CS 372 Notes

A network is a system for connecting computers using what?
→ Single Transmission Technology

What are some components of the UDP protocol? (check all that apply)
→Connection-less, Congestion Control, Unreliable data transfer (Fire & Forget)

What does a protocol do?
→Specifies the format and order of messages sent and received among network entities.
→Specifies actions taken upon the transmission and receipt of messages

Devices in Network Core:
→Routers, Switches

Components of the TCP protocol?
→Connection-Oriented with 3-way connection-setup handshake
→Flow control
→Congestion Control
→Reliable, in-order data transfer

Devices in Network Edge:
→End-Systems
→Smartphones
→Laptops
→Servers
→Hosts

Client-Server model has a dedicated service provider.

Hybrid model uses a central server to setup connections between peers.

Peer to Peer model connects hosts to each other without the use of dedicated services.

Characteristics of TDM?
→Only one user may transmit at a time

A circuit switched network has a dedicated circuit through which information is sent, whereas a
Packet switched network sends information in “chunks” through a network on shared media

Units for network bandwidth AND transmission rate?
→ bps

Packet Construction, Transmission, and Interpretation are three important functions of a packet-switched network

FDM Characteristics:
→Spectrum divided up into bands of frequency
→ Multiple users can transmit, IF they use right frequency

Packet-switched network may be faster than a Circuit-switched network due to its more adaptive use of the transmission medium.

What are some characteristics of statistical multiplexing?
→Adaptive sharing of the transmission medium
→Is an outcome of using packet-switched networks
→Hosts with no data to share do not waste the transmission medium

A Circuit-switched network may be faster than a Packet-switched networks due to the packet header overhead of packet-switched networks

Congestion with packets:
→Packet delay and Packet loss

Access network allows a host to connect to the internet

Throughput is the rate at which bits are actually transferred between sender/receiver

Processing delay → Time spent processing header info.
Queuing delay → Waiting on transmission medium
Prop Delay → Traveling on physical medium
Trans delay → Being placed on the physical medium limited by the transmission protocol

Broadcast cabling utilize a greater range of frequencies in transferring information. This allows more data to be transferred over this type of cabling.

Guided media

Waveguide cabling (fiber-optic)
Correct answer.
Twisted pair copper wires
Correct answer.
Cups with a string connecting them
Correct answer.
Coaxial cables

Multiplexing physical media

→Merge multiple communcations streams onto the same medium

Physical media is a physical link in the chain between sender/receiver pairs.

Role of physical media in access networks: Analog signals relate to bits propagating over/through the physical media.

Internet Protocol Stack?
Layer 1: Physical Layer
Layer 2: Link/Data-Link
Layer 3: Network
Layer 4: Transport
Layer 5: Application

Responsibilities of the Application Layer?
→Determine destination IP address
→Support network applications

The Transport layer manages communications from process to process.

As a packet is being constructed and passed “down” to the next layer of the internet
protocol stack, a new “header” is added. This process is called Encapsulation

The payload (non-header portion) of a transport-layer segment is the data from the Application

layer.

Open Systems Interconnection (OSI)?

Layer 1: Physical Layer
Layer 2: Link/Data-Link
Layer 3: Network
Layer 4: Transport
Layer 5: Session
Layer 6: Presentation
Layer 7: Application

Socket connection requires:
→Local host IP address & Port Number plus Remote host IP address & Port Number

Application Layer specifies:
Everything regarding messages send and response/exchanged

Show requests, non—persistent HTTP:

RQ #1: TCP Connection Request
RQ #2: Website Index Request
RQ #3: TCP Connection Request
RQ #4: Image #1
Request ...
RQ #13: TCP Connection Request
RQ #14: Image #6 Request

Persistent vs Non, time:

(14 req – 8 req) * 2 sec/req = 12 seconds. It takes 12 seconds longer

SMTP→ Push Protocol
IMAP and POP3→Pull Protocols

FTP protocol maintains these states:
→Current Directory
Correct answer.
Earlier Authentication
Correct answer.
Limit on Concurrent Connections

IP addresses→ 2^32

Unique network interface hardware addresses possible:
16^12 (281,474,976,710,656)

.org TLD managed by NOT PIO

Demultiplexing, UDP socket identified by:
→Dest IP and Port Numbers]

Transport Layer→Edge
→Manages communications from process to process

Network Layer→Edge

Two Generals Problem→ If there is any possibility of error in the communications channel, it is impossible to guarantee 100% reliable data transfer.

RDT UDP protocol→Simple error detection

Max number of bytes in app data of UDP seg → 65,527/65527.

TCP→Comnection oriented, full duplex, inorder delivery, pipelining, Flow+congestion control, reliable ddelivery

TCP→ Min: 20, Max: 60