INTRODUCTION TO INFORMATION TECHNOLOGY (131-1)

EO 1. **INFORMATION TECHNOLOGY (IT)** makes technological convergence possible by merging computing functions with high-speed communication links that carry data and sound and video information.

INFORMATION TECHNOLOGY HAS TWO COMPONENTS:

1. **Computers**--are programmable, multi-use machines that process data into information.
2. **Communications (telecommunications) technology**--consists of electromagnetic devices and systems capable of communicating over long distances, such as telephones; radios; and broadcast, satellite, and cable television. **An online computer** uses a data or voice network to access services and data from other online computers.
   Cell phone technology now allows access to the Internet without the aid of a personal computer.

EO 2. **THE EFFECTS OF INFORMATION TECHNOLOGY:**

1. **Education**--Students and teachers communicate through email.
   Schools use course management software to administer online assignments and exams, to create course schedules, and to track grades.
   Distance learning enhances home schooling and lets universities offer online courses to off-campus students.
   Intelligent tutoring programs tailor instruction to the needs each individual student.
2. **Health and medicine**--Telemedicine uses telecommunications to let health-care providers share medical information, consult with specialists, ***and*** perform long-distance treatments and surgery.
   Robotics and microcomputers have improved the function of artificial limbs.
3. **Financial matters**--Cash and paper checks are increasingly replaced by smart cards, Internet banking, electronic bill payments, and automatic paycheck deposits.
   Banks' websites give customers 24-hour access to their accounts.
4. **Leisure activities**--Internet users buy CDs, music files, and movies online.
   Digital editing and animation have revolutionized movie making.
5. **Government and politics**--Internet users are more likely than nonusers to contact government officials due to the ease of finding information online and the ease of using email for contact.
6. **Career advancement**--Job seekers can post their resumes online, check job listings on the Web, ***and*** interview for jobs online.

EO 3. **DEVELOPMENTS IN INFORMATION TECHNOLOGY:**

1. **Cellphones**--Smartphones can make calls, send and receive text messages, browse the Internet, and capture and transmit images.
2. **Email**--**Electronic mail (e-mail)** consists of electronic messages sent over a computer network.
   Email occupies its own a 'psychological space' because it is almost as immediate as a phone call, but it lets the responder plan and edit his reply.
   Email promotes communication, while minimizing human contact.
   Email marks society's return to reliance on written communications.
3. **The Internet, the web, and cyberspace**--**The Internet** is the worldwide computer network that connects hundreds of thousands of smaller networks.
   *[The text now uses the increasingly common spelling internet with a lower case i. I will **not.**]*
   A network is a communications system that connects two or more computers.
   The world wide web (WWW or www) (the web) is a worldwide computer network that stores multimedia information.
   The Internet is so much a part of our lives that it has become ordinary.
   Cyberspace encompasses the entire world of communications, including wired and wireless communication, the online world, conference calls, ATMs, ***and*** the Internet.

EO 4. **THE FIVE SIZES OF COMPUTERS:**

1. **Supercomputers** are expensive, high-capacity systems with thousands of processors that can perform trillions of calculations per second.
   Supercomputers are commonly used in national defense, weather forecasting, and scientific research by organizations such as NASA, Bell Labs, and large universities.
2. **Mainframe computers** are smaller than supercomputers.
   Mainframes are usually housed in controlled environments.
   They support the processing needs of hundreds or thousands of users.
   Mainframes are commonly used by banks, large insurers, and large universities.
   Users and computer professionals access a mainframe by a **terminal,** which has a display screen and keyboard and can input and output data to the mainframe but can ***not*** process data.
3. **Workstations** are midsized computers used for complex scientific, mathematical, and engineering calculations; computer-aided design; ***and*** computer-aided design manufacturing.
4. **Microcomputers** are **personal computers (PCs)** that are small enough to fit on or next to a desk.
   They support one user at a time.
   Microcomputers can be connected to a **local area network (LAN)** (a collection of microcomputers and other devices connected by cable).
   A desktop PC sits entirely on one desk.
   A tower PC sits next to a desk, freeing up workspace.
   A notebook (laptop) computer is a lightweight, portable, one-piece computer.
   A personal digital assistant (PDA, aka handheld computer and palmtop) contains personal organization tools and may also send and receive e-mail.
5. **Microcontrollers** are tiny, embedded computers installed in 'smart' appliances and automobiles.

EO 5. **A SERVER** is a central computer that holds databases and programs for the use of clients.
CLIENTS are PCs, workstations, and other devices that connect to the server.
The entire network is called a **CLIENT/SERVER NETWORK.**

***[Data** are* raw, unevaluated facts.*
***Information** consists of data that have been processed through software into a more useful form.*
***Hardware** is the computer itself.*
***Software** is the computer's instructions.]*

EOs 6 + 7. **THE FIVE OPERATIONS BY WHICH A COMPUTER PROCESSES DATA INTO INFORMATION:**

1. **Input**--feeds data into the computer. Input hardware devices include keyboards and mice.
   The keyboard is a hardware device that converts letters, numbers, and other characters into electrical signals the processor can read.
   The mouse is a hardware device that selects menu items and positions the cursor for data entry.
2. **Processing**--retrieves, interprets, and directs software instructions to process data into information.
   These are the four main processing hardware components:
   a. **System unit (aka case and system cabinet)**--is the box that houses the other components.
   b. **Processor chip (aka central processing unit, or CPU)**--is the piece of silicon with millions of miniature electronic circuits that processes data into information.
   c. **RAM (aka random access memory, primary storage, and memory chip)**--stores software and data temporarily while they are being used.
   d. **Motherboard**--is the main circuit board, holding the processor and the memory chips.
      Expansion slots on the motherboard allow the user to plug in additional circuit boards.

   [The processor chip and RAM together represent the 'brains' of the computer.]

3. **Storage**--includes both **primary storage or RAM** (See above.) and **secondary storage** (devices that store data and software permanently on storage drives).
   The three common forms of secondary storage:
   a. **Floppy disk drive**--stores data on removable flexible plastic disks.
   b. **Hard disk drive**--stores data on a metal disk built into the computer.
   c. **CD/DVD drive**--uses laser technology to read data from optical disks.
4. **Output**--displays information, the result of data processing. Information may be displayed on the screen **(softcopy),** communicated by sound (also **softcopy),** or printed on paper **(hardcopy).**
   Output hardware includes video cards, sound cards, monitors, speakers, ***and*** printers.
   A video card converts output information into video signals that can be sent to a monitor.
   A sound card converts output data into audio signals that can be sent to a computer's speakers.
   A monitor is the display screen that shows the electrical signals as images.
   A peripheral device or peripheral is a piece of hardware that connects to the computer to expand its input, storage, ***and/or*** output capabilities (eg, external modem, mouse, printer, display).
5. **Communication**--transfers data electronically from place to place.
   Most communication between computers takes place via telephone wire, cable, or radio waves.
   The main type of communication hardware is the modem (*mo*dulator/*dem*odulator), which sends and receives data over telephone lines to and from computers.

EO 8. **THE TWO CATEGORIES OF SOFTWARE:**

1. **System software**--runs basic computer functions (data storage, parity checking, retrieval).
   The most important systems software program is the **operating system** (the master control program that runs the computer).
2. **Application software**--meets the user's specific needs (spreadsheets, payroll programs, word processing, Donkey Kong).

EO 9. **THE THREE DIRECTIONS IN COMPUTER DEVELOPMENT:**

1. **Miniaturization**--makes ever-smaller computers.
   Desktop computers can now perform calculations that used to tax room-sized computers.
2. **Speed**--makes faster computers by putting more (miniaturized) components into each computer, increasing clock speed, ***and*** increasing data storage capacity.
3. **Affordability**--makes ever less expensive computers.
   Each generation of processors is smaller, faster, and cheaper than the last generation.

THE THREE DIRECTIONS IN COMMUNICATIONS DEVELOPMENT:

1. **Connectivity**--is the ability to connect two computers via modem or communications lines to access online information.
   Connectivity is a necessary component of voice mail, e-mail, telecommuting, teleshopping, online services, Internet access, electronic bulletin boards, and access to databases ***not*** located within the user's computer.
2. **Interactivity**--occurs when there is a 'dialogue' between the user and the computer or communications device, allowing the user to respond to and to modify the process.
3. **Multimedia**--presents information in more than one medium, combining sound, text, video, pictures, ***and/or*** animation.

FOUR EFFECTS OF COMBINING COMPUTERS AND COMMUNICATIONS:

1. **Convergence**--is the technological merger of several industries (eg, communications, computing, and entertainment) through devices that exchange information electronically.
   Convergence allows information to be communicated via satellite, fiber-optic cable, cellular phone, fax machine, compact disk, **and/or** other electronic media.

2. **Portability**--Portable computers today are as powerful and fast as most people could want. We no longer have to sacrifice power and speed to gain smaller size and weight.
3. **Personalization**--Computers can be programmed to gather news on designated topics. Businesses can send customers e-mail messages about new products and sales. Customers can order custom-built products electronically.
4. **Collaboration**--Software systems let users share information quickly and easily.

*[5. **Information overload**--Overuse of the Internet and e-mail slows down business and personal activities.*
Too much information impedes decision-making just as effectively as too little information.]

EO 11. **ETHICS** is a set of moral values or principles used to govern the conduct of an individual or a group.

THREE ETHICAL ISSUES RAISED BY USE OF COMPUTERS:

1. With information being processed and stored at speeds and on scales never before possible, what can be done to improve data security and personal privacy?
2. Should we let computers make decisions (ie, computer-controlled nuclear weapons) when really all they can do is process data?
3. Are the largest computer systems so complex as to be unmanageable?

[Let's be done with it now: **'Data'** is the plural of **'datum'.***
'The data are ... and they ...' is correct.
'The datum is ... and it ...' is correct.
Yes, I was a stickler for proper grammar when I taught English composition and, as a certified Latin teacher, I'd be derelict if I didn't distinguish between 'datum' and 'data' now.]