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Course: IT Fundamentals of Cyber Security

Project: Cyber Security 4 ALL(CS4ALL)

CHAPTER II

Fundamentals of Computer System

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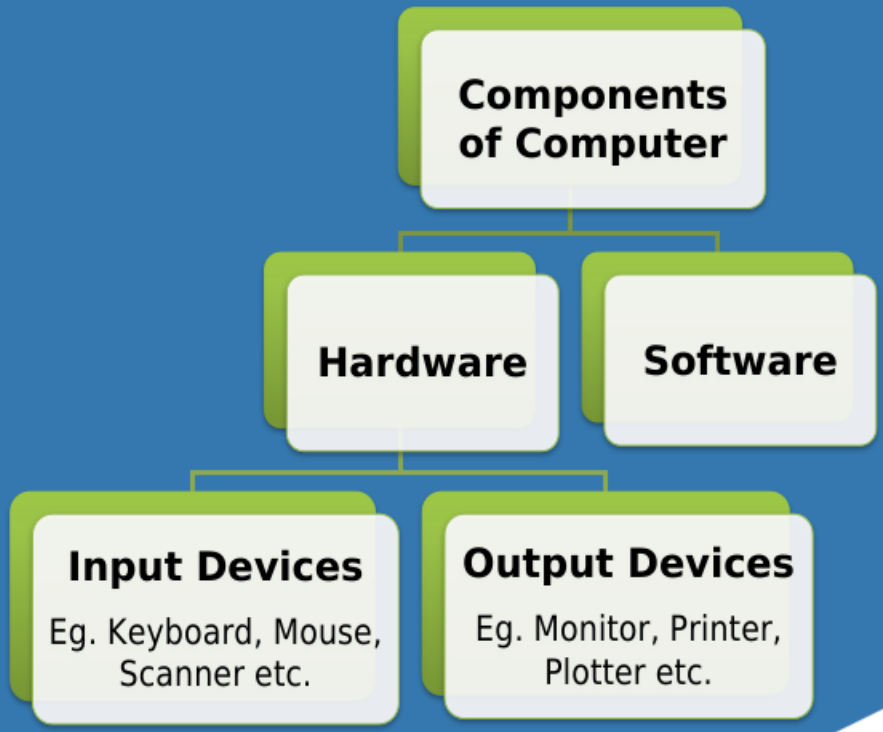
Understanding Computer Hardware Components

- Central Processing Unit (CPU)
- Motherboard
- Memory (RAM)
- Storage Devices
- Power Supply Unit (PSU)
- Graphics Processing Unit (GPU)
- Input Devices
- Output Devices
- Peripheral Devices.



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Introduction to Computer System

- A computer system is a combination of hardware and software that works together to process and store data.

Components & Types of Computer Systems

Hardware Components

- Central Processing Unit (CPU)
- Motherboard
- Memory (RAM)
- Storage Devices
- Hard Disk Drive (HDD)
- Solid State Drive (SSD)
- Power Supply Unit (PSU)
- Graphics Processing Unit (GPU)
- Input Devices
- Output Devices
- Peripheral Devices

Software Components

- System Software
- Application Software

Types of computer System

- Personal Computers (PCs)
- Workstations
- Embedded Systems
- Servers
- Cloud Computing Systems
- Mainframe Computers
- Supercomputer

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Security, Future Trends and Challenges in Computer Systems

Security in Computer System

- **Threats**
- Malware
- Phishing
- DDoS Attacks
- Data Breaches
- **Security Measures**
- Firewalls
- Antivirus Software
- Encryption
- Access Control
- Regular Update

Future Trends in Computer Systems

- Artificial Intelligence (AI) and Machine Learning
- Quantum Computing
- Edge Computing
- 5G Technology
- Blockchain Technology

Challenges in Computer Science

- Cyber security Threats
- Data Privacy Concerns
- Integration of Legacy Systems
- Scalability Issues
- Sustainability
- Skill Shortages

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Overview of Operating System (O.S) and Software Application

- An Operating System (O.S.) is system software that manages computer hardware and software resources and provides common services for computer programs.
- It acts as an intermediary between users and the computer hardware, enabling users to run applications efficiently.
- The operating system ensures that the hardware works in harmony with the software, managing memory, processing, storage, and peripheral devices.
- A software application (or simply, an application) is a program or group of programs designed for end-users to perform specific tasks or functions.

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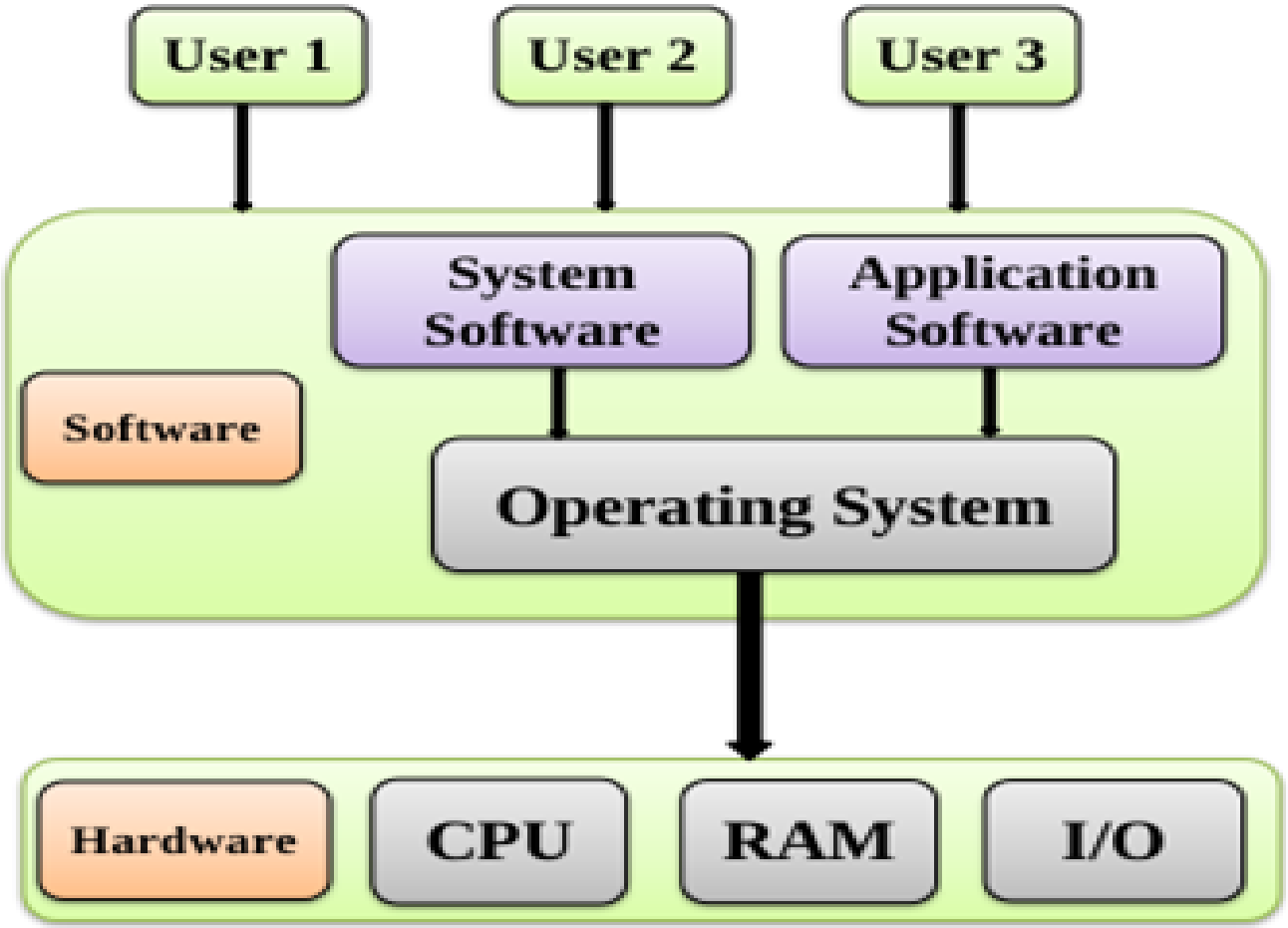
Overview of Operating System and Software Application



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Operating System & Software

- **Operating System:-** Software that manages computer hardware and software resources and provides services for computer programs.
- **Software:-** A set of instructions or programs that tell a computer how to perform specific tasks.

-Types of Software Application

- Freeware
- Open source
- Shareware
- Custom software
- Packaged software

-Important functions of an operating System

- Memory Management
- Processor Management
- Device Management
- File Management

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Data Storage and Memory

- **Data storage** refers to the method of saving digital information in a computer system or device for future access.

- **Memory** refers to the physical devices that temporarily or permanently store data and program instructions for a computer.

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Introduction to Computer Networks and Protocols

- **A computer network** is a collection of interconnected devices (computers, servers, routers, etc.) that communicate with each other to share resources, data, and applications.
- These devices use communication protocols to exchange data efficiently and securely over different mediums such as cables, fiber optics, or wireless signals. Computer networks enable connectivity across local areas (LAN) or globally (WAN/Internet), forming the backbone of modern communication.

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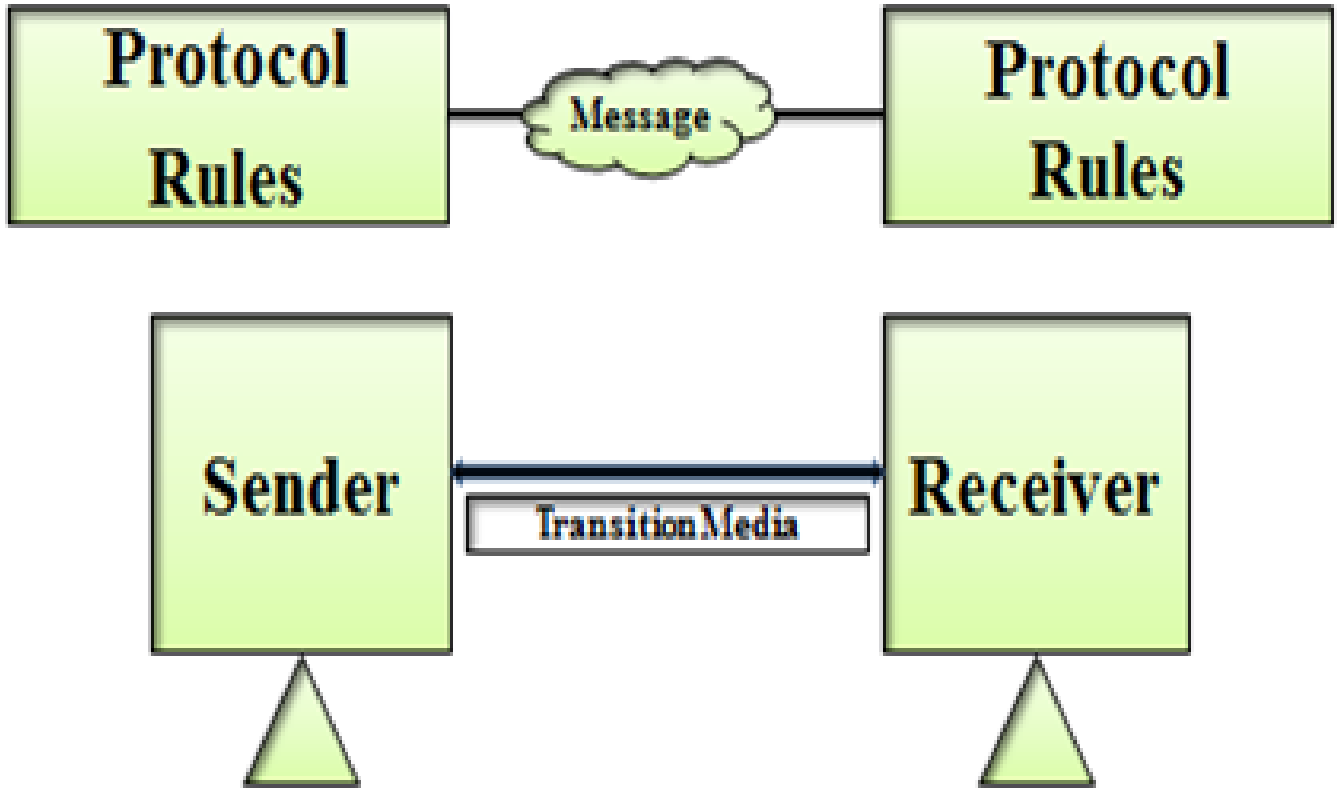
Introduction to Computer Networks and Protocols



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Computer Networking and Fundamentals

-What is Computer Network?

- A computer network is a group of interconnected devices that can share resources and exchange data with each other.

-Components

- Two or more computers Server or Client workstation.
- Networking Interface Card's (NIC)
- A connection medium i.e. wires or wireless.
- Network Operating system software, such as Microsoft Windows NT or 2000, Novell NetWare, UNIX and Linux.

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Network Types

Types of Computer Network

- LAN [Local Area Network}
- WLAN [Wireless local area network]
- CAN [Campus Area Network]
- MAN [Metropolitan Area Network]
- PAN [Personal Area Network]
- SAN [Storage Area Network]
- VPN [Virtual Private Network]
- WAN [Wide Area Network]

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Network Protocols

A **network protocol** is a set of rules or standards that define how data is transmitted and received across a network.

-Types of Network Protocol

- Hypertext Transfer Protocol(HTTP)
- Transmission Control Protocol(TCP)
- User Datagram Protocol(UDP)
- Border Gateway Protocol(BGP)
- Address Resolution Protocol(ARP)
- Internet Protocol(IP)
- Dynamic Host Configuration Protocol(DHCP)

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Network Security

1. Secure Socket Layer(SSL)

- Secure Socket Layer(SSL) it is a network security protocol mainly used for protecting sensitive data and securing internet connections.

Hypertext Transfer Protocol(HTTPS)

- Hypertext Transfer Protocol(HTTPS)It is the secured version of HTTP.

Transport Layer Security(TLS)

- Transport Layer Protocol it is a security protocol designed for data security and privacy over the internet.

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Conclusion

The fundamentals of computer systems helps in grasping how operating systems coordinate the myriad processes that enable software and hardware to function cohesively, ensuring that the system remains stable, secure, and efficient.

Questions & answers

Invite questions from the audience.

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Resources

List the resources you used for your research:

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Forensics and Legal Perspectives, Wiley

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Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

3. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

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2.https://www.researchgate.net/publication/358784151_Fundamentals_of_computer_systems

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