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SUBJECT: Data Communication And Networks

ASSIGNMENT NO: 1

DEPARTMENT: BS CS 4th

SUBMITTED TO: SIR GHASSAN

DATE : 31/05/2020

(a) What is an Internet Draft?

Internet Draft is a series of working documents published by the IETF. Typically, drafts for RFCs, but may be due to pending work not intended for publication as RFCs. Draft versions of the document are made available for informal review and comment by placing them in the IETF's Internet-Drafts directory, during the development of a specification,. 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.

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

Proposed Standard:

1. The entry-level maturity for the standards track is "Proposed Standard". A specific action by the IESG is required to move a specification onto the standards track at the "Proposed Standard" level.
2. A Proposed Standard specification is generally stable, has resolved known design choices, has received significant community review, is believed to be well-understood, and appears to enjoy enough community interest to be considered valuable
3. Usually, neither implementation nor operational experience is required for the designation of a specification as a Proposed Standard. However, such experience is highly desirable, and will usually represent a strong argument in favour of a Proposed Standard designation.
4. It is desirable to implement them in order to gain experience and to validate, test, and clarify the specification. However, since the content of Proposed Standards may be changed if problems are found or better solutions are identified, deploying implementations of such standards into a disruption sensitive environment is not recommended.
5. Further experience might result in a change or even retraction of the specification before it advances.
6. A Proposed Standard should have no known technical omissions with respect to the requirements placed upon it. However, the IESG may waive this requirement in order to allow a specification to advance to the Proposed Standard state when it is

considered to be useful and necessary (and timely) even with known technical omission

Draft Standard:

1. A specification from which at least two independent and interoperable implementations from different code bases have been developed, and for which sufficient successful operational experience has been obtained, may be elevated to the "Draft Standard" level.
2. A Draft Standard must be well-understood and known to be quite stable, both in its semantics and as a basis for developing an implementation.
3. A Draft Standard is normally considered to be a final specification, and changes are likely to be made only to solve specific problems encountered.
4. The requirement for at least two independent and interoperable implementations applies to all of the options and features of the specification. In cases in which one or more options or features have not been demonstrated in at least two interoperable implementations, the specification may advance to the Draft Standard level only if those options or features are removed.
5. In most circumstances, it is reasonable for vendors to deploy implementations of Draft Standards into a disruption sensitive environment.
6. In cases in which one or more options or features have not been demonstrated in at least two interoperable implementations, the specification may advance to the Draft Standard level only if those options or features are removed.

Standard:

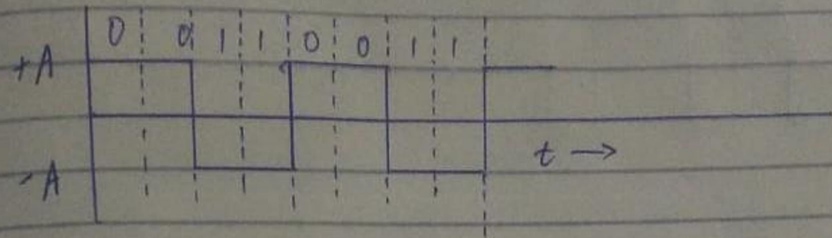
1. A specification for which significant implementation and successful operational experience has been obtained may be elevated to the Internet Standard level.
2. An Internet Standard (which may simply be referred to as a Standard) is characterized by a high degree of technical maturity and by a generally held belief that the specified protocol or service provides significant benefit to the Internet community
3. All specifications unconditionally accepted.
4. Has cleared requirements of both Proposed and Draft and beyond.
5. Completely acceptable to run in a disruption sensitive environment.
6. All features have been time tested.

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

- **00110011**
- **01010101**
- **10101010**

NRZ-L

00110011



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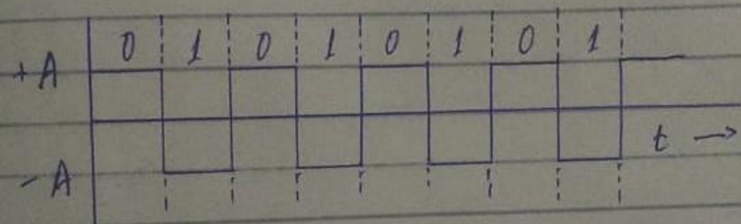

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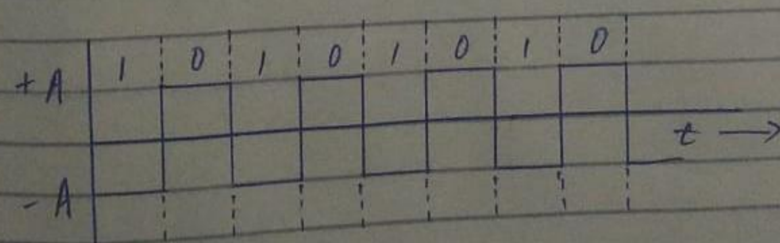
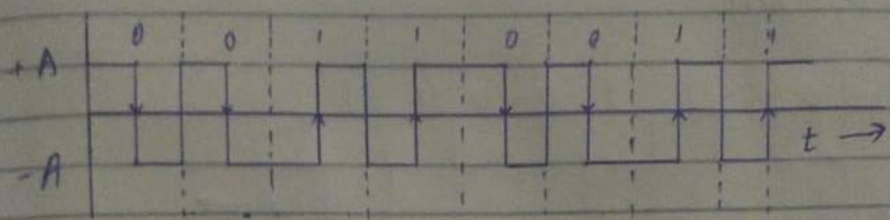


Manchester:

00110011



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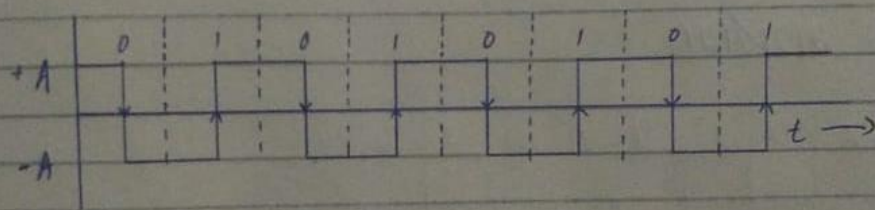

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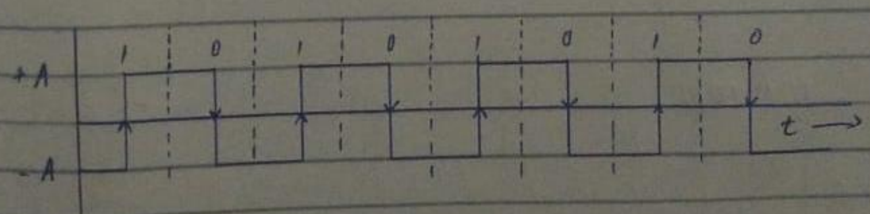
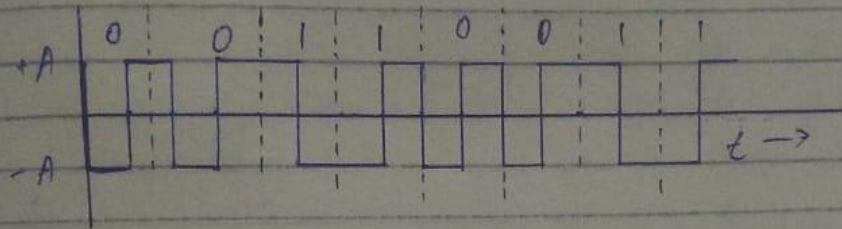


Differential Manchester

00110011



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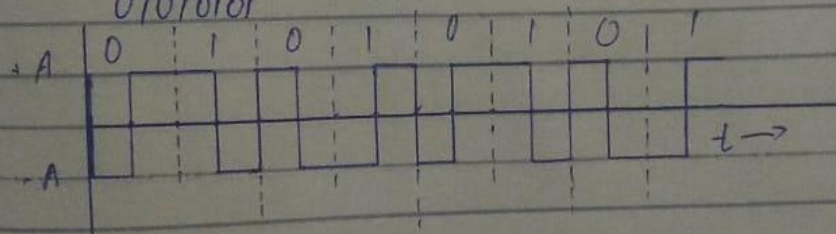

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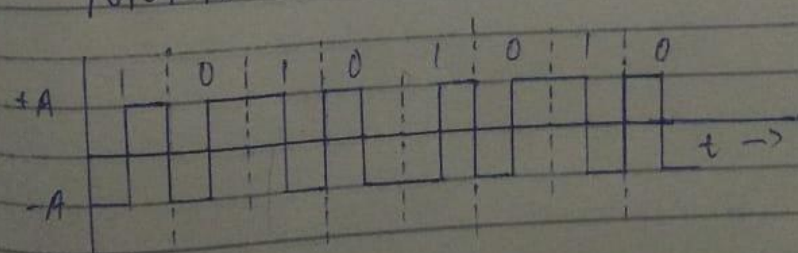
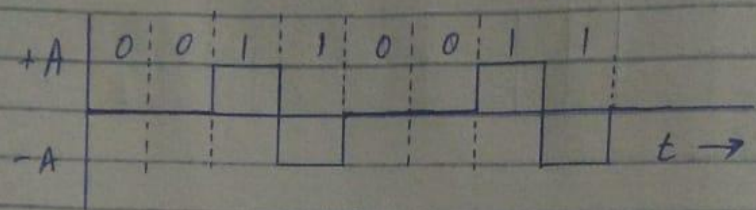


AMI

00110011



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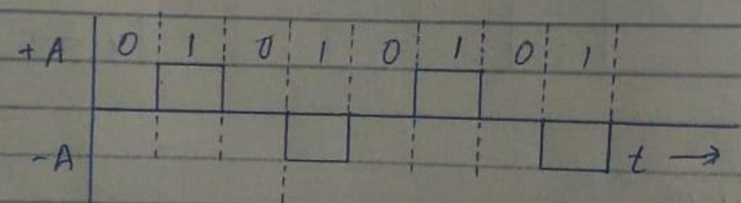

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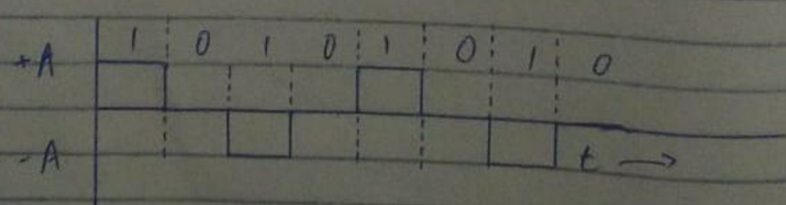

Question 3:You are working as a Network Specialist in ABC organization. You are asked to do research on the current and future Wireless Networks issues and challenges?

Current Wireless networks issues and challenges:

Physical Object Interference / Design

The reliability of your WLAN is heavily dependent on not only the architecture of your hardware and software but also the design and placement of the crucial pieces of your network. So if you're getting spotty signal in certain parts of your WLAN, make sure that your access points and routers are positioned optimally.

Walls, ceilings, and other large objects can inhibit the reach of your wireless signal. Even things like metal filing cabinets can affect your WLAN's performance.

RF Interference

802.11 technology has made the overall performance and reliability of WLAN networks much more suitable for daily enterprise use. Despite this, an invisible culprit often puts a fork in the road regarding signal strength: radio frequency (RF) interference.

RF interference can be caused by any device that emits electromagnetic signals. Examples of devices that emit these signals are:

- Mobile phones
- AM/FM radios
- Televisions
- Microwave ovens
- MRI machines
- Wi-Fi routers

The previously mentioned devices can be seen in almost any enterprise organization or large WLAN networks. Due to the underlying technology, even 802.11n access points themselves can be a source of RF interference.

Hardware Architecture & Firmware

Hardware issues are another major contributing factor to poor WiFi performance on large WLANs. More specifically, the two most common hardware issues we see affecting WLAN performance are either having not enough or too many access points, or having outdated firmware.

Deciding on the number of access points your network needs can be tricky. This design issue can be challenging for even the most seasoned WLAN architects. Also, power configuration and channel selection can make the architectural decision-making process more complex.

4. Security considerations.

Participants are also concerned with the security that surrounds the wireless environment itself. In order to ease these concerns, they have implemented security protocols, such as single sign-on.

Another concern is lost or stolen laptops. Some organizations are using centralized device software to quarantine lost or stolen devices and deny access to the network.

5. Network management issues.

The study suggests that IT professionals get a good idea of whether they are successfully managing their wireless environments by the volume of help desk calls they receive. Some organizations are trying to identify problems before they come to the attention of their users by implementing a formalized rounding program to survey staff about the issues they might be having and run reports on devices.

Future Wireless networks issues and challenges:

1. One of the challenges for designers of wireless hardware is to enable terminals with multiple modes of operation to support different applications. Desktop computers currently have the capability of processing voice, image, text, and video data for small, lightweight, hand-held devices; however, breakthroughs in circuit design will be necessary before multimode operation can be implemented. Because most people will not carry around a 20-pound battery, the signal processing and communications hardware of portable terminals must consume very little power. Many of today's signal processing techniques that increase channel capacity andmitigate channel impairments require a lot of processing power.
2. Another major design challenge will be overcoming the capacity limits, interference levels, and random variations of the wireless channel. Significant breakthroughs have been made in this arena over the last decade, driven mainly by commercial cellular technology. These breakthroughs include: multiple antennas at the transmitter and receiver to increase channel capacity; sophisticated coding strategies to correct channel-induced bit errors; multiuser detection techniques to reduce interference; equalization,

spread-spectrum, and multicarrier modulation to reduce self-interference from signal reflections; adaptive modulation to optimize performance over time-varying channels.

3. Another significant challenge is that the network must be able to locate a given user among millions of mobile terminals and route a call to that user, which could be moving at speeds of up to 100 mph. The finite resources of the network must be allocated fairly and efficiently to meet changing user demands and locations. Today, a tremendous infrastructure has been developed for wired networks: the telephone system, the Internet, and fiber-optic cable, which should also be used to connect wireless systems into a global network. However, because wireless systems with mobile users are not likely to be competitive with wired systems in terms of data rate and reliability, the design of protocols to provide interfaces between wireless and wired networks with vastly different performance capabilities remains a challenge.

4. Wireless systems must support wireless applications, which may have very different requirements (e.g., voice mail and email). It is impossible to design a "one-size-fits-all" wireless network that can support all of the applications that exist today, let alone the applications that will evolve in the future. Moreover, it is impossible to guarantee fixed performance metrics (e.g., data rate or a harddelay constraint) for a wireless network because of the underlying random channel and network dynamics. Thus, wireless applications will have to be adapted to these dynamics to deliver the best end-to-end performance. For example, a wireless video application might require a data rate of 10 megabits per second for very high picture and sound fidelity. However, if the underlying network cannot support this rate, the resolution could be scaled back to a rate commensurate with system capabilities.

5. Perhaps the most significant technical challenge to wireless network is an overhaul of the design process itself. Wireless links exhibit very poor performance, but this performance, along with user connectivity and network topology, changes over time. In fact, the very notion of a wireless link is somewhat fuzzy because of the nature of radio propagation, and because of the dynamic nature and poor performance of the underlying wireless communication channel. High-performance wireless systems will have to be optimized for this channel and must adapt to its variations as well as to user mobility. Thus, wireless systems will require a tightly integrated and adaptive design that transcends hardware, link, network, and application layers. Given the underlying constraints and dynamics of the channel and network, as well as the application requirements, each layer of the system design, as well as across layers, will have to adapt for the system to deliver the best end-to-end performance.