**CSS 212 TUTORIAL ONE**

**Questions**

1. Explain different modes of data transmission between two devices.
2. What do you understand by the standards? Explain briefly.
3. Define and describe the key elements of protocols.
4. Differentiate router and switch
5. Differentiate Bridge and Switch
6. Differentiate switch and hub.
7. What are the different criteria that a network should meet?
8. Explain the layers of OSI model layers'’’’
9. Explain the TCP/IP layers
10. Compare and Contrast OSI model and TCP/IP layers

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**ANSWER FOR QUESTION**

### QUESTION ONE

### Simplex

In simplex transmission mode, the communication between sender and receiver occurs in only one direction.  The sender can only send the data, and the receiver can only receive the data.  The receiver cannot reply to the sender. Eg; keyboard / monitor relationship

### Half Duplex

The communication between sender and receiver occurs in both directions in half duplex transmission, but only one at a time.  The sender and receiver can both send and receive the information, but only one is allowed to send at any given time.  Eg; radio call

### Full Duplex

In full duplex transmission mode, the communication between sender and receiver can occur simultaneously.  The sender and receiver can both transmit and receive at the same time. Eg; telephone.’’’

### Comparison Chart

|  |  |  |  |
| --- | --- | --- | --- |
| Basis for Comparison | Simplex | Half Duplex | Full Duplex |
| Direction of Communication | Unidirectional | Two-directional, one at a time | Two-directional, simultaneously |
| Send / Receive | Sender can only send data | Sender can send and receive data, but one a time | Sender can send and receive data simultaneously |
| Performance | Worst performing mode of transmission | Better than Simplex | Best performing mode of transmission |
| Example | Keyboard and monitor | Walkie-talkie | Telephone |

**QUESTION TWO**

**Standards:** is the set of rules for data communications that are needed for interoperability of networking technologies and processes. Standards help in creating and maintaining open markets and allow different vendors to compete on the basis of the quality of their products while being compatible with existing market products.

**OR**

**Standards** are the set of rules for data communication that are needed for exchange of information among devices. It is important to follow Standards which are created by various Standard Organization like IEEE, ISO, and ANSI etc.

**There are two types of standards which are:**

* **De Facto Standard.**
* **De Jure Standard.**

**De Facto Standard:** The meaning of the work” *De Facto ”* is ” By Fact ”  or “By Convention”.  
These are the standard s that have not been approved by any Organization , but have been adopted as  Standards  because of it’s widespread use. Also , sometimes these standards are often established by Manufacturers.

**For example :** Apple  and Google are two companies which established their own rules on their products which are different . Also they use some same standard rules for manufacturing for their products.

**De Jure Standard :** The meaning of the word *“De Jure”* is  “By Law” or “By  Regulations” .   
Thus , these are the  standards that have been approved by officially recognized body like ANSI , ISO , IEEE etc. These are the standard which are important to follow if it is required or needed.

**For example :** All the data communication standard  protocols like SMTP , TCP , IP , UDP etc. are important to follow the same when we needed them.

**Some of the noted standards organizations are**

* International Standards Organization (ISO)
* International Telecommunication Union (ITU)
* Institute of Electronics and Electrical Engineers (IEEE)
* ‘American National Standards Institute (ANSI)

**QUESTION THREE**

A protocol is a set of rules that govern data communications.

**The** **key elements of a protocol are syntax, semantics, and timing.**

**1. Syntax**

The term syntax refers to the structure or format of the data, meaning the order in which they are presented.

**For example**, a simple protocol might expect the first 8 bits of data to be the address of the sender, the second 8 bits to be the address of the receiver, and the rest of the stream to be the message itself.

**2. Semantics**

The word semantics refers to the meaning of each section of bits. How is a particular pattern to be interpreted, and what action is to be taken based on that interpretation?

**For example,** does an address identify the route to be taken or the final destination of the message?

**3. Timing**

The term timing refers to two characteristics: when data should be sent and how fast they can be sent.

For example,**if a sender produces data at 100 Mbps but the receiver can process data at only 1 Mbps, the** transmission will overload the receiver and some data will be lost.

**QUESTION FOUR**

| **Sr.No.** | **Router** | **Switch** |
| --- | --- | --- |
| 1. | The main objective of router is to connect various networks simultaneously. | While the main objective of switch is to connect various devices simultaneously. |
| 2. | It works in network layer. | While it works in data link layer. |
| 3. | Router is used by LAN as well as MAN. | While switch is used by only LAN. |
| 4. | Through router data is sent in the form of packet. | While through switch data is sent in the form of packet and frame. |
| 5. | There is less collision take place in router. | While there is no collision take place in full duplex switch. |
| 6. | Router is compatible with NAT. | While it is not compatible with NAT. |
| 7. | The types of routing are: Adaptive and Non-adaptive routing. | The types of switching are: Circuit, Packet and Message Switching. |

QUESTIN SEVEN

What are the different criteria that a network should meet?

***Performance***

Performance is the defined as the rate of transferring error free data. It is measured by the Response Time. Response Time is the elasped time between the end of an inquiry and the beginning of a response. Request a file transfer and start the file transfer. Factors that affect Response Time are:

* Number of Users: More users on a network - slower the network will run
* Transmission Speed: speed that data will be transmitted measured in bits per second (bps)
* Media Type: Type of physical connection used to connect nodes together
* Hardware Type: Slow computers such as XT or fast such as Pentiums
* Software Program: How well is the network operating system (NOS) written

## *Reliability*

Reliability is the measure of how often a network is useable. MTBF (Mean Time Between Failures) is a measure of the average time a component is expected to operate between failures. Normally provided by the manufacturer. A network failure can be: hardware, data carrying medium and Network Operating System.

## *Security*

Security is the protection of Hardware, Software and Data from unauthorized access. Restricted physical access to computers, password protection, limiting user privileges and data encryption are common security methods. Anti-Virus monitoring programs to defend against computer viruses are a security measure.

## *Recovery*

Recovery is the Network's ability to return to a prescribed level of operation after a network failure. This level is where the amount of lost data is nonexistent or at a minimum. Recovery is based on having Back-up Files.’’’’

***Consistency***

Consistency is the predictability of response time and accuracy of data.

* Users prefer to have consistent response times, they develop a feel for normal operating conditions. For example: if the "normal" response time is 3 sec. for printing to a Network Printer and a response time of over 30 sec happens, we know that there is a problem in the system!
* Accuracy of Data determines if the network is reliable! If a system loses data, then the users will not have confidence in the information and will often not use the system.

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QUESTION EIGHT

What is the OSI Model?

The open systems interconnection (OSI) model is a conceptual model created by the International Organization for Standardization which enables diverse communication systems to communicate using standard protocols. In plain English, the OSI provides a standard for different computer systems to be able to communicate with each other.

The OSI Model can be seen as a universal language for computer networking. It’s based on the concept of splitting up a communication system into seven abstract layers, each one stacked upon the last.

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