

Introduction to Computers and Software (an outline)

1. Introduction

1.1. Basic terminology: computer, user, hardware, software, chip, program

1.1.1. Input: data, instructions (programs, commands, user responses)

1.1.2. Output: text, graphics, video, audio

1.2. Types of computers: personal, notebook, handheld, PDA, internet appliance, server, mainframe, supercomputer

1.3. History

1.3.1. Early devices (Pascaline, Jacquard's Loom)

1.3.1.1. Babbage (Difference Engine, Analytical Engine)

1.3.1.2. Lovelace, Hollerith, Watson Sr

1.3.1.3. ABC machine

1.3.2. Eniac

1.3.3. Modern pioneers: von Neumann, Turing

1.3.4. Hardware generations: vacuum tubes, transistors, printed circuits, integrated circuits

1.3.4.1. Moore's law

1.3.5. Programming languages

1.3.5.1. Machine, assembly

1.3.5.2. High-level

1.3.6. Key terms: VLSI, microprocessor, microcomputer

1.4. Social implications

1.4.1. Terms: computer literacy, the digital divide, computer power

2. Computer Software

2.1. Terms: file, menu, font, voice recognition, FAQ, online help, wizard, software suite, single-user license, site license, application window, dialog box, clip art, cross-platform application

2.2. Application software

2.2.1. Word processing

2.2.2. Spreadsheet: cell, function, recalculation, charting

2.2.3. Database: record, field, query

2.2.4. Presentation: slide sorter

2.2.5. Other: accounting software, Computer Aided Design (CAD), desktop publishing, paint/image, multimedia, web authoring

2.3. System software

2.3.1. Operating System (OS)

2.3.1.1. Functions: startup, security, networking, schedule jobs, configure devices, manage memory, programs, user interface

2.3.1.2. Terms: user interface, graphical user interface (GUI), desktop, icons, menus, multitasking, multiuser, multiprocessing, fault-tolerant computing, memory management, job, spooling, device driver, virtual memory, file allocation table, screen saver

2.3.1.3. Examples: DOS, Windows (3.1, 95, 98, NT, 2000, ME, XP), Mac OS (X), Unix, Linux, Solaris

2.3.1.4. Location (floppy, CD, hard disk)

- 2.3.1.5. Booting (startup)
 - 2.3.1.5.1. Cold vs. warm
 - 2.3.1.5.2. BIOS
 - 2.3.1.5.3. Steps in booting
 - 2.3.2. Utility programs: file viewer, file compression, backup, screen saver, disk scanner, disk defragmenter
- 3. Computer hardware
 - 3.1. System unit
 - 3.1.1. Terms: motherboard, chip, memory, storage, expansion slot (plug and play), port (serial vs parallel), bus (expansion bus), power supply
 - 3.1.2. Central Processing Unit (CPU)
 - 3.1.2.1. Machine cycle (fetch, decode, execute, store)
 - 3.1.2.2. Terms: control unit, arithmetic logic unit, byte, bit, ASCII, register, system clock, pipelining, coprocessor, parallel processing
 - 3.2. Memory
 - 3.2.1. Measuring: kilo, mega, giga, tera, peta
 - 3.2.2. Volatile vs. nonvolatile
 - 3.2.3. RAM vs ROM
 - 3.2.4. Cache
 - 3.3. Storage
 - 3.3.1. Versus memory
 - 3.3.2. Device vs. medium
 - 3.3.3. Terms: reading, writing, access time, capacity, track, sector, formatting, backup, sequential vs. direct access
 - 3.3.4. Floppy disk (and drive)
 - 3.3.5. Hard disk
 - 3.3.5.1. Terms: head crash, disk cache, partition
 - 3.3.5.2. Tracks, sectors, platters
 - 3.3.5.3. RAID (mirroring and striping)
 - 3.3.5.4. Internet hard drive
 - 3.3.6. Compact disks (and drives)
 - 3.3.6.1. Types: CD-ROM, CD-R, CD-RW, DVD-ROM, DVD+RW
 - 3.3.6.2. Terms: land, pit, track, sectors, transfer rate (e.g., 40X)
 - 3.3.7. Tape (and drive)
 - 3.3.8. PC Cards
 - 3.3.9. Miniature mobile storage (Compact Flash, Memory Stick, Microdrive, SmartMedia)
 - 3.4. Input Devices
 - 3.4.1. Keyboard
 - 3.4.1.1. Terms: typing area, numeric keypad, function keys
 - 3.4.2. Pointing Devices
 - 3.4.2.1. Pointing operations
 - 3.4.2.1.1. point, click, right-click, double-click, drag, right-draw, rotate wheel
 - 3.4.2.2. Mouse, optical mouse
 - 3.4.2.3. Others: trackball, touchpad, pointing stick, light pen, touch screen, stylus
 - 3.4.2.4. Handwriting recognition software

- 3.4.3. Sound
 - 3.4.3.1.Types: voice, music
 - 3.4.3.2.Microphone
- 3.4.4. Image
 - 3.4.4.1.Digital camera
 - 3.4.4.2.Scanners (flatbed, optical readers)
 - 3.4.4.2.1. Terms: resolution, pixel, image processing
 - 3.4.4.2.2. Optical readers
 - 3.4.4.2.2.1.Optical character recognition (OCR), bar code scanner, Optical Mark Recognition (OMR)
 - 3.4.4.2.2.2.Terms: bar code, turnaround document
- 3.4.5. Video
 - 3.4.5.1.Web cam
 - 3.4.5.2.PC Video camera
- 3.5. Output Devices
 - 3.5.1. Display device
 - 3.5.1.1.Terms: soft copy, pixel, viewable size, display resolution, dot pitch, refresh rate, video card, terminal (dumb, intelligent, point of sale)
 - 3.5.1.2.CRT monitor
 - 3.5.1.3.Liquid Crystal Display (LCD) – passive versus active matrix
 - 3.5.1.4.Gas plasma monitor
 - 3.5.2. Printer
 - 3.5.2.1.Terms: hard copy, resolution, dots per inch (dpi)
 - 3.5.2.2.Impact printers
 - 3.5.2.2.1. Dot-matrix printer
 - 3.5.2.2.2. Line printer
 - 3.5.2.2.3. Plotter
 - 3.5.2.3.Non-impact printers
 - 3.5.2.3.1. Ink-jet
 - 3.5.2.3.2. Laser
 - 3.5.2.3.3. Thermal
 - 3.5.3. Audio output
 - 3.5.3.1.Types: voice, music
 - 3.5.3.2.Speakers, headsets
 - 3.5.4. Other: data projector, fax machine (fax modem)
- 4. Networking
 - 4.1. Internet
 - 4.1.1. Services: email, World-Wide Web, file transfer (FTP), chat, message boards, instant messaging, newsgroups
 - 4.1.2. History: ARPANET (distributed functioning)
 - 4.1.2.1.Control – none (public, cooperative through committees)
 - 4.1.3. Terms: internet service provider (ISP), online service provider, internet protocol (IP) address, email address, user ID, domain name, netiquette
 - 4.1.4. World-Wide Web

- 4.1.4.1. Terms: web browser, URL, search engine, multimedia, hyperlink (link), hypertext, web community, web-casting, web application, web-based training, web publishing
- 4.1.4.2. Web pages: personal, portal, informational, business, advocacy, news
- 4.1.4.3. Multimedia: images (GIF, JPG, PNG), thumbnail image, animation, audio (MP3), video, streaming audio or video, virtual reality
- 4.1.4.4. E-Commerce
 - 4.1.4.4.1. Types: B2C, C2C, B2B
 - 4.1.4.4.2. Terms: brick-and-mortar business, clicks-and-mortar business, peer-to-peer (P2P), vertical B2B, business-to-employee (B2E), online banking, online trading
 - 4.1.4.4.3. Revenue streams: ads, sales, subscription, web hosting, etc.
 - 4.1.4.4.3.1. Electronic storefronts: development, secure checkout, secure server
- 4.2. Communications
 - 4.2.1. Terms: sending and receiving (communications) devices, communications software, communications channel, analog vs. digital data, intranet, extranet, firewall, home network, intelligent home network
 - 4.2.2. Network types
 - 4.2.2.1. Local Area Network (LAN)
 - 4.2.2.1.1. Types: peer-to-peer, client/server
 - 4.2.2.1.2. Network topology: bus, ring, star
 - 4.2.2.2. Wide Area Network (WAN)
 - 4.2.2.3. Metropolitan Area Network (MAN)
 - 4.2.3. Network communications technology
 - 4.2.3.1. Ethernet
 - 4.2.3.2. Token ring
 - 4.2.3.3. Transmission Control Protocol/Internet Protocol (TCP/IP)
 - 4.2.3.3.1. Terms: packets, routers, packet switching
 - 4.2.3.4. Wireless Applications Protocol (WAP)
 - 4.2.4. Connection devices
 - 4.2.4.1. Terms: transfer rate, hub, channel, bandwidth
 - 4.2.4.2. Type of connection: Dial-up lines, dedicated lines (DSL, Cable, T1, T3)
 - 4.2.4.2.1. Devices: modems (dial-up, DSL, cable), network interface cards
 - 4.2.5. Transmission media: twisted-pair cable, coaxial cable, fiber-optic cable, wireless (broadcast radio, microwave radio, satellite, cellular, infrared)
- 5. Social implications
 - 5.1. Terms: videoconferencing, telecommuting, computer-based training, distance learning, edutainment, computer addiction, green computing, ergonomics, artificial intelligence, intelligent agents, robots, computer crime, cyber crime
 - 5.2. Security and Privacy
 - 5.2.1. Computer viruses
 - 5.2.1.1. Terms: rescue disk, virus hoax
 - 5.2.1.2. Methods of infection: attached to email, attached to code (open or run to infect)
 - 5.2.1.3. Types: boot sector, file, macro, polymorphic, stealth
 - 5.2.1.4. Activation: logic bomb, time bomb, malware

- 5.2.1.5. Protection: antivirus program
- 5.2.2. Unauthorized access
 - 5.2.2.1. Terms: hacker, cracker
 - 5.2.2.2. Methods of security
 - 5.2.2.2.1. Passwords
 - 5.2.2.2.2. Biometric devices (fingerprint scanner, hand geometry system, face recognition, iris verification)
 - 5.2.2.2.3. Possessed objects (badges, cards)
 - 5.2.2.2.4. Callback systems
- 5.2.3. Software theft (intellectual property)
 - 5.2.3.1. Single-user, site, multi-user licenses
- 5.2.4. Encryption
 - 5.2.4.1. Terms: Plaintext, ciphertext, public key encryption
- 5.2.5. Web security
 - 5.2.5.1. Terms: cookie, electronic profile, spam, spyware, filtering software, secure sockets layer (SSL), pretty good privacy (PGP), digital certificate
- 5.3. System failure
 - 5.3.1. Surge protectors, uninterruptible power supply (UPS)
 - 5.3.2. Backup
 - 5.3.2.1. Full, differential, incremental
 - 5.3.3. Disaster recovery plan
- 5.4. Appropriate conduct
 - 5.4.1. Terms: netiquette
- 5.5. Information Accuracy