IQRA NATIONAL UNIVERSITY
Phase II,Hayatabad peshawar

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Dept: <u>BS (CS)</u>   Assignment:01   Subject: <u>Data Comunication & Networks</u>

Question 1: Go to www.ietf.org/rfc.html and look up RFC 2026 and read it. Answer these questions:

   (a) What is an Internet Draft?

   (b) What are the differences between a Proposed Standard, Draft Standard, and Standard?

Answer:Part(a):-

Internet Draft:- Internet-Drafts are working documents of the IETF, its areas, and its Working Groups. Note that other groups may also distribute working documents as Internet-Drafts.

- During the development of a specification, draft versions of the document are made available for informal review and comment by placing them in the IETF's Internet-Drafts directory. This makes an evolving working document readily available to a wide audience, facilitating the process of review and revision.
- Internet-Drafts have no formal status, and are subject to change or removal at any time; therefore they should not be cited or quoted in any formal document.
- Anyone can submit Internet-Drafts. Opinions expressed in the drafts are the authors'. The drafts do not necessarily have any standing in the IETF unless, for instance, adopted by a working group or approved as an RFC.

   Part (b):-

Proposed Standard:-

- A *Proposed Standard* specification is stable, has resolved known design choices, has received significant community review, and appears to enjoy enough community interest to be considered valuable. Usually, neither implementation nor operational experience is required for the designation of a specification as a Proposed Standard.
- Proposed Standards are of such quality that implementations can be deployed in the Internet. However, as with all technical specifications, Proposed Standards may be revised if problems are found or better solutions are identified, when experiences with deploying implementations of such technologies at scale is gathered

  Draft Standard:-

   A Draft Standard is a third classification that was discontinued in 2011. A Draft Standard was an intermediary step that occurred after a Proposed Standard but prior to an Internet Standard.

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In October 2011, RFC 6410 merged the second and third maturity levels into one Draft Standard. Existing older Draft Standards retain that classification.   The IESG can reclassify an old Draft Standard as Proposed Standard after two years (October 2013).

Standard:- In general, an Internet Standard is a specification that is stable and well-understood, is technically competent, has multiple, independent, and interoperable implementations with substantial operational experience, enjoys significant public support, and is recognizably useful in some or all parts of the Internet**.**

Question 2: Draw the graph of the NRZ-L, Manchester, Differential Manchester, and AMI schemes of the following data streams:
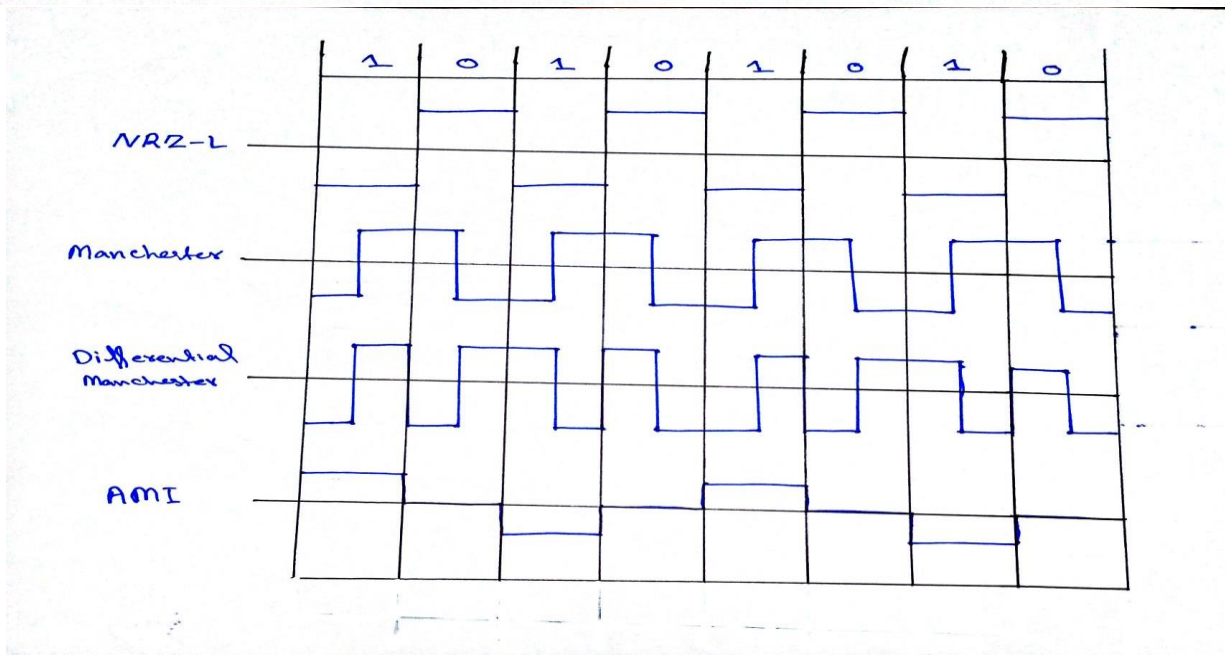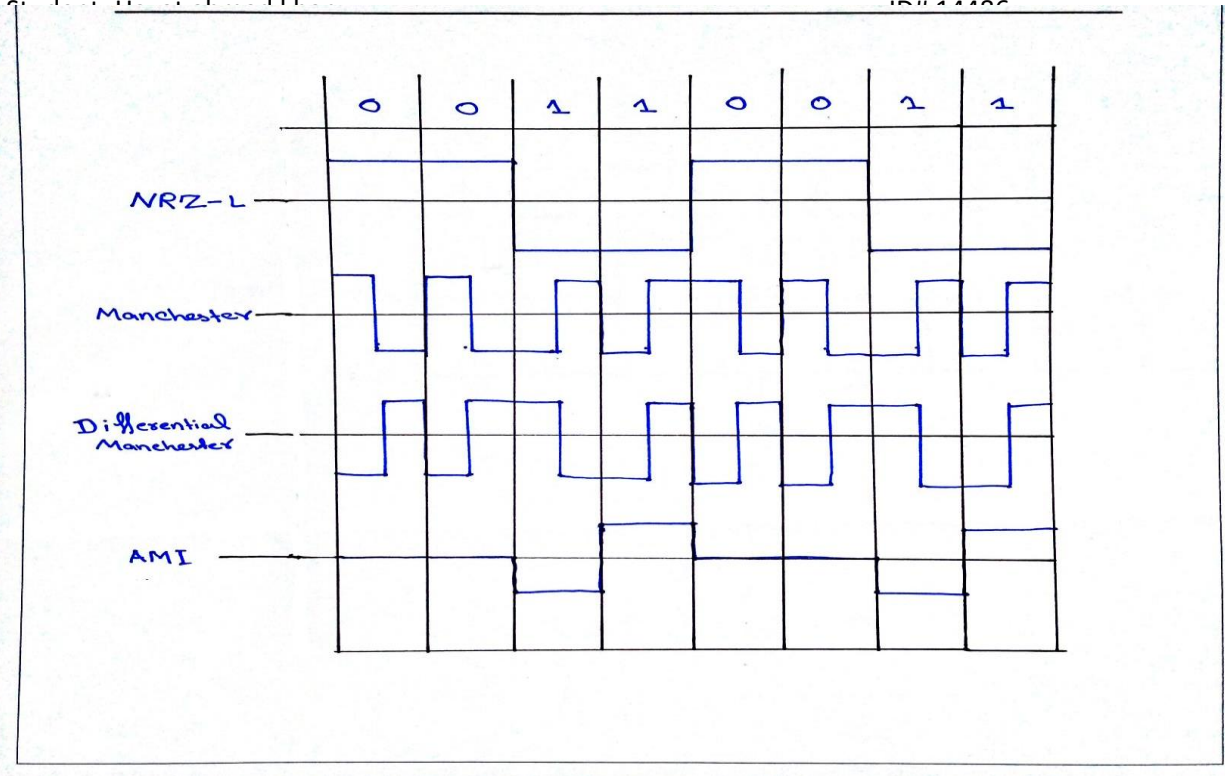
- 00110011
- 01010101
- 10101010

Answers:-
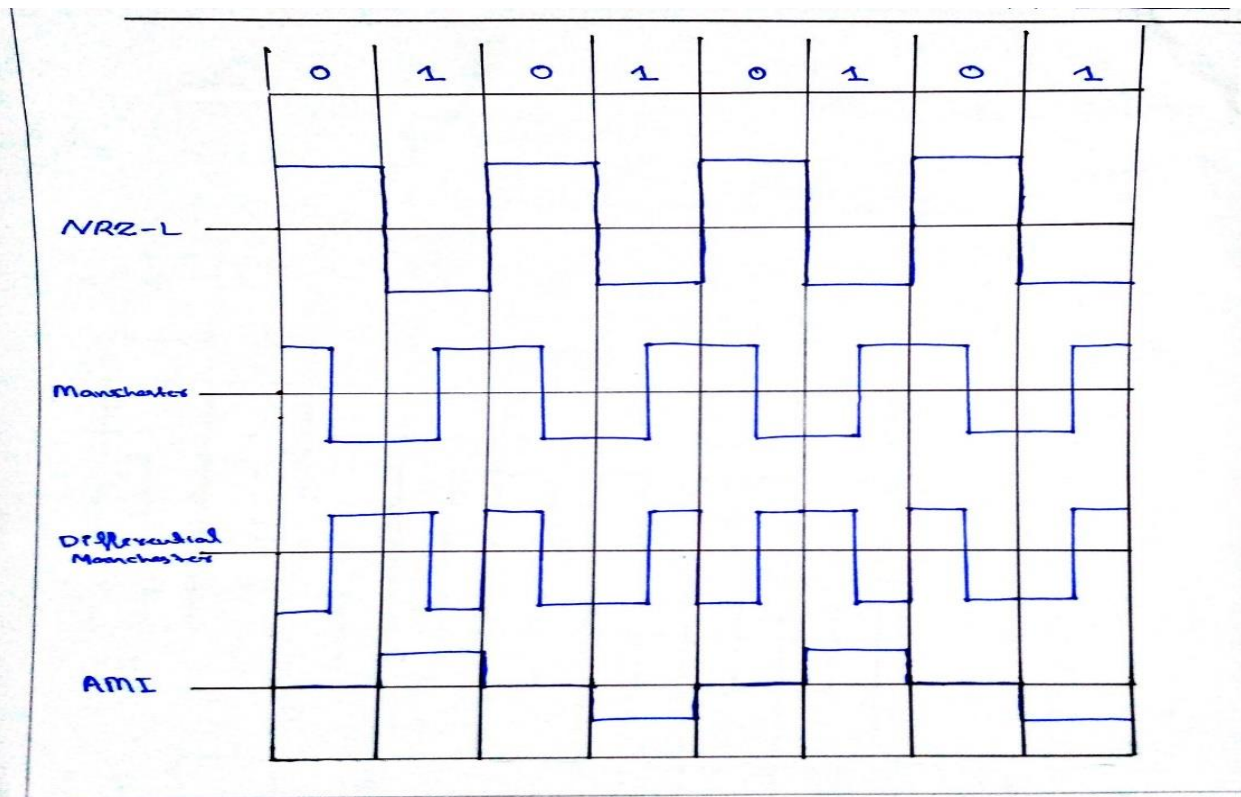
Student: Hayat ahmad khan   ID# 14486

Dept: BS (CS)   Assignment:01   Subject: Data Comunication & Networks

Question 3: You are working as a Network Specialist in ABC organization. You are asked to do research on the **current and future Wireless Networks issues and challenges**? (Maximum 2 pages)

Answers:-

Introduction

In the early days of computing, computers were seen as devices for making calculations, storing data, and automating business processes. However, as the devices evolved, it became apparent that many of the functions of telecommunications could be integrated into the computer. During the 1980s, many organizations began combining their once-separate telecommunications and information-systems departments into an information technology, or IT, department. This ability for computers to communicate with one another and, maybe more importantly, to facilitate communication between individuals and groups, has been an important factor in the growth of computing over the past several decades.

Computer networking really began in the 1960s with the birth of the Internet, as we'll see below. However, while the Internet and web were evolving, corporate networking was also taking shape in the form of local area networks and client-server computing. In the 1990s, when the Internet came of age, Internet technologies began to pervade all areas of the organization. Now, with the Internet a global phenomenon, it would be unthinkable to have a computer that did not include communications capabilities. This chapter will review the different technologies that have been put in place to enable this communications revolution.

Networking communication is full of some very technical concepts based on some simple principles. Learn the terms below and you'll be able to hold your own in a conversation about the Internet.

Packet: The fundamental unit of data transmitted over the Internet. When a device intends to send a message to another device (for example, your PC sends a request to YouTube to open a video), it breaks the message down into smaller pieces, called packets. Each packet has the sender's address, the destination address, a sequence number, and a piece of the overall message to be sent.

IQRA NATIONAL UNIVERSITY

Phase II,Hayatabad peshawer

Student: Hayat ahmad khan   ID# 14486

Dept: BS (CS)   Assignment:01   Subject: Data Comunication & Networks

Hub: A simple network device that connects other devices to the network and sends packets to all the devices connected to it.

Bridge: A network device that connects two networks together and only allows packets through that are needed.

Switch: A network device that connects multiple devices together and filters packets based on their destination within the connected devices.

Router: A device that receives and analyzes packets and then routes them towards their destination. In some cases, a router will send a packet to another router; in other cases, it will send it directly to its destination.

IP Address: Every device that communicates on the Internet, whether it be a personal computer, a tablet, a smartphone, or anything else, is assigned a unique identifying number called an IP (Internet Protocol) address. Historically, the IP-address standard used has been IPv4 (version 4), which has the format of four numbers between 0 and 255 separated by a period. For example, the domain Saylor.org has the IP address of 107.23.196.166. The IPv4 standard has a limit of 4,294,967,296 possible addresses. As the use of the Internet has proliferated, the number of IP addresses needed has grown to the point where the use of IPv4 addresses will be exhausted. This has led to the new IPv6 standard, which is currently being phased in. The IPv6 standard is formatted as eight groups of four hexadecimal digits, such as 2001:0db8:85a3:0042:1000:8a2e:0370:7334. The IPv6 standard has a limit of 3.4×10^{38} possible addresses.

Domain name: If you had to try to remember the IP address of every web server you wanted to access, the Internet would not be nearly as easy to use. A domain name is a human-friendly name for a device on the Internet. These names generally consist of a descriptive text followed by the top-level domain (TLD).

DNS: DNS stands for "domain name system," which acts as the directory on the Internet. When a request to access a device with a domain name is given, a DNS server is queried. It returns the IP address of the device requested, allowing for proper routing.

Packet-switching: When a packet is sent from one device out over the Internet, it does not follow a straight path to its destination. Instead, it is passed from one router to another across the Internet until it is reaches its destination. In fact, sometimes two packets from the same

message will take different routes! Sometimes, packets will arrive at their destination out of order. When this happens, the receiving device restores them to their proper order.

Protocol: In computer networking, a protocol is the set of rules that allow two (or more) devices to exchange information back and forth across the network

Wireless Networking

Today we are used to being able to access the Internet wherever we go. Our smartphones can access the Internet; Starbucks provides wireless "hotspots" for our laptops or iPads. These wireless technologies have made Internet access more convenient and have made devices such as tablets and laptops much more functional. Let's examine a few of these wireless technologies.

Wi-Fi

Wi-Fi is a technology that takes an Internet signal and converts it into radio waves. These radio waves can be picked up within a radius of approximately 65 feet by devices with a wireless adapter. Several Wi-Fi specifications have been developed over the years, starting with 802.11b (1999), followed by the 802.11g specification in 2003 and 802.11n in 2009. Each new specification improved the speed and range of Wi-Fi, allowing for more uses. One of the primary places where Wi-Fi is being used is in the home. Home users are purchasing Wi-Fi routers, connecting them to their broadband connections, and then connecting multiple devices via Wi-Fi.

Mobile Network

As the cellphone has evolved into the smartphone, the desire for Internet access on these devices has led to data networks being included as part of the mobile phone network. While Internet connections were technically available earlier, it was really with the release of the 3G networks in 2001 (2002 in the US) that smartphones and other cellular devices could access data from the Internet. This new capability drove the market for new and more powerful smartphones, such as the iPhone, introduced in 2007. In 2011, wireless carriers began offering 4G data speeds, giving the cellular networks the same speeds that customers were used to getting via their home connection.

Student: <u>Hayat ahmad khan</u>   ID# <u>14486</u>

Dept: <u>BS (CS)</u>   Assignment:01   Subject: <u>Data Comunication & Networks</u>

Bluetooth

While Bluetooth is not generally used to connect a device to the Internet, it is an important wireless technology that has enabled many functionalities that are used every day. When created in 1994 by Ericsson, it was intended to replace wired connections between devices. Today, it is the standard method for connecting nearby devices wirelessly. Bluetooth has a range of approximately 300 feet and consumes very little power, making it an excellent choice for a variety of purposes. Some applications of Bluetooth include: connecting a printer to a personal computer, connecting a mobile phone and headset, connecting a wireless keyboard and mouse to a computer, and connecting a remote for a presentation made on a personal

VoIP

A growing class of data being transferred over the Internet is voice data. A protocol called voice over IP, or VoIP, enables sounds to be converted to a digital format for transmission over the Internet and then re-created at the other end. By using many existing technologies and software, voice communication over the Internet is now available to anyone with a browser (think Skype, Google Hangouts). Beyond this, many companies are now offering VoIP-based telephone service for business and home use. computer.

Organizational Networking

LAN and WAN

Scope of business networks

While the Internet was evolving and creating a way for organizations to connect to each other and the world, another revolution was taking place inside organizations. The proliferation of personal computers inside organizations led to the need to share resources such as printers, scanners, and data. Organizations solved this problem through the creation of local area networks (LANs), which allowed computers to connect to each other and to peripherals. These same networks also allowed personal computers to hook up to legacy mainframe computers.

Student: Hayat ahmad khan   ID# 14486

Dept: BS (CS)   Assignment:01   Subject: Data Comunication & Networks

An LAN is (by definition) a local network, usually operating in the same building or on the same campus. When an organization needed to provide a network over a wider area (with locations in different cities or states, for example), they would build a wide area network (WAN).

Client-Server

The personal computer originally was used as a stand-alone computing device. A program was installed on the computer and then used to do word processing or number crunching. However, with the advent of networking and local area networks, computers could work together to solve problems. Higher-end computers were installed as servers, and users on the local network could run applications and share information among departments and organizations. This is called client-server computing.

Intranet

Just as organizations set up web sites to provide global access to information about their business, they also set up internal web pages to provide information about the organization to the employees. This internal set of web pages is called an intranet. Web pages on the intranet are not accessible to those outside the company; in fact, those pages would come up as "not found" if an employee tried to access them from outside the company's network.

Extranet

Sometimes an organization wants to be able to collaborate with its customers or suppliers while at the same time maintaining the security of being inside its own network. In cases like this a company may want to create an extranet, which is a part of the company's network that can be made available securely to those outside of the company. Extranets can be used to allow customers to log in and check the status of their orders, or for suppliers to check their customers' inventory levels.

Sometimes, an organization will need to allow someone who is not located physically within its internal network to gain access. This access can be provided by a virtual private network (VPN). VPNs will be discussed further in the chapter 6 (on information security).

Sidebar: Microsoft's SharePoint Powers the Intranet

As organizations begin to see the power of collaboration between their employees, they often look for solutions that will allow them to leverage their intranet to enable more collaboration.

Student: Hayat ahmad khan   ID# 14486

Dept: BS (CS)   Assignment:01   Subject: Data Comunication & Networks

Since most companies use Microsoft products for much of their computing, it is only natural that they have looked to Microsoft to provide a solution. This solution is Microsoft's SharePoint.

SharePoint provides a communication and collaboration platform that integrates seamlessly with Microsoft's Office suite of applications. Using SharePoint, employees can share a document and edit it together – no more e-mailing that Word document to everyone for review. Projects and documents can be managed collaboratively across the organization. Corporate documents are indexed and made available for search. No more asking around for that procedures document – now you just search for it in SharePoint. For organizations looking to add a social networking component to their intranet, Microsoft offers Yammer, which can be used by itself or integrated into SharePoint.

Cloud Computing

We covered cloud computing in chapter 3, but it should also be mentioned here. The universal availability of the Internet combined with increases in processing power and data-storage capacity have made cloud computing a viable option for many companies. Using cloud computing, companies or individuals can contract to store data on storage devices somewhere on the Internet. Applications can be "rented" as needed, giving a company the ability to quickly deploy new applications

Summary

The networking revolution has completely changed how the computer is used. Today, no one would imagine using a computer that was not connected to one or more networks. The development of the Internet and World Wide Web, combined with wireless access, has made information available at our fingertips. The Web 2.0 revolution has made us all authors of web content. As networking technology has matured, the use of Internet technologies has become a standard for every type of organization. The use of intranets and extranets has allowed organizations to deploy functionality to employees and business partners alike, increasing efficiencies and improving communications. Cloud computing has truly made information available everywhere and has serious implications for the role of the IT department.