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Digital Technology  
Pertemuan-2

Dosen :Kundang K Juman  
Prodi Teknik Informatika , Fakultas Ilmu Komputer

# Why Study Computers and Digital Technologies?

- What is a Computer?
- The Power of Connections
- What Can Computers Do
- Information Systems
- Using Digital Technologies to Succeed in Your Career
- Using Digital Technologies to Achieve Personal Goals
- Information Security and the Social Impact and Implications of Digital Technologies



Please discontinue use of cell phone and turn off ringer

# 1.1 What is a Computer?

## Some Fundamental Concepts

### Key Terms

- *Computer literacy*
- *Computer*
- *Technology*
- *Digital electronics device*
- *Bit*
- *Byte*
- *File*
- *Data*
- *Digitization*
- *Information*
- *Microprocessor*
- *Kilo, Mega, Giga, etc*
- *Hardware*
- *Software*
- *Personal computer*
- *Computing platform*
- *Server*
- *Supercomputer*
- *Kiosk*
- *Embedded computer*

What's a  
Computer  
?

[www.target.com](http://www.target.com)

The screenshot shows the Target website's Electronics department page. At the top, there's a navigation bar with the Target logo, a search bar, and links for CART, MY ACCOUNT, REDCARDS, and HELP. Below this is a secondary navigation bar with links for TARGET PHOTO, STORE LOCATOR, WEEKLY AD, CLUB WEDD REGISTRY, TARGET BABY REGISTRY, WISH LIST, GIFT FINDER, and GIFTCARDS. A red banner contains departmental links: Women, Men, Baby, Kids, Home, Bed + Bath, Furniture, Patio + Garden, Sports, Toys, Electronics, and Entertainment. The main content area is titled 'Target : Electronics' and features a 'This Week in Electronics' section with a 'Weekly Ad' and 'Lexmark Printers' sale. A 'Hot Deals' section lists 'MP3 Players + Accessories' with links for Flash, Hard Drive, Apple iPod, and MP3 Accessories. The 'Home Audio' section lists Home Theater Systems, Desktop Music Systems, Speakers, Clock Radios, and Audio Accessories. The main promotional banner for 'Electronics' features three products: a COLORWARE Notebook for \$999.99, a Creative Labs MP3 Player for \$299.99, and a Virgin Mobile Camera Phone for \$99.99. Below this, a 'Get set with back-to-school gadgets:' section lists 'Learning Essentials' (Notebook Computers, Scanners, Printers, Computers + Accessories) and 'Entertainment Essentials' (MP3 Players, TVs, DVD Players + Video, Telephones + Communications).

**Target**

**What's a Computer?**

[CART](#) [MY ACCOUNT](#) [REDCARDS](#) [HELP](#)

[TARGET PHOTO](#) [STORE LOCATOR](#) [WEEKLY AD](#)

[CLUB WEDD REGISTRY](#) [TARGET BABY REGISTRY](#) [WISH LIST](#) [GIFT FINDER](#) [GIFTCARDS](#)

[Women](#) [Men](#) [Baby](#) [Kids](#) [Home](#) [Bed + Bath](#) [Furniture](#) [Patio + Garden](#) [Sports](#) [Toys](#) [Electronics](#) [Entertainment](#)

Can we help you find something? **Search**  [All Products](#) [GO](#) [Shop All Departments](#)

**Target : Electronics**

**This Week in Electronics**

**Weekly Ad** [Check out what's in store.](#)

**Lexmark Printers**  
Sale on select choices. [See All](#)

**Hot Deals**

**MP3 Players + Accessories**  
[Flash](#)  
[Hard Drive](#)  
[Apple iPod](#)  
[MP3 Accessories](#)  
[See All](#)

**Home Audio**  
[Home Theater Systems](#)  
[Desktop Music Systems](#)  
[Speakers](#)  
[Clock Radios](#)  
[Audio Accessories](#)  
[See All](#)

**Satellite Radio**

**Electronics. Backpack? Check. Laptop? Check.**  
Prep for the school year with high-tech must-haves.

**\$999.99**  
COLORWARE Notebook [View Details](#)

**\$299.99**  
Creative Labs MP3 Player [View Details](#)

**\$99.99**  
Virgin Mobile Camera Phone [View Details](#)

**Get set with back-to-school gadgets:**

**Learning Essentials**

- ▶ Notebook Computers
- ▶ Scanners
- ▶ Printers
- ▶ Computers + Accessories

**Entertainment Essentials**

- ▶ MP3 Players
- ▶ TVs
- ▶ DVD Players + Video
- ▶ Telephones + Communications



# A Computer is...

- A *digital electronics device* that combine **hardware** and **software** to accept the **input** of data, **process** and **store** the data, and produce some useful **output**.

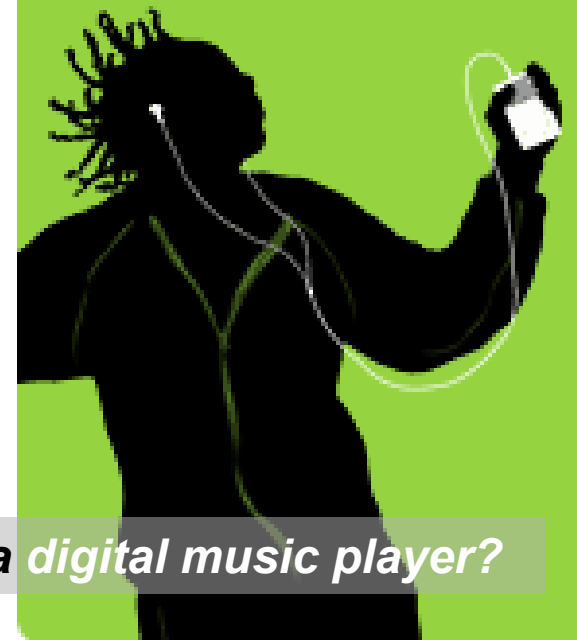
Electronic  
instructions

Tangible  
components



## iPod

15, 20 and 40GB models.  
For Mac and Windows.



*How do these concepts relate to a digital music player?*

# Digital Electronics

- Digital electronics devices store and process **bits** electronically.
  - A **bit** represents data using 1's and 0's
  - Eight bits is a **byte** – the standard grouping in digital electronics
  - **Digitization** is the process of transforming information into 1's and 0's

For more on digitization:

<http://en.wikipedia.org/wiki/Digitization>

<http://electronics.howstuffworks.com/analog-digital.htm>

<http://www.hardwaresecrets.com/article/317>

# General and Special Purpose Computers

- **General-purpose computers** can run any number of software applications



- **Special-purpose computers** are designed primarily for one particular function



**Computer Literacy** is a working understanding of computers and their uses

# Producing Valuable Information

- **Data:** items stored on a digital electronics device: text and values
- **Information:** data organized and presented in a manner that provides value to the user: documents, graphs, music, photos
- *Computers provide value to people by transforming data into information.*

*Relate these concepts to*





# Digital Technology Metrics

*Kilo, Mega, Giga, what comes next?*

TABLE 1.2 • Prefixes for digital technology metrics

Prefix	Value	Amount
<i>Kilo</i>	1,000	Thousand
<i>Mega</i>	1,000,000	Million
<i>Giga</i>	1,000,000,000	Billion
<i>Tera</i>	1,000,000,000,000	Trillion
<i>Peta</i>	1,000,000,000,000,000	Quadrillion
<i>Exa</i>	1,000,000,000,000,000,000	Quintillion

TABLE 1.3 • Storage capacity examples

Example storage sizes	
Text file	1 KB
Spreadsheet file	50 KB
High-resolution digital photo	1.2 MB
MP3 digital music file	5 MB
Music file on CD	64 MB
Microsoft Office software	640 MB
<i>The Matrix</i> motion picture	7.38 GB
Sears inventory and customer database	55 TB
CERN database (nuclear and particle physics research)	20 PB
Google database	30 PB

# Personal Computer (PC)

- General purpose computer designed to accommodate an individual's needs.
  - Desktop computer
  - Notebook computer
  - Tablet PC
  - Handheld PC

Examples:

[www.hp.com](http://www.hp.com)

[www.apple.com](http://www.apple.com)

[www.microsoft.com/windowsxp/tabletpc](http://www.microsoft.com/windowsxp/tabletpc)

# Computing Platform

- A computer's type, processor, and operating system define its ***computing platform***.



**Toshiba Portege M400**

1.66GHz Intel Core Duo Processor T2300E w/Centrino Duo Mobile Technology, 1GB RAM, 80GB hard drive, CD-RW/DVD-ROM, WiFi 802.11a/b/g, Microsoft® Windows® XP Tablet, 12.1" XGA display  
**MFG#: PPM40U-1CL03C**



**Apple MacBook Pro**

2.16GHz Intel Core Duo Processor T2600, 1GB RAM, 100GB hard drive, SuperDrive (DVD±RW/CD-RW), AirPort Extreme, Bluetooth, Mac OS X, 15.4" display  
**MFG#: MA601LL/A**



**BlackBerry 7290**

BlackBerry Handheld Software RAM: 4 MB - ROM: 32 MB - Bluetooth - GSM 900/1800/1900  
**MFG#: 610214611031**

# Types of *General Purpose* Computer Systems

## ***Supercomputer***

Most powerful with fastest processing speeds



## ***Server***

Powerful, multiprocessor computers that provide services to many users over a network



## ***Workstation***

Powerful, multiprocessor, special-purpose PC



## ***Personal Computer (PC)***



# Special-Purpose Computers & Mobile Digital Devices



Kiosk

## Embedded Computers



Digital Music Players



Game consoles







# Review

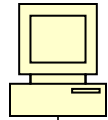
# 1.2 The Power of Connections

## Telecommunications and Computer Networks

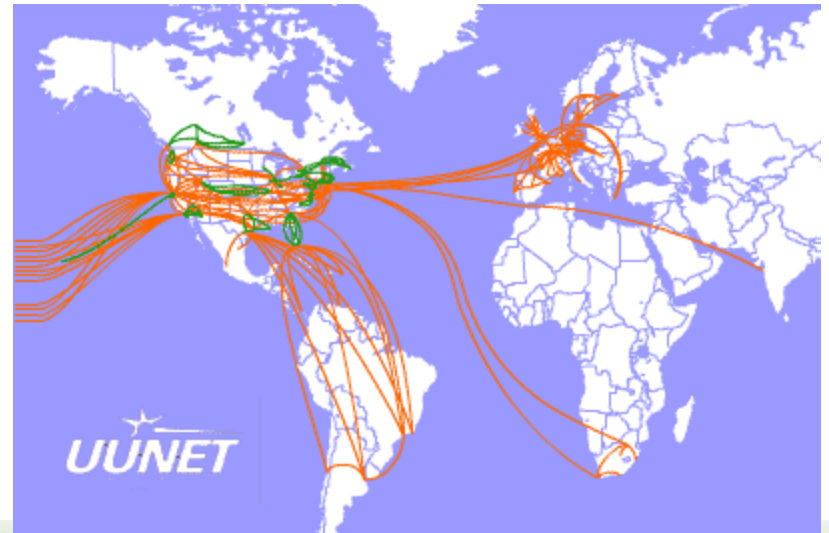
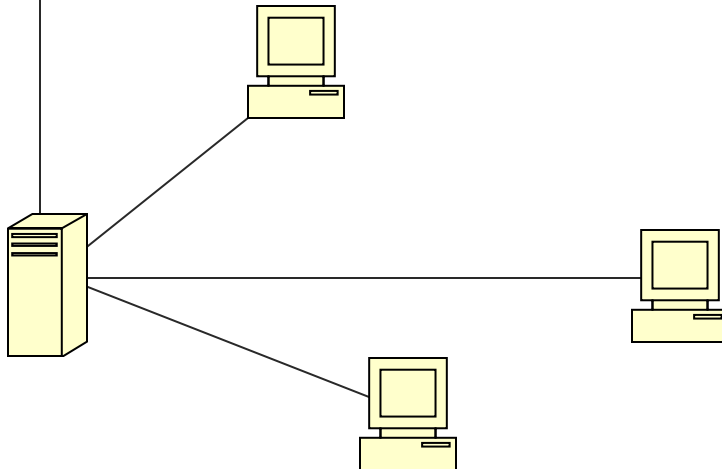
### Key Terms

- *Telecommunications*
- *Computer Network*
- *Protocols*
- *The Internet*
- *World Wide Web*
- *Wireless Network*
- *Wi-Fi*

# Telecommunications & Computer Networks

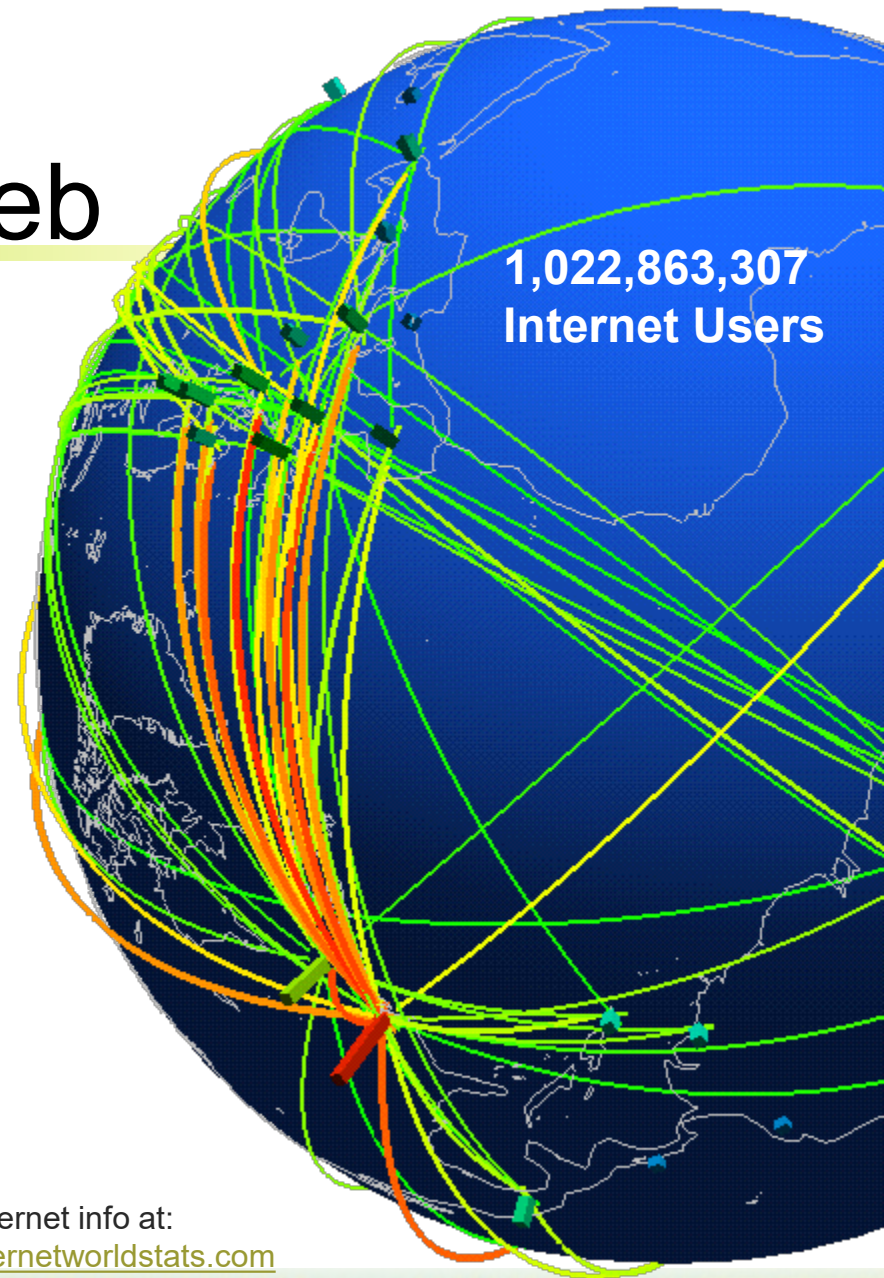


- **Telecommunications** are communications that take place electronically over a distance.
- A **computer network** is a telecommunications network that connects two or more computers for data communications.



# The Internet & Web

- The **Internet** is the world's largest public computer network, a network of networks, that provides a vast array of services.
- The **Web** is an Internet service that provides convenient access to information through hyperlinks



More Internet info at:

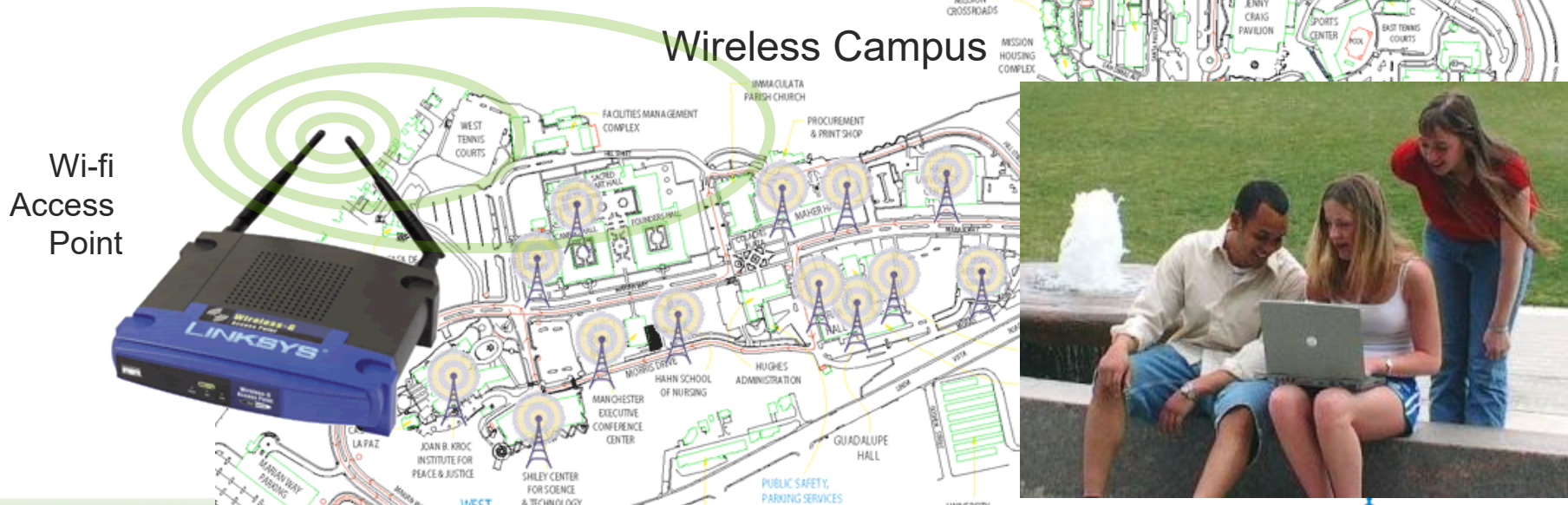
[www.internetworldstats.com](http://www.internetworldstats.com)

<http://www.cybergeography.org/atlas/geographic.html>



# Wireless Networking

- **Wireless networks** use radio signals rather than cables to connect users.
- **Wi-fi** is a popular wireless standard.





# 1.3 What Can Computers Do?

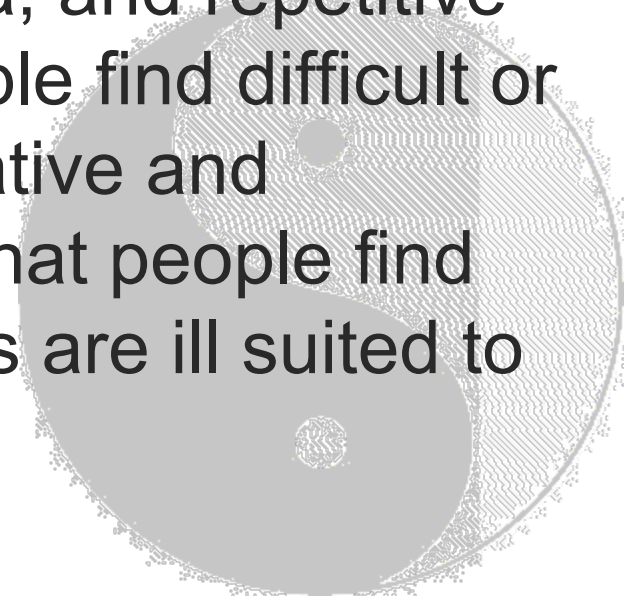
..and what can't they do?

## Key Terms

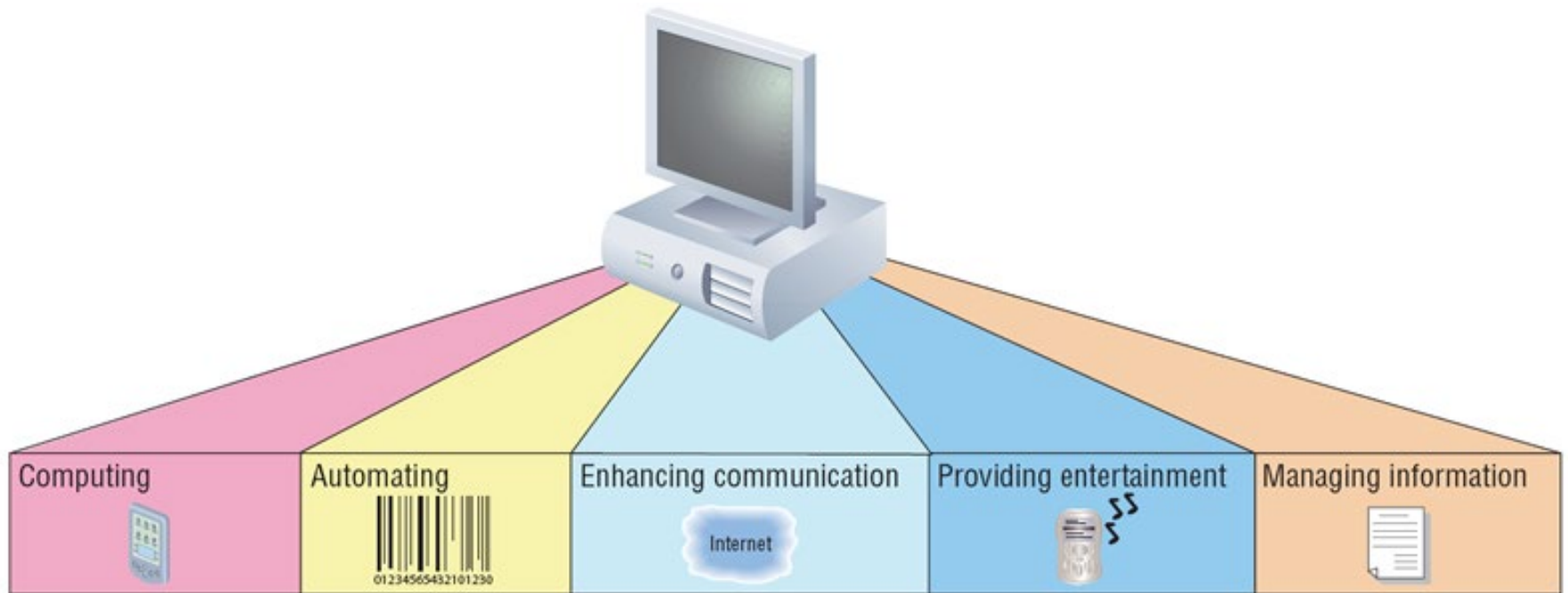
- *Artificial Intelligence (AI)*
- *VoIP*
- *Computer-based information system*
- *database*

# The Computer and Human Relationship

- “Things that computers do well —working with large amounts of data, and repetitive tasks, are things that people find difficult or monotonous, and the creative and interpersonal endeavors that people find most engaging, computers are ill suited to perform”.



# Computer Strengths



# Computing

- Computers were invented to compute –calculate solutions to mathematical problems.

***Artificial Intelligence (AI)*** deals with simulating human thought and behavior in computers.

...used to extend natural human abilities, and take over and automate activities that people find tedious, dangerous, or difficult.



Production Sequencing Facility at DOE's Joint Genome Institute in Walnut Creek, CA



# Automating

- Automation involves utilizing computers to control otherwise human actions and activities.



Mars Rover



# Enhancing Communication

- Computer systems control, support, or provide many forms of communication.

***Voice over Internet Protocol (VoIP)***  
popular technology that allows  
phone conversations to travel over  
the Internet (see [www.vonage.com](http://www.vonage.com)).

Hands-free  
cell phone 😊



# Providing Entertainment

- Computers act as our tools for the production, storage, distribution, and delivery of
  - video and motion pictures
  - photos
  - art
  - music
  - games

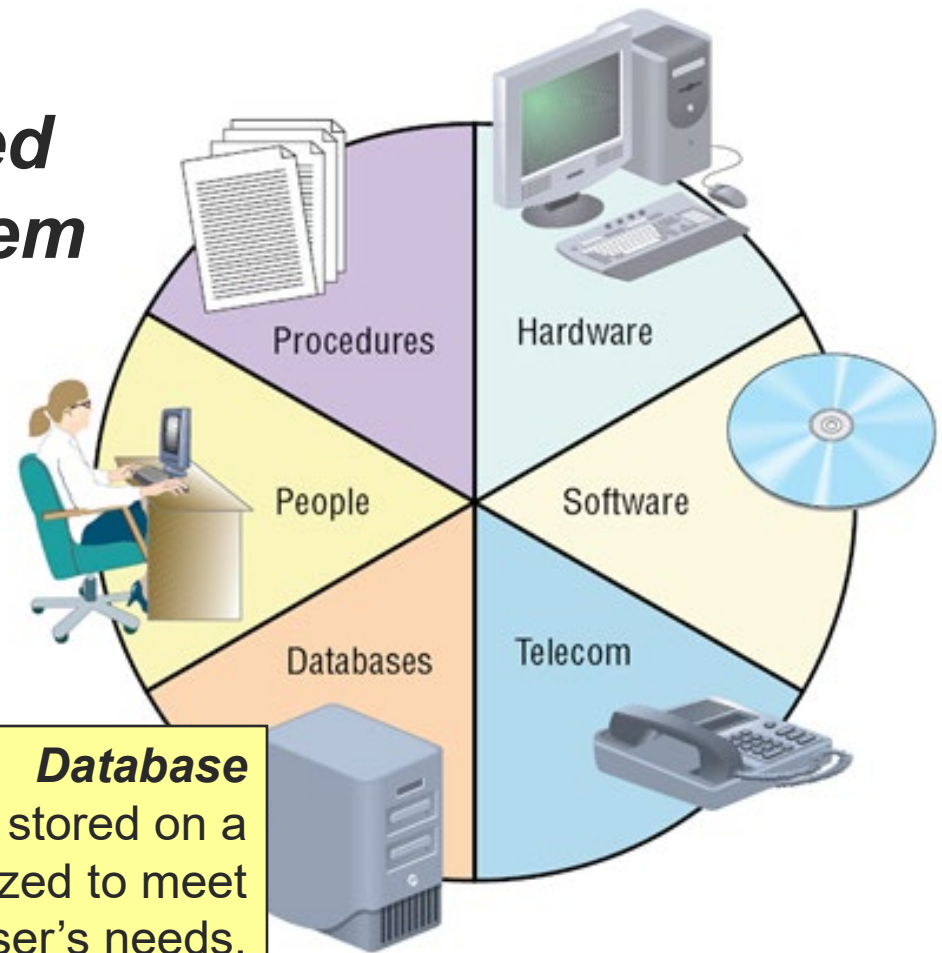


For more on special effects in The Matrix:  
<http://www.wired.com/wired/archive/11.05/>

Neo stopping bullets in *The Matrix Reloaded*

# Managing Information

- A **Computer-based Information System (CBIS)** uses these components to manage distribute information.



## **Database**

a collection of data stored on a computer and organized to meet user's needs.



# Review



# 1.4 Information Systems

## Key Terms

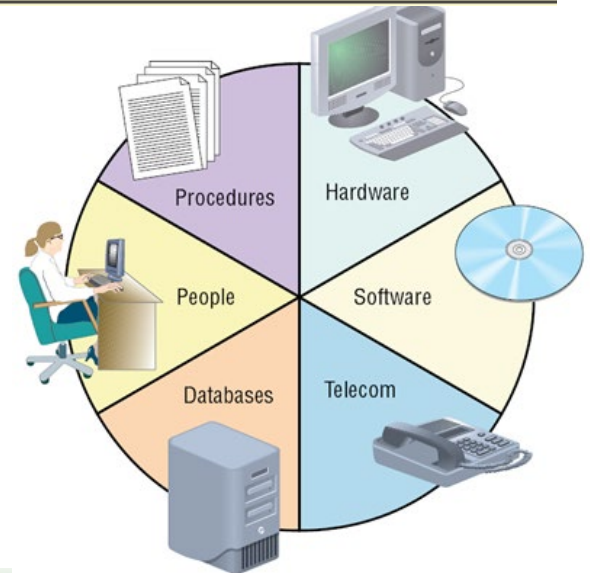
- *Information technology (IT)*
- *Systems development*
- *Transaction support system (TPS)*
- *Management Information System (MIS)*
- *Decision Support System (DSS)*
- *Expert System*



# Information Systems

Term	Definition
<i>Digital electronics device</i>	Any device that stores and processes bits electronically
<i>Computer</i>	A digital electronics device that utilizes hardware to accept the input of data, and software, or a computer program, to process and store the data and produce some useful output
<i>Computer system</i>	Multiple computers working together over a network towards a common goal
<i>Information system</i>	A computer system that makes use of hardware, software, databases, telecommunications, people, and procedures to manage and distribute digital information
<i>Information technology (IT)</i>	Issues related to the components of an information system

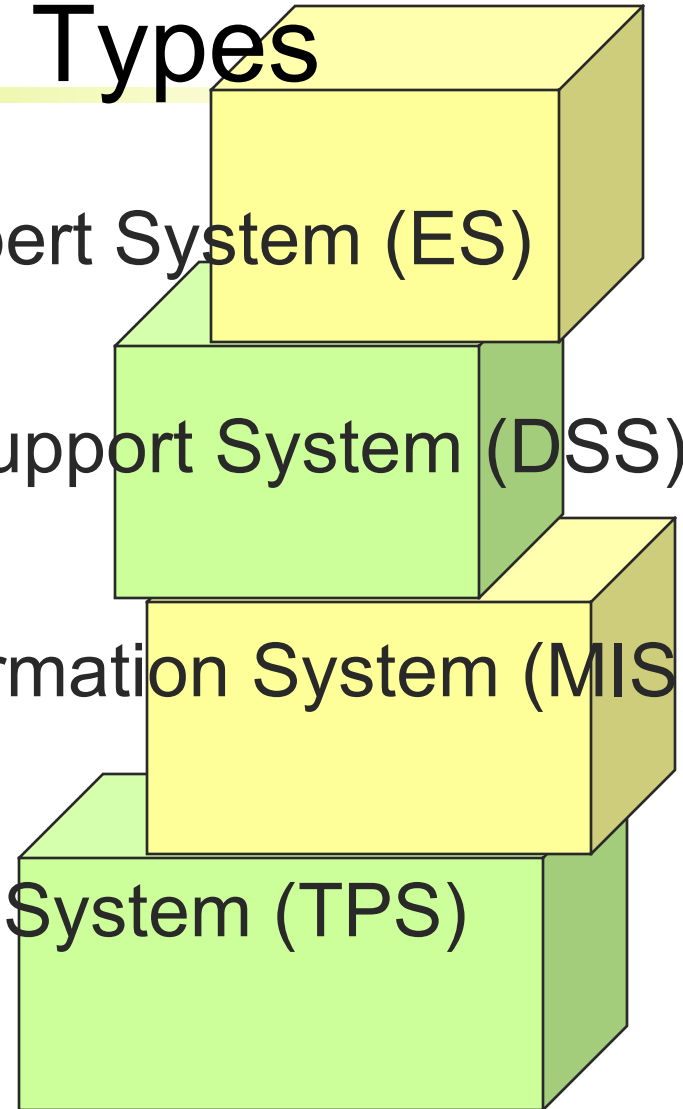
- ***Systems development*** is the activity of creating or modifying existing information systems.



# Information System Types

COMPLEXITY / INTELLIGENCE

- Expert System (ES)
- Decision Support System (DSS)
- Management Information System (MIS)
- Transaction Processing System (TPS)



# Transaction Processing System

- A ***TPS*** is an information system used to support and record transactions.

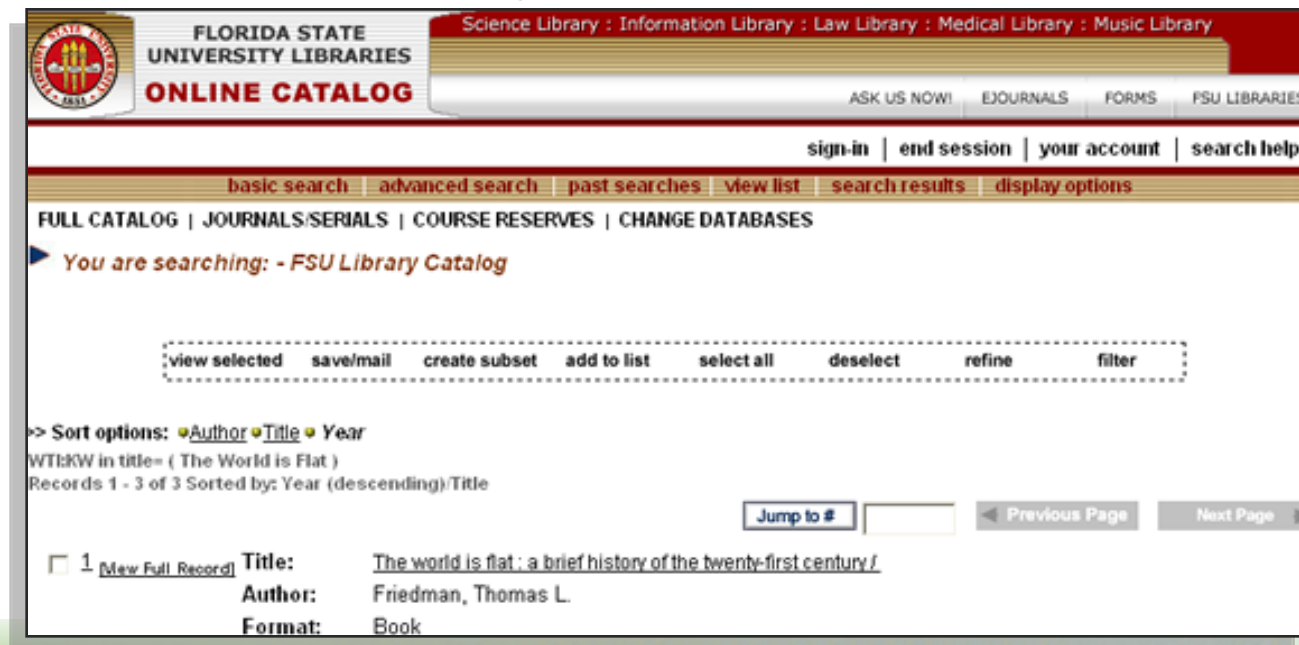
## ***E-commerce***

Transactions carried out online, over the Internet or other telecommunications network.



# Management Information System

- An **MIS** is an information system used to provide useful information to decision makers, usually in the form of a report.



[www.lib.fsu.edu](http://www.lib.fsu.edu)



# Decision Support System

- A **DSS** is an information system used to support problem-specific decision-making.



The screenshot shows the Progressive Insurance website interface. At the top, the Progressive logo is on the left, followed by the date "July 20, 1969", a "Contact Us" link, and a search bar. Below this is a navigation bar with links: "Home", "Shop", "Claims Service", "Manage Your Policy", and "About Progressive". The main content area features a large blue banner with the text "Get a Quote in About 8 Minutes" and "Buy online & print your insurance card!". Below the banner, there's a section for "Car insurance — quote and compare our Direct rates." which includes a form with "Insure Your:" (set to "Auto"), a "ZIP Code:" field, and a "GET A QUOTE" button. To the right of the form is a "Rate Ticker\*" showing a comparison of rates for a "Shopper P.N. in FL" for a "CHEVROLET C1500 SILVERADO 5.3L H" on "7/21, 11:25 AM ET". The table lists rates for Allstate, State Farm (A), Progressive Direct, and State Farm (B). A "Search Over 1 Million Comparisons" button is also present. On the right side of the page, there's a photo of a smiling man in a maroon shirt, and a badge that says "1 Insurance Web Site 2006 KEYNOTE".

**PROGRESSIVE** July 20, 1969 Contact Us Search:

Home Shop Claims Service Manage Your Policy About Progressive

**Get a Quote in About 8 Minutes**  
Buy online & print your insurance card!

Car insurance — quote and compare our Direct rates.

Insure Your:

ZIP Code:

**GET A QUOTE**

Retrieve a Saved Quote

**Rate Ticker\***

Shopper P.N. in FL  
CHEVROLET C1500 SILVERADO 5.3L H  
7/21, 11:25 AM ET

Allstate	\$375 - \$601
State Farm (A)	\$520 - \$960
Progressive Direct	\$553
State Farm (B)	\$631 - \$1156
Price of Quote	\$701

Search Over 1 Million Comparisons

Learn about our accurate rate comparisons.

1 Insurance Web Site 2006 KEYNOTE

[www.progressive.com](http://www.progressive.com)

# Expert System


- An **ES** is an information system that utilizes AI techniques to make suggestions and reach conclusions in one particular area of expertise.

## Acquired Intelligence

Company	Services	Products	Acquire Demos	Information
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### Acquire® Demonstrations: Whale Watcher

*An Acquire® expert system application for identifying whales.*



Whale watching is so popular that many people find this application to be entertaining, educational, interesting and useful. We certainly hope you enjoy it.

The Whale Watcher will ask you some questions as it tries to identify the whale that you have observed. If you like it, you can [download](#) your own copy.

When using this application, bear in mind that this expert system is meant for demonstration purposes only; it is not definitive. If you want a more informed identification of your observed whale(s), you should consult your government's Ministry of Fisheries and Oceans, marine biologists at your local university, a published reference work, or visit one of the Web sites listed below.

[Run Whale Watcher](#)

<http://www.aiinc.ca/demos/whale.html>



# Review

# 1.5 Using Digital Technologies to Succeed in Your Career

## Digital Technologies in...

- Computer Professions
- Business & Communications
- Science and Mathematics
- Engineering
- Social Sciences
- Fine Arts
- Sports, Nutrition, and Exercise
- Government & Law
- Medicine and Health Care
- Criminology, Law Enforcement, and Security
- Education and Training





# 1.6 Using Digital Technologies to Achieve Personal Goals

## Digital Technologies in...

- Personal Finance
- Personal Information Management
- Personal Research
- Personal Relations



# 1.7 Information Security and the Impact and Implications of Digital Technologies

## Key Terms

- *Information Security*
- *Hacker*
- *Digital divide*

# Information Security

- ***Information security*** refers to the protection of information systems and the information they manage against unauthorized access, use, manipulation, or destruction, and against the denial of service to authorized users.

More on Info Sec at  
[www.cert.org](http://www.cert.org)  
[www.whitehouse.gov/pcipb/](http://www.whitehouse.gov/pcipb/)  
[www.issa.org](http://www.issa.org)



## Hacker

an individual who subverts computer security without authorization.

[http://en.wikipedia.org/wiki/Kevin\\_Mitnick](http://en.wikipedia.org/wiki/Kevin_Mitnick)

# The Global Perspective

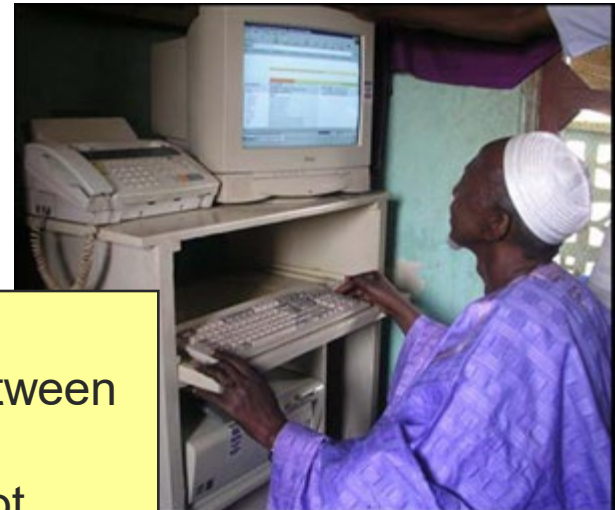
- Digital technologies are impacting the world socially and economically and providing many ethical issues.

How is the world being impacted?

What are some of the ethical issues?

## ***The Digital Divide***

title used for the social and economic gap between those that have access to computers and information technologies and those that do not.



More on Digital Divide  
[World Economic Forum IT Web site](#)  
[AMD Effort Web site](#)



# Chapter 1 Questions?



Don't forget to turn  
your phone on!!