of networks. Their arrangement determines the topology of the Internet. A considerable amount of information about the Internet topology is available on line. Use a search engine to find out more about the Internet topology and write a short report summarizing your findings.

* 1. **Discussion**

1. 分层体系结构的特点
2. 现有的网络拓扑结构
3. **chapter 2**
   1. **Homework**
4. No. 7--8

It is desired to send a sequence of computer screen images over an optical fiber. The screen is 1920 x1200 pixels, each pixel being 24 bits. There are 50 screen images per second. How much bandwidth is needed?

1. No. 30--30

What is the difference, if any, between the demodulator part of a modem and the coder part of a codec? (After all, both convert analog signals to digital ones.)

1. No. 35--37

Three packet-switching networks each contain n nodes. The first network has a star topology with a central switch, the second is a (bidirectional) ring, and the third is fully interconnected, with a wire from every node to every other node. What are the best-, average-, and worst-case transmission paths in hops?

1. No. 36--38

Compare the delay in sending an x-bit message over a k-hop path in a circuit-switched network and in a (lightly loaded) packet-switched network. The circuit setup time is s sec, the propagation delay is d sec per hop, the packet size is p bits, and the data rate is b bps. Under what conditions does the packet network have a lower delay? Also, explain the conditions under which a packet-switched network is preferable to a circuit-switched network.

1. No. 44--46

A CDMA receiver gets the following chips: (−1 +1 −3 +1 −1 −3 +1 +1). Assuming the chip sequences defined in Fig. 2-28(a), which stations transmitted, and which bits did each one send?

* 1. **Discussion**

1. 比特率、波特率、信道容量和数据传输速率的关系
2. 编码和复用技术
3. 分组交换和电路交换
4. **chapter 3**
   1. **Homework**
5. No. 1--1

An upper-layer packet is split into 10 frames,each of which has an 80% chance of arriving undamaged. If no error control is done by the data link protocol, how many times must the message be sent on average to get the entire thing through?

1. No. 6--8

To provide more reliability thana single parity bit can give, an error-detecting coding scheme uses one parity bit for checking all the odd-numbered bits and a second parity bit for all the even-numbered bits. What is the Hamming distance of this code?

1. No. 17--19

In the discussion of ARQ protocol in Section 3.3.3, a scenario was outlined that resulted in the receiver accepting two copies of the same frame due to a loss of acknowledgement frame. Is it possible that receiver may accept multiple copies of the same frame when none of the frames (message or acknowledgement) are lost?

1. No. 18--20

A channel has a bit rate of 4 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop-and-wait give an efficiency of at least 50%?

( 5 ) No. 30--34

Consider an error-free 64-kbps satellite channel used to send 512-byte data frames in one direction, with very short acknowledgements coming back the other way. What is the maximum throughput for window sizes of 1,7,15, and 127? The earth-satellite propagation time is 270 msec.

* 1. **Discussion**

1. 停止等待协议
2. 滑动窗口
3. 海明码
4. 链路管理、流控、透明传输在BSC、HDLC和PPP协议中的实现方式
5. **chapter 4**
   1. **Homework**
6. No. 6--6

What is the length of a contention slot in CSMA/CD for (a) a 2-km twin-lead cable (signal propagation speed is 82% of the signal propagation speed in vacuum)?, and (b) a 40-km multimode fiber optic cable (signal propagation speed is 65% of the signal propagation speed in vacuum)?

1. No. 7--7

How long does a station, s, have to wait in the worst case before it can start trans-mitting its frame over a LAN that uses the basic bit-map protocol?

1. No. 8--8

In the binary countdown protocol, explain how a lower-numbered station may be starved from sending a packet.

1. No.15--15

A 1-km-long, 10-Mbps CSMA/CD LAN (not 802.3) has a propagation speed of 200 m / μ sec. Repeaters are not allowed in this system. Data frames are 256 bits long, including 32 bits of header, checksum, and other overhead. The first bit slot after a successful transmission is reserved for the receiver to capture the channel in order to send a 32-bit acknowledgement frame. What is the effective data rate, excluding overhead, assuming that there are no collisions?

1. No.16--null

Consider building a CSMA/CD network running at 1Gbps over a 1-km cable with no repeaters. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?

1. No. 25--25

Suppose that an 11-Mbps 802.11b LAN is transmitting 64-byte frames back-to-back over a radio channel with a bit error rate of 10− 7. How many frames per second will be damaged on average?

* 1. **Discussion**

1. Multi Access Problem and Multi Access Protocols
2. CSMA/CD and CSMA/CA
3. Limited-Contention Protocol
4. WLAN
5. Ethernet
6. VLAN
7. **chapter 5**
   1. **Homework**
8. No. 20--23

Suppose that host A is connected to a router R 1, R 1 is connected to another router, R 2, and R 2 is connected to host B. Suppose that a TCP message that contains 900 bytes of data and 20 bytes of TCP header is passed to the IP code at host A for delivery to B. Show the Total length, Identification, DF, MF, and Fragment offset fields of the IP header in each packet transmitted over the three links. Assume that link A-R1 can support a maximum frame size of 1024 bytes including a 14-byte frame header, link R1-R2 can support a maximum frame size of 512 bytes, including an 8-byte frame header, and link R2-Bcan support a maximum frame size of 512 bytes including a 12-byte frame header.

1. No. 24--27

Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation.

1. No. 25--28

A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle?

1. No. 27--30

A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose that four organizations, A , B , C , and D , request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z / s notation.

1. No. 28--31

A router has just received the following new IP addresses: 57.6.96.0/21,57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated? If so, to what? If not, why not?

1. No.30--33

A router has the following (CIDR) entries in its routing table:

Address/mask Next hop

135.46.56.0/22 Interface 0

135.46.60.0/22 Interface 1

192.53.40.0/23 Router 1

Default Router 2

For each of the following IP addresses, what does the router do if a packet with that address arrives?

(a) 135.46.63.10

(b) 135.46.57.14

(c) 135.46.52.2

(d) 192.53.40.7

(e) 192.53.56.7

1. CIDR:假定计算机学院共90个办公室和实验室，每个办公室或实验室需要一个公网IP地址，分得一个C类IP地址，其net-id为202.202.5.0；但这样会造成IP地址的浪费。合理的解决方法有：（1）进行子网划分，请给出子网掩码；（2）CIDR，请给出CIDR地址块。
2. RIP算法计算：假定网络中的路由器B的路由表有如下的项目（这3列分别表示“目的网络”，“距离”，“下一跳路由器”）

N1 7 A

N2 2 C

N6 8 F

N8 4 E

N9 4 F

现在B收到C发来的路由信息

（这2列分别表示“目的网络”，“距离”）

N2 4

N3 8

N6 4

N8 3

N9 5

试求出路由器B更新后的路由表（请给出计算步骤）。

* 1. **Discussion**