Veri İletişimi ve Bilgisayar Ağları
BLM3051

Dr. Öğr. Üyesi Furkan ÇAKMAK

Course Information

- **Class Hours:**
  - **Thursday 13:00 – 15:50**
- The entire course will be delivered face-to-face.
- For announcements: https://avesis.yildiz.edu.tr/fcakmak/dokumanlar
  - OBS Bulk Email System
  - Google Classroom Code: **pnfyige**
  - You can ask your questions via Google Classroom.
- For your questions and communication requests, please use the e-mail address fcakmak@yildiz.edu.tr.

Ders Bilgilendirme Formu – Haftalık Konular

Week #	Date	Subjects
1	20.02.2025	Veri İletişimine Giriş, Mimari Modeller
2	27.02.2025	OSI Referans Modeli, Katmanları, Fonksiyonları
3	06.03.2025	Fiziksel Katman, Sinyalleşme
4	13.03.2025	Paralel ve Seri İletişim, Haberleşme Ortamları ve Teknik Özellikleri, Multiplexing (TDM, FDM)
5	20.03.2025	Hata Tespiti ve Düzeltme Yöntemleri
6	27.03.2025	Veri Bağı Kontrol Teknikleri ve Akış Kontrolü
7	03.04.2025	Senkron ve Asenkron Veri Bağı Protokolleri (BSC, HDLC)
8	10.04.2025	Ara Sınav
9	17.04.2025	LAN Teknolojileri, IEEE 802.3, IEEE 802.4, 802.5, 802.11
10	24.04.2025	Geniş Alan Ağlarında Kullanılan Teknolojiler (X.25, ISDN, FR, ATM, xDSL.)
11	01.05.2025	Emek ve Dayanışma Günü
12	08.05.2025	Ağ Katmanı, Anahtarlama, Bağlantılı ve Bağlantısız Servisler, Statik ve Dinamik Routing
13	15.05.2025	Ağ Katmanında Sıkışıklık, Sebepleri ve Çözümleri, IP (Internetworking Protocol)
14	22.05.2025	ICMP, BOOTP, DHCP, Taşıma Katmanı - UDP (User Datagram Protocol), TCP (Transmisson Control Protocol)
15	29.05.2025	Öğrenci Proje Sunumları

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Course Information Form – Weekly Subjects

Week #	Date	Subjects
1	20.02.2025	Introduction to Data Communication, Architectural Models
2	27.02.2025	OSI Reference Model, Layers, Functions
3	06.03.2025	Physical Layer, Signaling
4	13.03.2025	Parallel and Serial Communication, Communication Environments and Technical Specifications, Multiplexing (TDM, FDM)
5	20.03.2025	Error Detection and Correction Methods
6	27.03.2025	Data Link Control Techniques and Flow Control
7	03.04.2025	Synchronous and Asynchronous Data Link Protocols (BSC, HDLC)
8	10.04.2025	Midterm
9	17.04.2025	LAN Technologies, IEEE 802.3, IEEE 802.4, 802.5, 802.11
10	24.04.2025	Technologies Used in Wide Area Networks (X.25, ISDN, FR, ATM, xDSL.)
11	01.05.2025	Labor Day
12	08.05.2025	Network Layer, Switching, Connection-based and Connectionless Services, Static and Dynamic Routing
13	15.05.2025	Congestion at the Network Layer, Causes and Solutions, IP (Internetworking Protocol)
14	22.05.2025	ICMP, BOOTP, DHCP, Transport Layer - UDP (User Datagram Protocol), TCP (Transmission Control Protocol)
15	29.05.2025	Student Project Presentations

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Course Information Form – Coursebooks

	Coursebooks
1	Introduction to Data Communications & Networking, Behrouz Foruzan
2	Computer Networks 2e, Andrew S. Tanenbaum
3	Data Networks:Concepts, Theory and Practice, Uyless D.Black
4	Routing & Switching: Time of convergence, Puzmanova

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Course Information Form – Evaluation

	Method	#	Ratio (%)
	Midterms	1	30
	Quizzes	-	-
Evaluation Systematics	Homeworks	1	10
	Projects	1	20
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	40

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What is Communication?

- Sharing information/data
- Telecommunication (Tele -> far *Greek)
- Communication Aim: Trafic data
- Telephone, Television, vb.
  - Ses, video, resim
- Computer
  - Medium/Media -> 0/1
- Protocol Stack: Software and Hardware

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What is Communication? – Con't

- Humanity History: 200k
- Sumerians: B.C 4000
- *«Verba volant, scripta manent»*
- Copper Cable
  - Telegraph: 1837-1838
  - Telephone: 1876
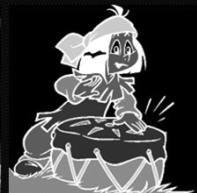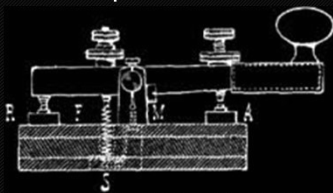
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Essentials of Data Communication

- Message
- Sender
- Receiver
- Medium
- Protocol

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Data Communication
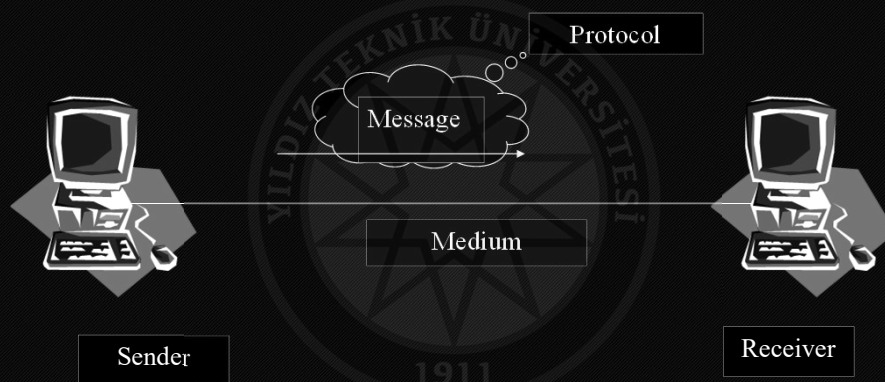
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Data Comm. Features

- Delivery
- Accuracy
- Timeliness

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Pros of Computer Network

- Resource Sharing
- Info/Data Sharing
- Load Sharing / Balancing
- Reliability
- Econmony
- Efficient communication between in different places
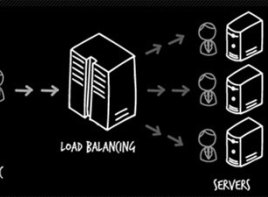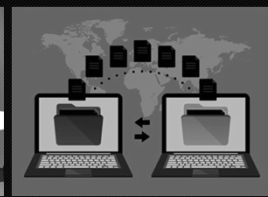
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Evaluation Criteria for Computer Networks

- Performance
  - Transmit time
  - Response time
- QoS
  - Circuit-switched (Synchronous)→ Bit rate, Min Error Rate, Transmission Rate
  - Packet-switched (Asynchronous) → Maximum Packet Size, Mean Packet Transfer Rate, Mean Packet Error Rate, Jitter, Mean Packet Transmit Delay
- Reliability/Availability
  - MTBF – Mean Time Between Failure
  - Restoring Time
  - 5-9 → 99,999%
- Security
- Scaleable
- Adaptable
  - Software, Hardware

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Network Standards

- De Jure
  - ISO (International Organization for Standardization)
  - ITU (The **International** Telegraph and **Telephone** Consultative Committee)
  - IEEE (The Institute of Electrical and Electronics Engineers)
  - ETSI (The European Telecommunications Standards Institute)
  - EIA (Energy Information Administration)
  - TIA (Telecommunications Industry Association)
  - ANSI (American National Standards Institute)
  - TSE (Türk Standartları Enstitüsü)
  - IETF (Internet Engineering Task Force)
- De Facto
  - QWERTY keyboards
  - VHS video format
  - PDF document type
  - Buttons on men's shirts are on the right, buttons on women's shirts are on the left.

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Computer Network (CN)

- ARPANET (1970s)
- Classification of CN
  - Technique of Tranmission
    - Broadcast
    - Peer to peer – P2P
  - Network Dimension
    - PAN-Personal Area Network (< 10m)
    - LAN-Local Area Network (< 100m-200m)
    - CAN-Campus Area Network (< 1-5km)
    - MAN-Metropolitan Area Network (< 10-50km)
    - RAN-Regional Area Network (< 100-200km)
    - WAN- Wide Area Network (< 1000km)
- Bit Rate

	10m	100m	1Km	10Km	100Km	1Mm
10Gbps	Çok yüksek hızlı LAN					
1Gbps	Yüksek hızlı LAN		MAN		Yüksek hızlı WAN	
100Mbps	Hızlı LAN					
10Mbps	Düşük hızlı LAN					
1Mbps					WAN	
100kbps						
10kbps						

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Topology

- Bus
- Star
- Tree
- Ring
- Mesh
- Hybrid

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Bus Topology

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Star Topology
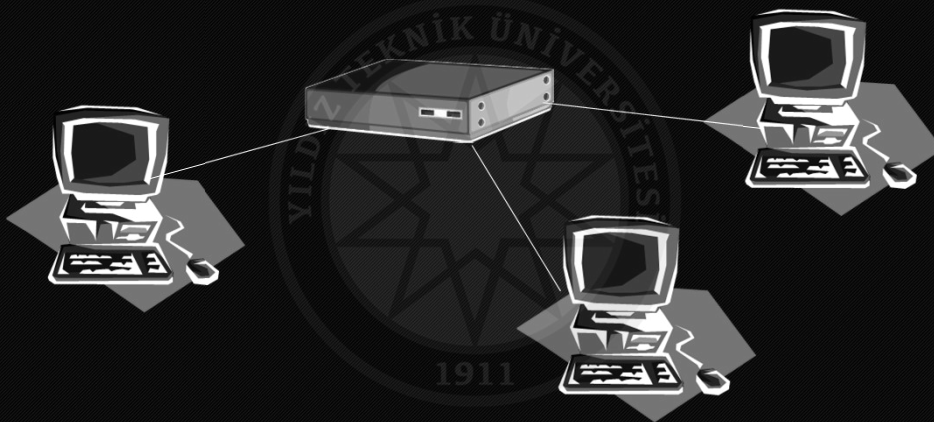
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Tree Topology

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Ring Topology

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Mesh Topology
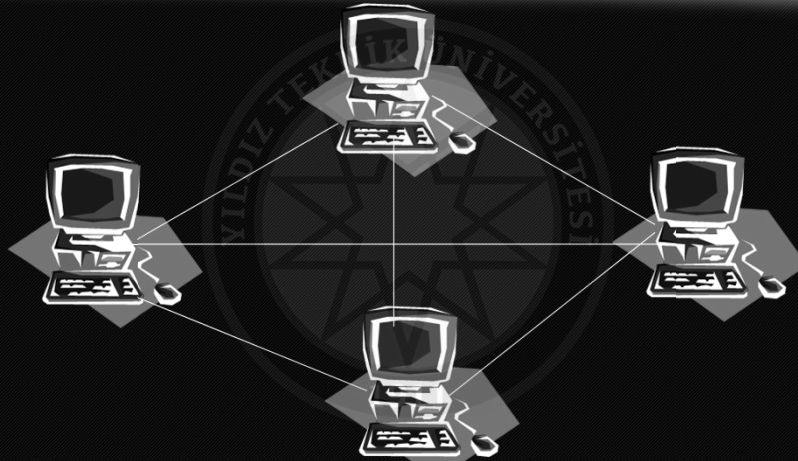
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Hybrid Topology
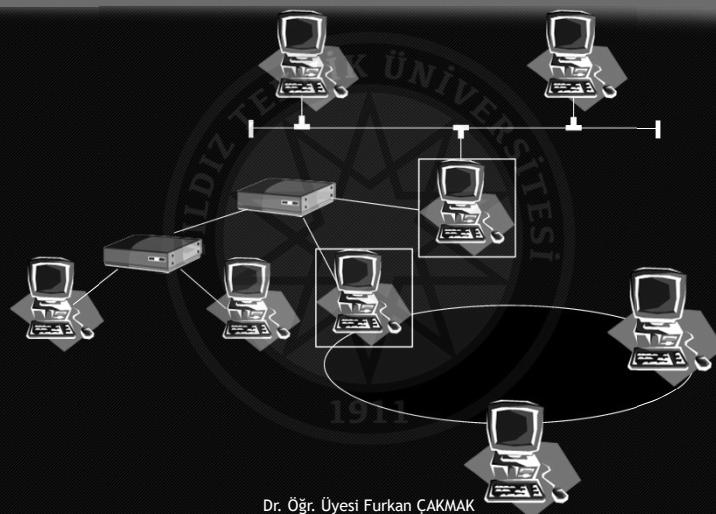
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Thank you for listening

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