Computing Concepts for Information Technology

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3.6. Modern Computer Architecture
    3.6.1. RISC Computers
    3.6.2. Pipelined Execution
    3.6.3. Many Registers
    3.6.4. Superscalar Architecture
    3.6.5. Multiple Cores
    3.6.6. High-Performance Computing
3.7. Summary
3.8. References

4. Input and Output
4.1. Computer Peripheral Concepts
    4.1.1. Input, Output, and Storage
    4.1.2. Programmed I-O
    4.1.3. Interrupt-Driven I-O
    4.1.4. DMA I-O
    4.1.5. Scheduling and Device Priority
        Includes cycle-stealing and bus contention
4.2. Storage Devices
    4.2.1. Hierarchy of Storage – Access Time and Transfer Rate
        Includes sequential vs. direct access
    4.2.2. Magnetic Disks
    4.2.3. Solid-State Disks and Flash Drives
    4.2.4. CD and DVD Devices
    4.2.5. Magnetic Tape
    4.2.6. Redundancy – RAID and ZFS
4.3. Displays and Printers
4.4. Other Devices
    Includes keyboards, mice, touch screens, scanners, cameras, etc.
4.5. Summary
4.6. References

5. Data Communications and Networks
5.1. Messages, Protocols, and Connections
    5.1.1. Circuit Switching and Packet Switching
    5.1.2. Reliable and Unreliable Protocols
5.2. Protocol Stacks and the OSI Model
5.3. Ethernet, Local Networks and the Data Link Layer
    5.3.1. Transmission Characteristics, Data Link Layer Addressing
    5.3.2. Collisions and Switching
5.4. TCP /IP and the Internet Model
    5.4.1. The Data Link Layer
        Address Resolution Protocol
    5.4.2. The Internet Protocol Layer
        IPv4
        IP v6

5.4.3. The Transport Layer
TCP
UDP
SCTP
QUIC
5.4.4. The Application Layer
The Domain Name System
5.5. Physical Transmission
5.5.1. Transmission media (Wired, fiber optic, radio)
Includes attenuation and noise
5.5.2. Network Topologies, Physical and Logical
5.5.3. Signaling Mechanisms – Amplitude, Frequency, and Phase.
5.5.4. Analog vs. Digital Signaling
5.5.5. Baseband and Broadband Circuits
5.6. Summary
5.7. References

6. Programming and Computer Software
6.1. Application software and software development.
6.1.1. Software Engineering
6.1.2. Programming Languages
6.2. Operating Systems
6.2.1. Functions of the Operating System
6.2.2. Process Dispatching
6.2.3. Interrupts and Concurrent Operation
6.2.4. Hardware Support and Privileges Instructions
What the software needs from the hardware: Privileged instructions, protected memory, timer interrupts.)
6.2.5. File Management
6.2.6. Memory Management and Virtual Memory
6.2.7. Limits on Throughput
6.3. Virtualization
6.4. Summary
6.5. References

7. Computer Security
7.1. What Does “Secure” Mean?
7.2. Properties of a Secure System
7.2.1. Confidentiality
7.2.2. Integrity
7.2.3. Availability
7.2.4. Properties, States, and Controls: the McCumber Model
7.2.5. Other “Properties”
7.3. Goals of an Information Security Program
7.4. Policy, Procedures, and Controls
7.5. Assets, Risks, and Risk Management