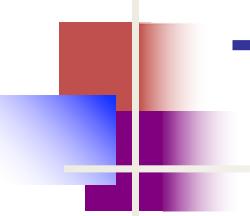




# EE:450 – Computer Networks

Discussion Session  
Spring 2023



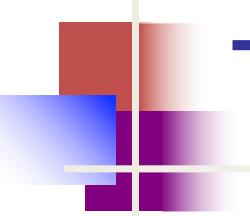
# Teaching Assistant 1

- Name: Xuejing Lei (Rachel)
- . E-Mail Address: [xuejing@usc.edu](mailto:xuejing@usc.edu)
- . Office: PHE 320
- . Office Hours: Friday 12:00pm-2:00pm
- . Zoom Link:  
<https://usc.zoom.us/j/8999083483?pwd=L2ZtYmJKNWZWQk5oazNqNlFDVnB6UT09>
- . Meeting ID: 899 908 3483
- . Passcode: xuejing



# Teaching Assistant 2

- Name: Yue Hu
- E-Mail Address: [yhu57782@usc.edu](mailto:yhu57782@usc.edu)
- Office: EEB 338
- Office Hours: Monday, 8:30am-10:30am, Wednesday 8:30am – 9:30am
- Zoom Link:  
<https://usc.zoom.us/j/2019950912?pwd=V0NoemljbTFvZ2FaK0FDVEVhdTNDQT09>
- Meeting ID: 201 995 0912
- Passcode: 111111



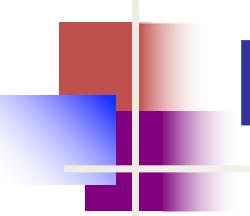
# Teaching Assistant 3

- Name: Mahtab Movahhedrad
- . E-Mail Address: [movahhed@usc.edu](mailto:movahhed@usc.edu)
- . Office: PHE 320
- . Office Hours: Wednesday, 11:00am – 1:00pm
- . Zoom Link:  
<https://usc.zoom.us/j/7788683821?pwd=eDNxVVBN1RuaU5vUDBDMVI1YVpwZz09>
- . Meeting ID: 778 868 3821
- . Passcode: 481232



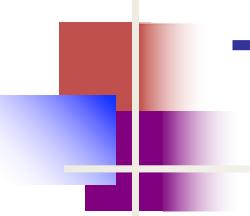
# Teaching Assistant 4

- Name: Gagan Punathil Ellath
- E-Mail Address: [gpunathi@usc.edu](mailto:gpunathi@usc.edu)
- Office: PHE 320
- Office Hours: Monday 2:30-4:30 PM
- Zoom Link:  
<https://usc.zoom.us/j/91675508410?pwd=YU5wRFFLMXJYcHlrZ2doR09FeDExUT09>
- Meeting ID: 916 7550 8410
- Passcode: EE450



# My Responsibilities

- Conducting a weekly discussion
- Maintaining the course web site
- Conducting office hours (**open to all students**)
- Designing and grading projects
- Assisting (via e-mail)
  - **Regardless** of your enrollment in the discussion session and **Regardless** on which discussion session you attend, your email should be forwarded to your designated TA (TBD)



# TA Assignments (TBD)

- Student will be divided between the TAs
- The designated TA will be responsible for answering the emailed questions from his assigned students
  - The student can only email his designated TA if he has any questions
  - Emails sent to different TA will be forwarded to the student designated TA
- However, we **strongly recommend** that you use Piazza class discussion board for your questions. This way it will benefit everyone.

# Piazza Discussion Board

The incredibly easy, completely free Q&A platform  
Save time and help students learn using the power of community

- Wiki style format enables collaboration in a single space
- Features LaTeX editor, highlighted syntax and code blocking
- Questions and posts needing immediate action are highlighted
- Instructors endorse answers to keep the class on track
- Anonymous posting encourages every student to participate
- Highly customizable online polls
- Integrates with every major LMS

[Students Get Started](#) [Professors and TAs Get Started](#) [View a Real Class](#)

**Week 3 Discussion Question**  
How different or similar you think Speech Science is in comparison to the other courses you have been enrolled in Communication Sciences and Disorder?

**Instr. Lecture #4 Question 4**  
The resonant frequencies of the vocal tract are called [a] Formants [e] Variable resonator [o] Spec

**Instr. Lecture #4 Question 3**  
A system that resists energy above a specific lower cutoff frequency, while allowing it to pass through

**Instr. Lecture #4 Question 2**  
The point at which a resonator becomes unresponsive to an applied frequency is referred to as? [a] Applied Frequency [b] Resonance

**Instr. Lecture #4 Question 1**  
What refers to the rate at which an object vibrates? [a] Frequency [b] Amplitude [c] Physical characteristics! [e] Applied Frequency

**Private Instr. Lecture 6 class response**  
How well were you able to understand today's lecture? [o] Very well [o] Fairly [o] I didn't understand anything

**Followup discussions** for lingering questions and comments

**Resolved** **Unresolved**

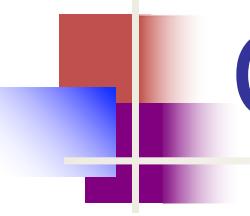
The first thing I noticed is that there are numbers and data and quantitative research involved in this course. Other classes (language disorders, communication disorders in children) talk about behaviors that can be measured in other ways but not by how fast or slow the frequency of their voice is...we talk a lot in speech science about norms and what the "normal range" is for frequency and pitch and amplitude and intensity, and while this is true somewhat in other courses, there is more room for interpretation and ways to "back up your answer." There is more writing in other courses. Quizzes are essays and depend on your ability to reason and interpret. I suppose that is the case with speech science, but there is a lot more math in this course than I expected. This course is more "there is a right answer and a wrong answer" and that is somewhat comforting. That's it for now...just initial reflections, may have more when others contribute...

21 days ago by I

21 days ago I think it is very similar in some of the concepts. I know that a lot of the material has overlapped so far for Speech Science and Audiology in terms of basics (frequency, amplitude, sound waves, etc.), and that the topics for some of the group projects are similar in that they cover some of the same material. My group is preparing to cover the Articulatory System, which includes the vowel quadrilateral that many of us learned in Phonetics and the vocal valves and cavities from Anatomy and Physiology.

I think that this course is different in that it develops these concepts further than just basic definitions, or that it takes the information from more than one class and fuses it together to show us how exactly everything works in a human body and in a clinical setting.

- You should have received an email to join USC 450 discussion board in Piazza website.
- We encourage you to use it for posting questions regarding to Homeworks/Labs/Project.
- The TAs will answer your questions, so people visit this website often and make sure to check if your question was asked before to avoid double posts.
- Also, if necessary, you can post anonymously.



# Course webpages



- Class Website (you **must** visit the class website frequently):
  - <http://den.usc.edu>
  - Webcasts for both lecture and discussion are available (all sessions)
  - Lecture and discussion notes, assignments, solutions, labs and project as well as important class announcements/news will be posted on the website
  - Whenever a document is posted on the website, you will be notified by email with EE450 in the subject line
  - **DO CHECK and READ your emails every day!**
  - TAs may make mistakes – We appreciate your constructive feedback

# Homeworks



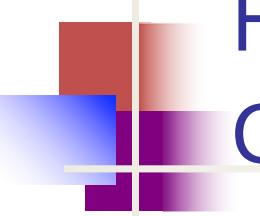
- 4 – 5 homeworks this Semester
  - You must submit HWs and Labs to the online submission folder by the due date
  - HW/Lab must NOT be emailed to TA or the professor
- Goal of Homework
  - To help you learn the Material
  - For you to gain experience in solving networking-related problems
- Homework is difficult
  - Help is available – but not at last minute
  - Start Early – Cannot answer 20 emails an hour before homework is due
  - Come to discussion/office hours with Questions



# Extra Credit Labs

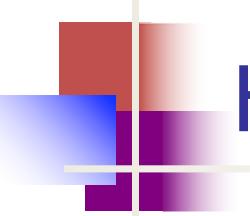
- Extra credit Labs (**Strongly recommended**)
  - Protocol analysis using Wireshark (Ethereal)
    - 2 labs, assigned before the Midterm
  - Network simulation using Mininet
    - 3 labs, assigned after the midterm
    - Mininet is a network emulator that creates a realistic virtual network on a single virtual machine
  - Each lab is worth 4 points added to your midterm grade out of 100
- i.e. you can potentially earn 20 points of extra credit if you successfully fulfill all 5 labs

Introduction to Wireshark (Ethereal) and Instructions for Downloading and Installing Mininet will be posted on DEN>Course documents in the corresponding folders



# Hard Deadline Policy Regarding Collecting Graded Assignments and Grade Adjustments

- Once grades for an assignment are ready for viewing on DEN, TAs will notify the class by email and announce a deadline as the last day **to resolve** grading issues
- Please note that **NO** grade adjustments are allowed or accepted after the deadline for a specific assignment. This applies to students in both sessions as well as DEN remote students



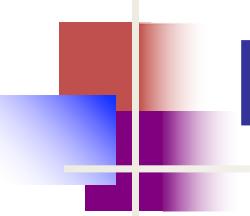
## How and When to Resolve

- Students have about **2 weeks** from the time of the notification email to:
  - Contact the designated grader (and if necessary the designated TA) to resolve any grading issues and have their grade updated in the grade book.



# Project

- Client/server socket programming
  - Mandatory (hard deadline strictly enforced)
  - Important to learn (a stepping stone to CS-551)
  - Will expose you to the basics network programming
- Requirements
  - Knowledge of C or C++ programming (Medium to Skillful)
  - Knowledge of Unix (Basic)
  - Knowledge of Network Programming (Network Sockets)
    - If you are new to socket programming, do study this tutorial carefully asap and before starting the project) at <http://beej.us/guide/bgnet>
- TAs will guide and help you only with the project itself
- They will **NOT** teach you C/C++ programming, debugging, Unix or network programming



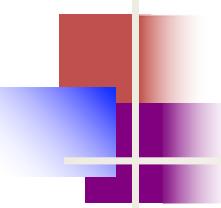
# Project Platform

- We will create an Ubuntu virtual machine (VM) and share it with everyone.
- You should load that VM in your laptops using VM applications such as:
  - Oracle VirtualBox (Recommended)
  - VMware etc.
- During grading, TAs will load a fresh copy of the VM and grade your projects on it.
- You may write your code in a Linux editor on the VM (preferred method) or in any other editor elsewhere and **MUST copy it to VM for testing**.
- No MS-Windows programs will be accepted.
- Ubuntu VM copy has been provided on D2L.
- In the meantime, we recommend that you get yourself familiar with C/C++ and Linux.

# Discussion Class



- **Discussion** is not a *Lecture Class*
- In order to be useful, I need your help
- Please come ready with Questions
- Do the homework before hand
  - Start early! HW can not be done in just a few hours
- I want you to be able to point out the tricks or subtleties to some of the problems in networking
- The more exposure you have to the subject, the more prepared you will be for the exams



# Format

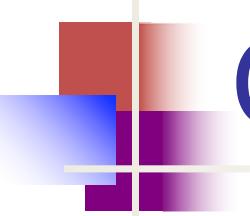


- I'll typically give a short lecture on some of the key topics for the week
- Go over some extra examples
- Go over any questions
- Let me know:
  - If something is not clear
  - If you can't read my handwriting
  - I'm speaking too fast

# Getting Help

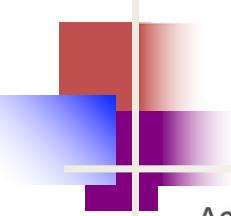
- Methods
  - Ask Me in Class
  - Come to office hours
  - Send me an email (Check your Designated TA)
    - Notice: If you are on campus, It's more effective to come and get help





# Other Ideas

- Use the web for help
  - Be careful
  - Searches on Google usually return some very good info
- You may talk with each other about concepts discussed in class, but remember:
  - All assignments (HW, Labs and Project) require individual effort!
  - Don't copy! It doesn't pay off and it is NOT allowed!!!



# Academic Integrity

Academic Integrity violations (academic dishonesty) include, but are not limited to:

## ***Plagiarism***

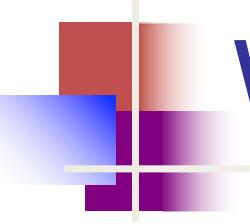
- The submission of material authored by another person but represented as the student's own work, whether that material is paraphrased or copied in verbatim or near-verbatim form.
- Re-using any portion of one's own work (essay, term paper, project, or other assignment) previously submitted without citation of such and without permission of the instructor(s) involved.
- Improper acknowledgment of sources in essays or papers, including drafts. Also, all students involved in collaborative work (as permitted by the instructor) are expected to proofread the work and are responsible for all particulars of the final draft.
- Acquisition of academic work, such as term papers, solutions, or other assignments, from any source and the subsequent presentation of those materials as the student's own work, or providing academic work, such as term papers, solutions, or assignments that another student submits as their own work.

## ***Cheating***

...

Learn more:

[https://policy.usc.edu/wp-content/uploads/2022/09/USC\\_StudentCode\\_August2022.pdf](https://policy.usc.edu/wp-content/uploads/2022/09/USC_StudentCode_August2022.pdf) Page 11

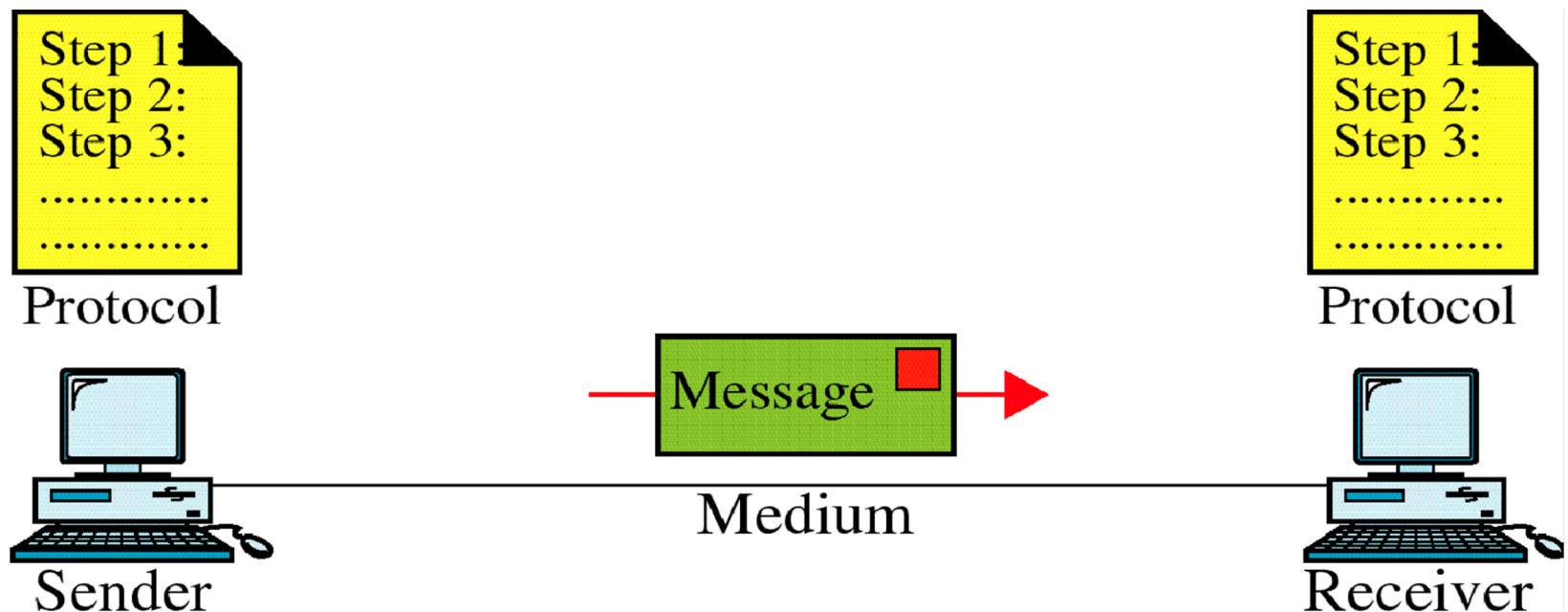


# Why Networks?

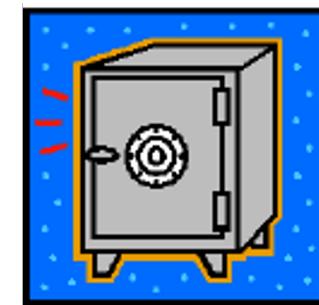
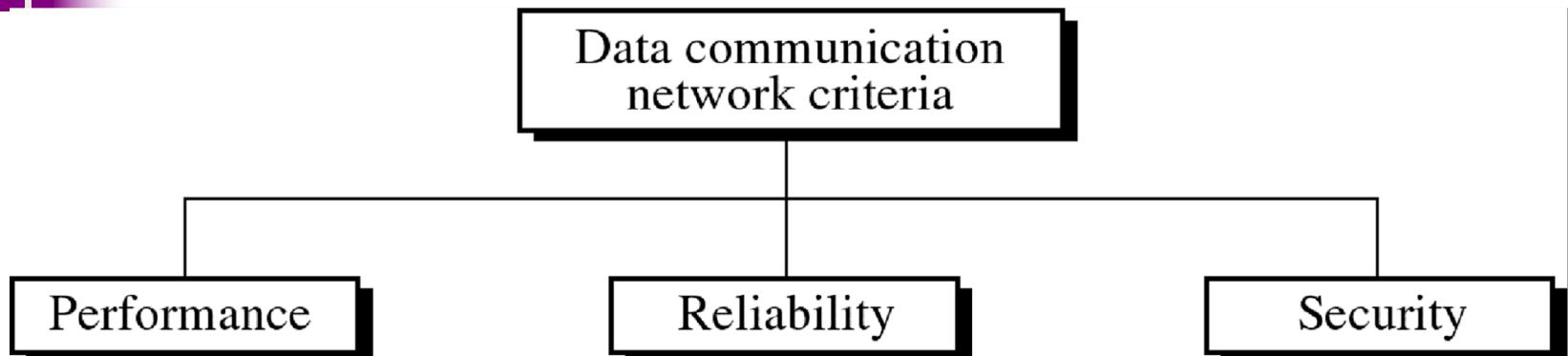
- Networks are connections
- Computers are powerful by themselves but many times more powerful when they are connected
- We live in a world where having information is not worth much, but being able to share it is very valuable

# Some Networking Basics

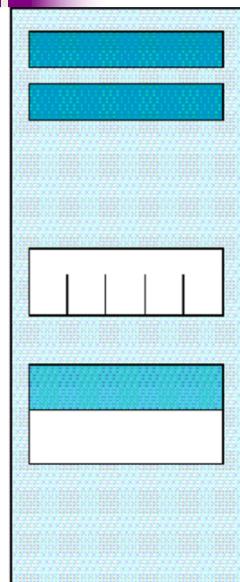
## ■ Lets Define a Communication System



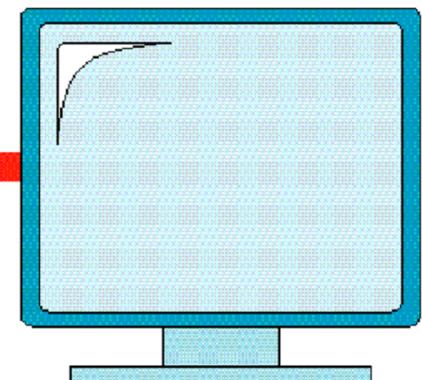
# Three goals



# Simplex



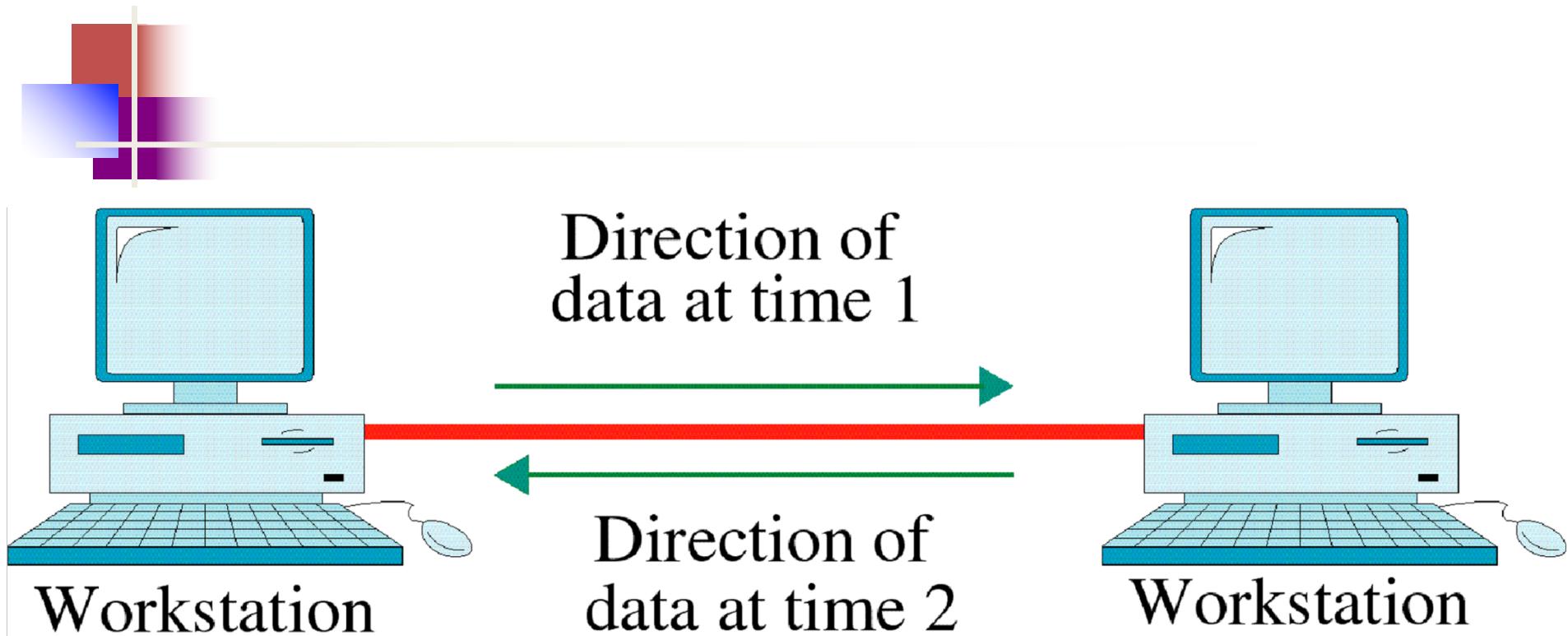
Direction  
of data

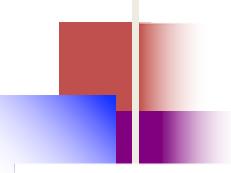


Mainframe

Monitor

# Half-Duplex





# Network

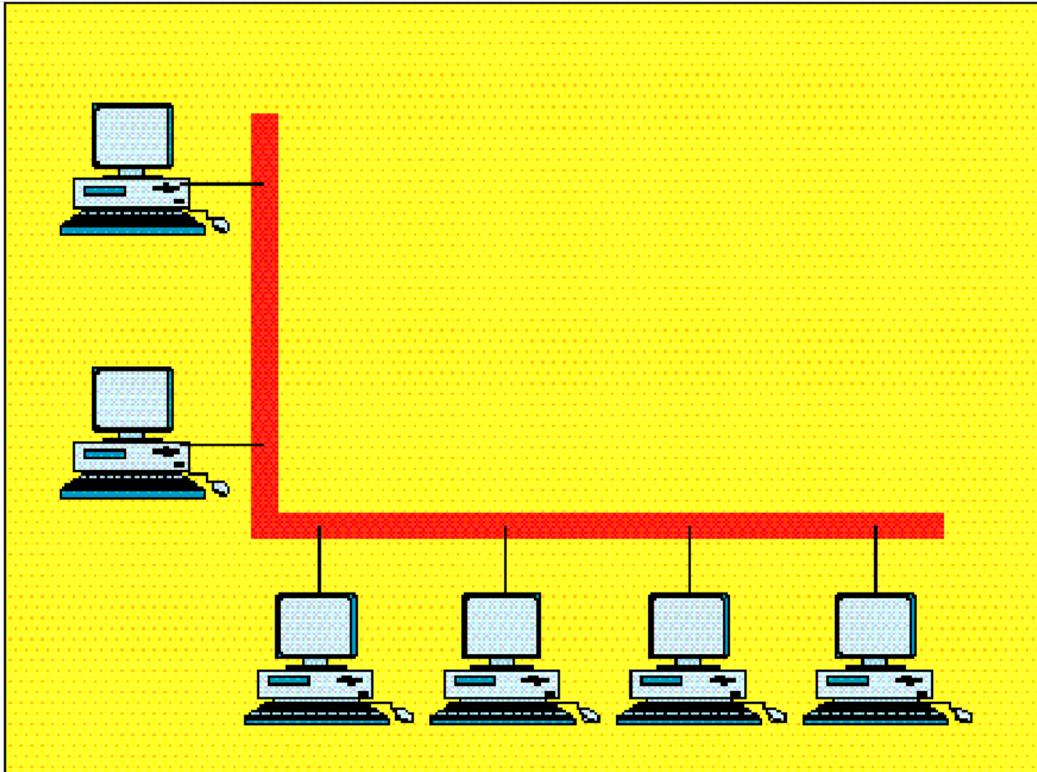
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Local area  
network  
(LAN)

Metropolitan area  
network  
(MAN)

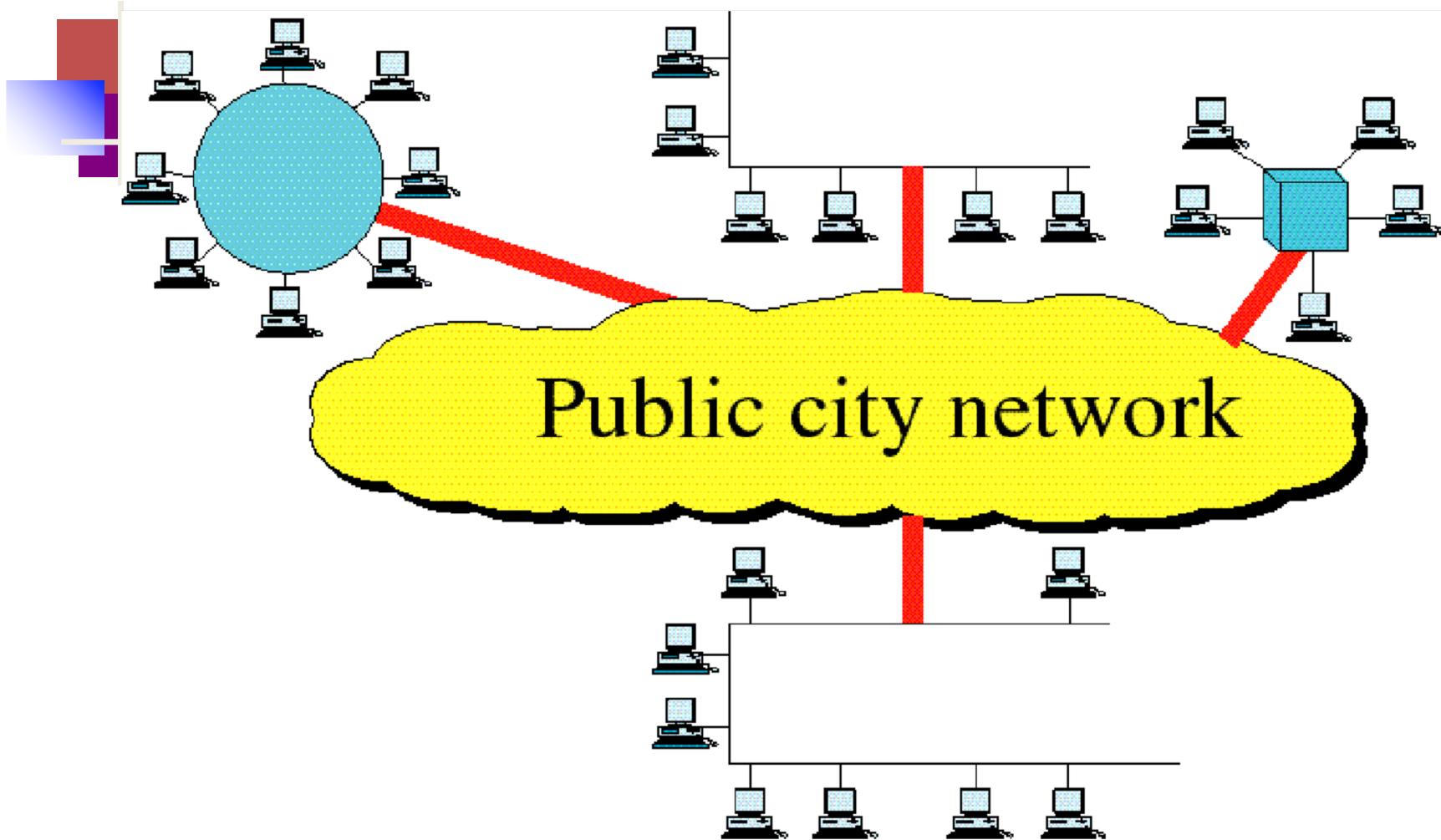
Wide area  
network  
(WAN)

# Local Area Network

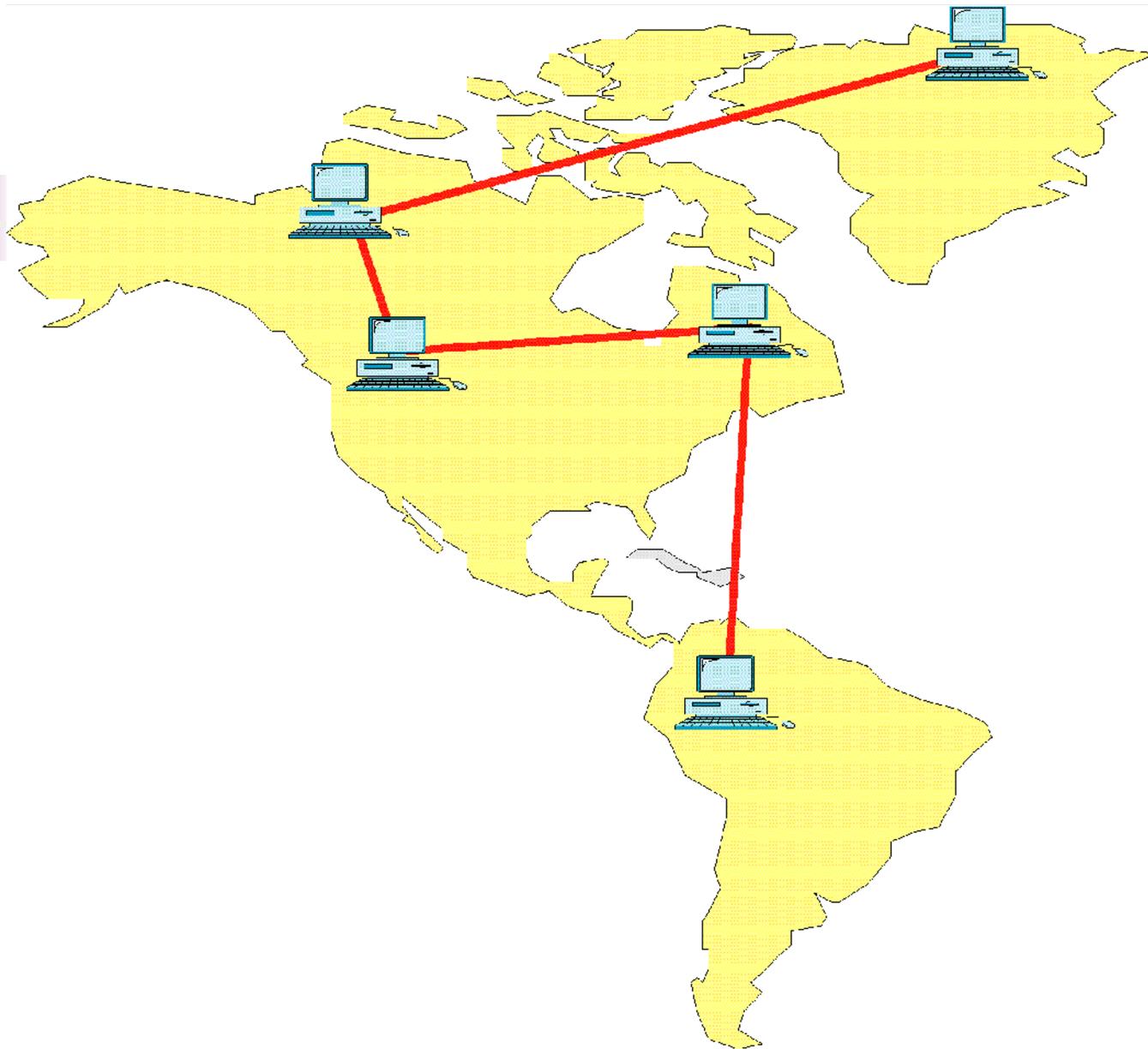


Single building LAN

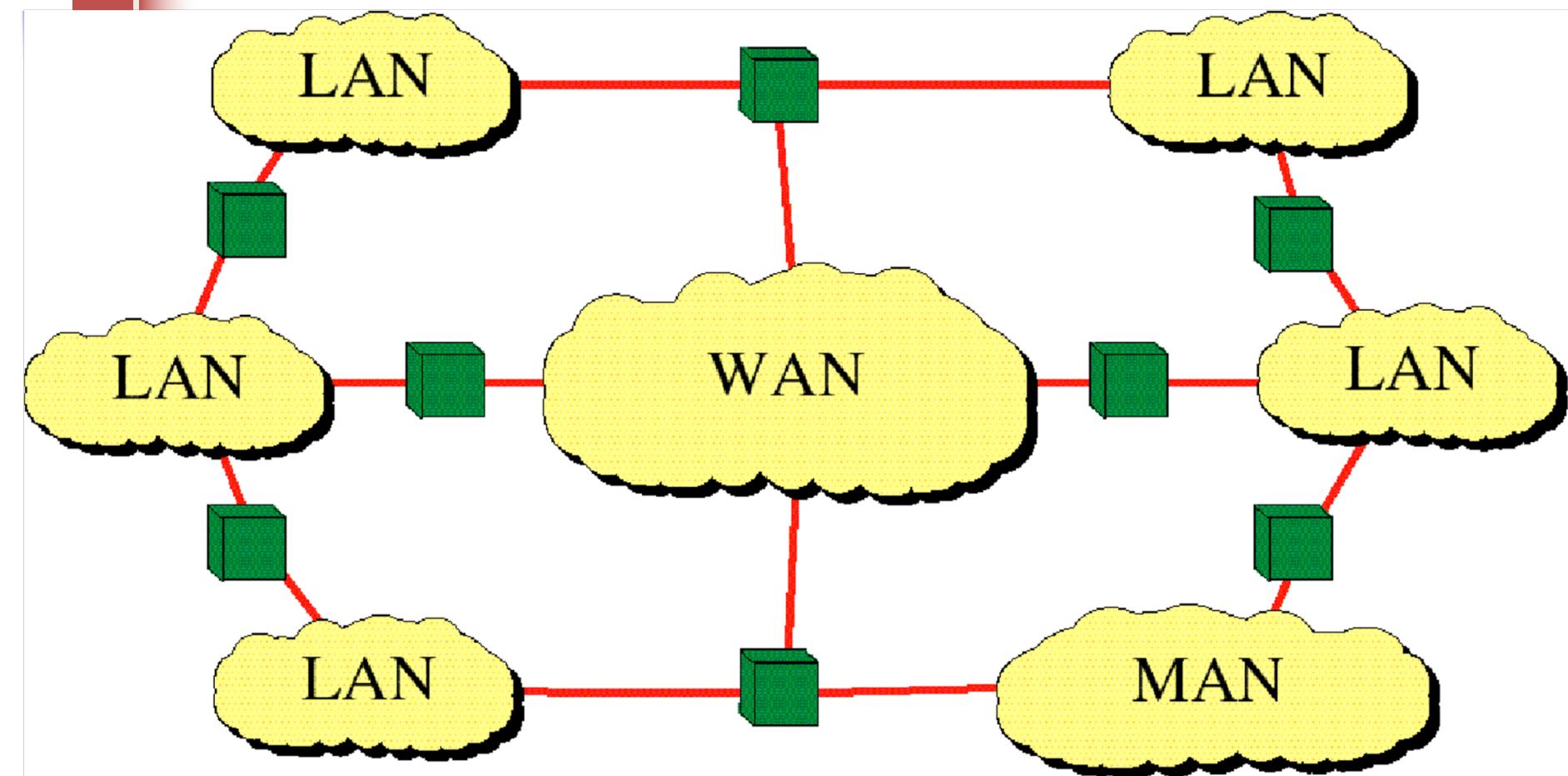
# Metropolitan Area Network



# Wide Area



# Internetwork (Internet)





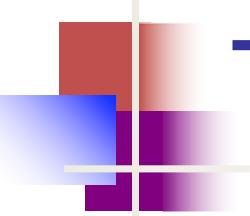
## Basics continued...

- Communicating parties can be
  - Telephones
  - Cell Phones
  - TV/Radio transmitters/receivers
  - Computers



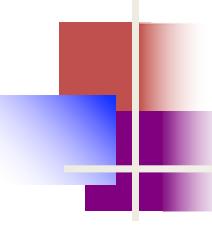
## Basics continued...

- Transmission medium can be
  - Twisted pair copper wire
  - Coaxial cable
  - Optical fiber
  - Or simply air...



# Transmission

- **Transmitter**
  - Messages are converted into electrical signals
- **Transmission Medium**
  - Transmitter End: Electrical signals are converted into suitable transmission signals depending on the transmission medium. (EM waves for air, Light for optical fiber, etc)
  - Transmission signals are propagated through the medium
  - Receiver End: Converts the transmission signals into Electrical signals
- **Receiver**
  - Electrical signals are decoded to get the original message back.



# SIGNALS

- The electrical signals can be **ANALOG** or **DIGITAL**
- **ANALOG** – the amplitude can take infinite number of values
  - Ex: TV/Radio transmission
- **DIGITAL** – the amplitude can take finite number of values only
  - Ex: Computer Communications (uses two logic values 0 and 1)

**We will be dealing with DIGITAL transmissions** <sup>34</sup>