Chapter 1: Sample Questions, Problems and Solutions
Bölüm 1: Örnek Sorular, Problemler ve Çözümleri

Örnek Sorular (Sample Questions):

- What is the computer network?
- What is the distributed system?
- What is resource sharing?
- What is the client-server model?
- What is Broadcast network?
- What are Point-to-point networks?
- What are broadcasting, multicasting and unicasting?
- What is LAN?
- What is MAN?
- What is WAN?
- What is a communication subnet or subnet for short? Give an example?
- What is host?
- What is a protocol?
- What are the peers?
- What is physical medium?
- What is an interface?
- Draw an architecture which relates layers, protocols and interfaces?
- What is a protocol stack?
- What is a header?
- Draw an architecture which relates between the virtual and actual communication and the difference between protocols and interfaces.
- What is an addressing?
- What is an error control?
- What is a flow control?
- What is a multiplexing?
- What is a demultiplexing?
- What is a routing?
- What is a connection-oriented service?
- What is a connectionless service?
- What is a datagram service?
- What is an acknowledged datagram service?
- What is a request-reply service?
- What are the service primitives?
- Draw an architecture which relates between a service and a protocol.
- What is OSI reference model?
- What is a TCP/IP reference model?
- What is an ATM reference model?
- What is a Hybrid model?
- What is a physical layer?
- What is a data link layer?
- What is a network layer?
- What is a transport layer?
- What is a session layer?
- What is a presentation layer?
- What is an application layer?

Örnek Problemler ve Çözümleri (Sample Problems and Solutions):

(Cpt.1, Problem 6-1)

A client-server system uses a satellite network, with the satellite at a height of 40,000 km. What is the best-case delay in response to a request?

ANS:
The request has to go up and down, and the response has to go up and down. The total path length traversed is thus 160.000 km. The speed of light in air and vacuum is 300,000 km/sec, so the propagation delay alone is 160,000/300,000 sec or about 533 msec.

(Cpt.1, Problem 6-2)

A client-server system uses a satellite network, with the satellite at a height of 15,000 km. What is the best-case delay in response to a request?

ANS:
The request has to go up and down, and the response has to go up and down. The total path length traversed is thus 60.000 km. The speed of light in air and vacuum is 300,000 km/sec, so the propagation delay alone is 60,000/300,000=0,2 sec or about 200 msec.

(Cpt.1, Problem 6-3)

A client-server system uses a satellite network, with the satellite at a height of 75 000 km. What is the best case delay in response to a request?

ANS:
The request has to go up and down, and the response has to go up and down. The total path length traversed is thus 300 000 km. The speed of light in air and vacuum is 300 000 km/sec, so the propagation delay alone is 300 000 / 300,000 = 1 sec.

(Cpt.1, Problem 11)

What are two reasons for using layered protocols?

ANS:
Among other reasons for using layered protocols, using them leads to breaking up the design problem into smaller, more manageable pieces, and layering means that protocols can be changed without affecting higher or lower ones.

(Cpt.1, Problem 13)

What is the principal difference between connectionless communication and connection-oriented communication?

ANS:
Connection-oriented communication has three phases. In the establishment phase a request is made to set up a connection. Only after this phase has been successfully completed can the data transfer phase be started and data transported. Then comes the release phase. Connectionless communication does not have these phases. It just sends the data.

(Cpt.1, Problem 28-1)

An image is *1024x768 pixels* with *3 bytes/pixel*. Assume the image is uncompressed. How long does it take to transmit it:
a) over a *56-kbps* modem channel?
b) over a *1-Mbps* cable modem?
c) over a *10-Mbps* Ethernet?
d) over *100–Mbps* Ethernet?

ANS:
The image is *1024x768x3 bytes* or *2,359,296 bytes*. This is *18,874,368* bits.

a) **At *56,000 bits/sec*, it takes about *337.042 sec*.**
b) **At *1,000,000 bits/sec*, it takes about *18.874 sec*.**
c) **At *10,000,000 bits/sec*, it takes about *1.887 sec*.**
d) **At *100,000,000 bits/sec*, it takes about *0.189 sec*.**

(Cpt.1, Problem 28-2)

An image is *800x600 pixels* with *3 bytes/pixel*. Assume the image is uncompressed. How long does it take to transmit it:
a) over a *56-kbps* modem channel?
b) over a *1-Mbps* cable modem?
c) over a *10-Mbps* Ethernet?

ANS:
The image is 800*600*3 bytes=1440000 bytes=11520000 bits.
a) At 56,000 bits/sec, it takes about 11520000 bits / 56,000 bits/sec =205,714 sec.
b) At 1,000,000 bits/sec, it takes about 11520000 bits / 1,000,000 bits/sec =11,52 sec.
c) At 10,000,000 bits/sec, it takes about 11520000 bits / 10,000,000 bits/sec =1,152 sec.

(Cpt.1, Problem 28-3)

An image is *1000x800 pixels* with *3 bytes/pixel*. Assume the image is uncompressed. How long does it take to transmit it:
a) over a *64-Kbps* modem channel?
b) over a *1-Mbps* cable modem?
c) over a *10-Mbps* Ethernet?
Note: For calculations take *1-Kb = 1000* bits and *1-Mb = 1000000* bits.

ANS:

The image is 1000*800*3 bytes=2400000 bytes = 19200000 bits.
a) At 64000 bits/sec, it takes about 19200000 bits / 64000 bits/sec =300 sec.
b) At 1000000 bits/sec, it takes about 19200000 bits / 1000000 bits/sec =19,2 sec.
c) At 10000000 bits/sec, it takes about 19200000 bits / 10000000 bits/sec =1,92 sec.

(Cpt.1, Problem 27)

How long was a bit on the original 802.3 standard in meters? Use a transmission speed of 10 Mbps and assume the propagation speed in coax is 2/3 the speed of light in vacuum.

ANS:

The speed of light in coax is about 200,000 km/sec, which is 200 meters/µsec.

At 10 Mbps, it takes 0,1 µsec to transmit a bit.

Thus, the bit lasts 0,1 µsec in time, during which it propagates 20 meters.

Thus, a bit is 20 meters long here.

(Cpt.1, Page 16)

Classify the interconnected processors by scale.

ANS:

Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	
1 km	Campus	
10 km	City	Metropolitan area network
100 km	Country	Wide area network
1000 km	Continent	
10 000 km	Planet	The internet