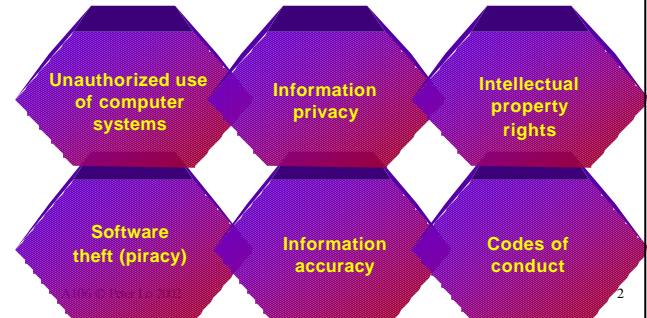


# Computing Issues

## Part I: Ethics

# What are Computer Ethics?

- Moral guidelines that govern use of computers and information systems



# What do you think about ethical issues?

	ETHICAL	UNETHICAL
1. A company requires employees to wear badges that track their whereabouts while at work.	<input type="checkbox"/>	<input type="checkbox"/>
2. A supervisor reads an employee's e-mail.	<input type="checkbox"/>	<input type="checkbox"/>
3. An employee uses his computer at work to send e-mail messages to a friend.	<input type="checkbox"/>	<input type="checkbox"/>
4. An employee sends an e-mail message to several co-workers and blind copies his supervisor.	<input type="checkbox"/>	<input type="checkbox"/>
5. An employee forwards an e-mail message to a third party without permission from the sender of the message.	<input type="checkbox"/>	<input type="checkbox"/>
6. An employee uses her computer at work to complete a homework assignment for school.	<input type="checkbox"/>	<input type="checkbox"/>
7. The vice president of your Student Government Association (SGA) downloads a photograph from the Web and uses it in a flyer recruiting SGA members.	<input type="checkbox"/>	<input type="checkbox"/>
8. A student copies text from the Web and uses it in a research paper for his English Composition class.	<input type="checkbox"/>	<input type="checkbox"/>
9. An employee sends political campaign material to individuals on her employer's mailing list.	<input type="checkbox"/>	<input type="checkbox"/>
10. As an employee in the registration office, you have access to student grades. You look up grades for your friends so they do not have to wait for delivery of grade reports from the postal service.	<input type="checkbox"/>	<input type="checkbox"/>

# What do you think about ethical issues?

11. An employee makes a copy of software and installs it on her computer at home. No one uses her computer at home while she is at work, and she uses her computer at home only to finish projects from work.	<input type="checkbox"/>	<input type="checkbox"/>
12. An employee that has been laid off installs a computer virus on his employer's computer.	<input type="checkbox"/>	<input type="checkbox"/>
13. A person designing a Web page finds one on the Web similar to his requirements, copies it, modifies it, and publishes it as his own Web page.	<input type="checkbox"/>	<input type="checkbox"/>
14. A student researches solely using the Web to write a report.	<input type="checkbox"/>	<input type="checkbox"/>
15. In a society in which all transactions occur online (a cashless society), the government tracks every transaction you make and automatically deducts taxes from your bank account.	<input type="checkbox"/>	<input type="checkbox"/>
16. Someone copies a well-known novel to the Web and encourages others to read it.	<input type="checkbox"/>	<input type="checkbox"/>

## Why is information accuracy important?

- Inaccurate input can result in erroneous information and incorrect decisions based on that information
- Evaluate Web page's value before relying on its content

## Why is information accuracy important?

Evaluation Criteria	Reliable Web Pages
Audience	The Web page should be written at an appropriate level.
Authority	The Web page should list the author and the appropriate credentials.
Affiliation	A reputable institution should support the Web site without bias in the information.
Content	The Web page should be well organized and the links should work.
Currency	The information on the Web page should be current.
Design	The Web site should load quickly, and be pleasing visually and easy to navigate.
Objectivity	The Web page should contain little advertising and be free of bias.

## What are the ethics of using computers to alter output?

- Alteration could lead to deliberately misleading photographs



## Intellectual Property Rights

- Intellectual property (IP) refers to work created by inventors, authors, and artists
- Intellectual property rights are rights to which creators are entitled for their inventions, writings, and works of art



## IT code of conduct

- Written guideline that helps determine whether specific computer action is ethical or unethical

1. Computers may not be used to harm other people.
2. Employees may not interfere with other's computer work.
3. Employees may not meddle in other's computer files.
4. Computers may not be used to steal.
5. Computers may not be used to bear false witness.
6. Employees may not copy or use software illegally.
7. Employees may not use other's computer resources without authorization.
8. Employees may not use other's output.
9. Employees shall consider the social impact of programs and systems they design.
10. Employees always should use computers in a way that demonstrates consideration and respect for fellow humans.

## Computing Issues

### Part II: Security

## Computer Security Risk

Event or action that causes loss of or damage to a computer system

### Computer crime

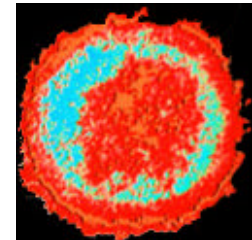
Any illegal act involving a computer

### Cybercrime

Online or Internet-based illegal acts

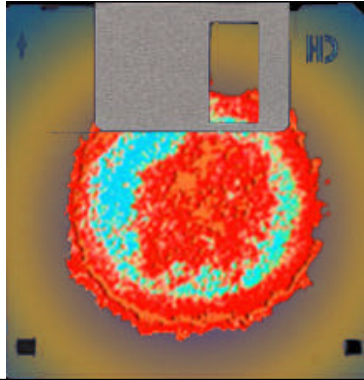
## Computer Virus

- Potentially damaging program that affects computer negatively by altering way computer works
- Segment of program code from some outside source that implants itself in computer



## What are the ways viruses can be activated?

- Opening infected file
- Running infected program
- Booting computer with infected floppy disk in disk drive



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## What is the source of a virus?

- Written by programmer
- Some write viruses as challenge
- Others write viruses to cause destruction or to slow Internet

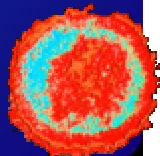


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## Signs of a Virus Infection

### SIGNS OF VIRUS INFECTION

- An unusual message or graphical image displays on the computer monitor
- An unusual sound or music plays randomly
- The available memory is less than what should be available
- A program or file suddenly is missing
- An unknown program or file mysteriously appears
- The size of a file changes without explanation
- A file becomes corrupted
- A program or file does not work properly



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## Three main types of virus

### Boot sector virus

- Resides in boot sector of floppy disk or master boot record of hard disk

### File virus

- Attaches itself to program files

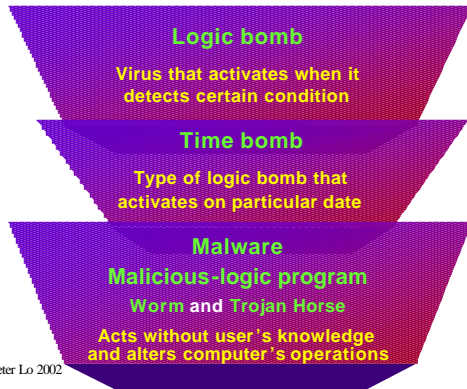
### Macro virus

- When you open document that contains infected macro, virus loads into memory

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## How do viruses activate?



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## Antivirus Program

- A utility that prevents, detects, and removes viruses from a computer's memory or storage devices
- Some viruses destroy or corrupt data

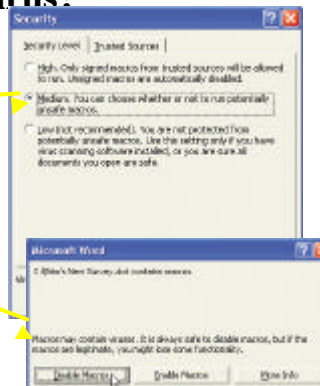


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## How can you protect your system from a macro virus?

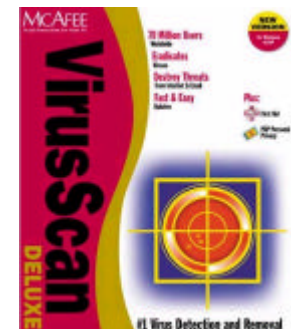
- Set macro's security level in all applications that allow you to write macros
- At medium security level, warning displays when you attempt to open document that contains macro



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## What does an Antivirus Program do?

- Detects and identifies viruses
- Inoculates existing program files
- Removes or quarantines viruses
- Creates rescue disk



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## How does an Antivirus program scan for a virus?

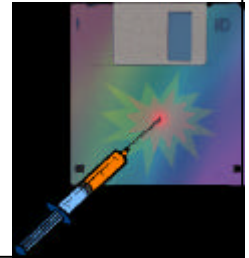
- Scans for
  - ◆ Programs that attempt to modify boot program, operating system, and other programs that normally read from but not modified
  - ◆ Files you download from the Web
  - ◆ E-mail attachments
  - ◆ Files you open
  - ◆ All removable media, such as a floppy

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## How does an Antivirus program inoculate a program file?

- Antivirus program records file size and creation date and uses this information to detect if a virus tampers with inoculated program file



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## What two types of virus are more difficult to detect?

### Polymorphic virus

Modifies its own code each time it attaches itself to another program or file

Cannot be detected by its virus signature because code pattern in virus never looks the same

### Stealth virus

Infects a program file, but still reports size and creation date of original, uninfected program

Cannot be detected by inoculation file

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## What does an Antivirus program do once it detects a virus?

- Removes virus if possible
- Quarantines infected file in folder on hard disk



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## Rescue Disk

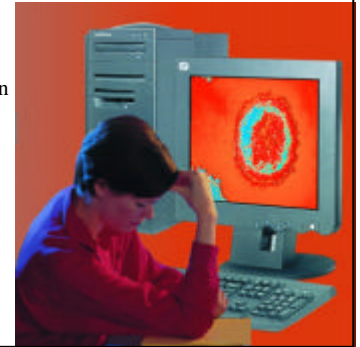
- Removable disk that contains uninfected copy of key operating system commands and startup information
- Upon startup, rescue disk finds and removes boot sector virus



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## What should you do if a virus infects your system?

- Remove virus
- If you share data with other users, then immediately inform them of virus infection



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## How can you stay informed about viruses?

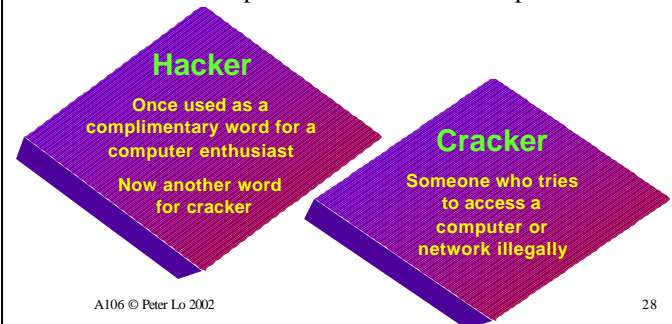
- Several Web sites publish list of virus alerts and virus hoaxes



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## Unauthorized Access

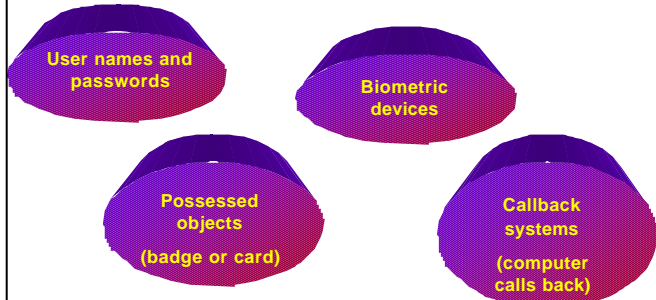
- Use of computer or network without permission



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## How can unauthorized access and use be prevented?



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## How can you make your password more secure?

- Longer passwords provide greater security

NUMBER OF CHARACTERS	POSSIBLE COMBINATIONS	AVERAGE TIME TO DISCOVER	
		HUMAN	COMPUTER
1	36	3 minutes	.000018 second
2	1,300	2 hours	.00065 second
3	47,000	3 days	.02 second
4	1,700,000	3 months	1 second
5	60,000,000	10 years	30 seconds
10	3,700,000,000,000,000	580 million years	59 years

\* Possible characters include the letters A-Z and numbers 0-9  
 \* Human discovery assumes 1 try every 10 seconds  
 \* Computer discovery assumes one million tries per second  
 \* Average time assumes the password would be discovered in approximately half the time it would take to try all possible combinations

## How should you select a user name and password?

- Avoid obvious passwords, such as your initials or birthday
- Select password that is easy for you to remember

**I A W L 0 9 0 1**

First letter of each word in your favorite movie, It's a Wonderful Life

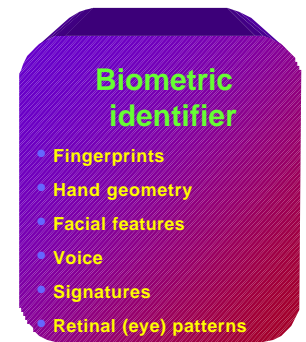
September 1 is your anniversary

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## Biometric Device

- Translates person's characteristics into digital code that is compared to digital code stored in computer



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## Fingerprint scanner

- Captures curves and indentations of a fingerprint



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## Hand geometry system

- Measures shape and size of person's hand
- Typically used as time and attendance device by large companies



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## Face recognition system

- Captures face image and compares it to stored image to see if person is legitimate user
- Can recognize people with or without glasses, makeup, or jewelry, and with new hairstyles



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## Iris verification system

- Reads patterns in tiny blood vessels in back of eye



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## Audit trail

- Records in file both successful and unsuccessful access attempts

Companies should document and explain to employees policies regarding use of computers by employees for personal reasons

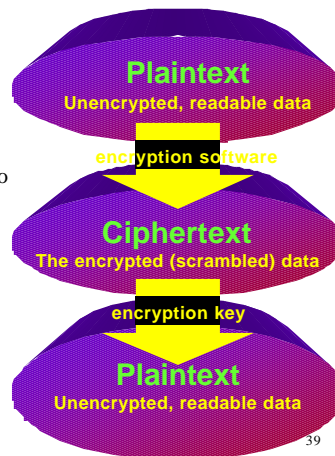
## Software theft

- Can range from someone stealing media that contains software to intentional piracy of software
- Software piracy is unauthorized and illegal duplication of copyrighted software

When you purchase software, you do not own the software; instead, you become a licensed user

## Encryption

- Process of converting readable data into unreadable characters to prevent unauthorized access
- Used to transmit files over Internet



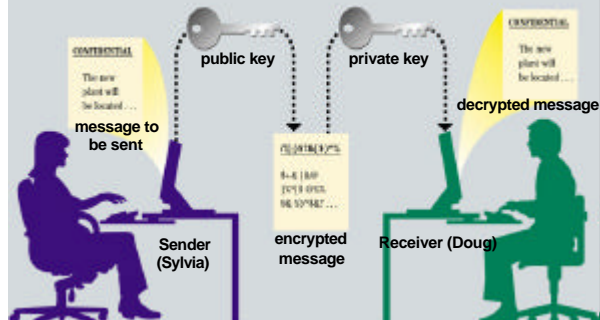
## Some data encryption methods

- Encryption key (formula) often uses more than one of these methods

SIMPLE ENCRYPTION METHODS				
NAME	METHOD	PLAINTEXT	CIPHERTEXT	EXPLANATION
Transposition	Switch the order of characters	WIRELESS	IMWRELESS	Adjacent characters swapped
Substitution	Replace characters with other characters	NOTEBOOK	XADROGAZ	Each letter replaced with another
Expansion	Insert characters between existing characters	MOUSE	MDDDDDDDD	Letter D inserted after each character
Compression	Remove characters and store elsewhere	COMMUNICATION	COMUNICIN	Every third letter removed (M, N, A, O)

## How does public key encryption work?

Step 4: Receiver can read or print the decrypted message.



## What services can help with security plans?

- International Computer Security Association (ICSA) can assist companies and individuals who need help with computer security plans



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## How do Web browsers provide secure data transmission?

- Many Web browsers use encryption
- Web site that uses encryption techniques to secure its data is known as secure site
  - Use digital certificates with security protocol



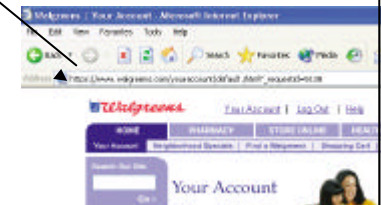
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## Secure Sockets Layer (SSL)

- Provides private-key encryption of all data that passes between client and server

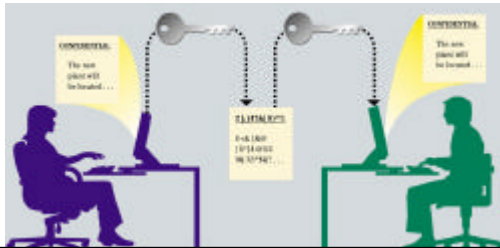
https indicates secure connection



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## Pretty Good Privacy (PGP)

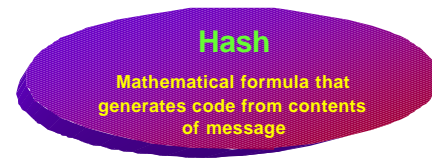
- One of most popular e-mail digital encryption programs
- Freeware for personal, non-commercial users
- Uses public-key encryption scheme



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## Digital signature

- Encrypted code that person, Web site, or company attaches to electronic message to verify identity of message sender
  - ◆ Code usually consists of user's name and hash of all or part of message

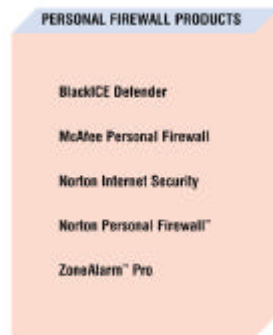


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## Personal firewall

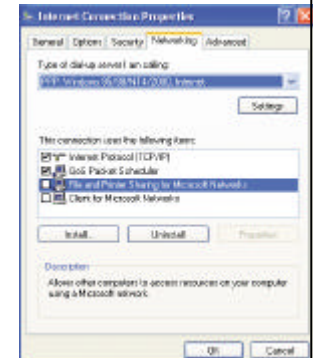
- Software program that detects and protects personal computer and its data from unauthorized intrusions
- Constantly monitors all transmissions to and from computer
- Informs you of any attempted intrusions



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## What is another way to protect your personal computer?

- Disable File and Print Sharing on Internet connection



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## What are ways to safeguard personal information?

### How to Safeguard Personal Information

1. Fill in only necessary information on rebate, warranty, and registration forms.
2. Do not preprint your telephone number or Social Security number on personal checks.
3. Have an unlisted or unpublished telephone number.
4. If Caller ID is available in your area, find out how to block your number from displaying on the receiver's system.
5. Do not write your telephone number on charge or credit receipts.
6. Ask merchants to not write credit card numbers, telephone numbers, Social Security numbers, and driver's license numbers on the back of your personal checks.
7. Purchase goods with cash, rather than credit or checks.
8. Avoid shopping clubs and buyers' cards.
9. If a merchant asks personal questions, find out why they want to know before releasing the information.
10. Inform merchants that you do not want them to distribute your personal information.
11. Ask, in writing, to be removed from mailing lists.

(continued)

## What are ways to safeguard personal information?

12. Obtain your credit report once a year from each of the three major credit reporting agencies (Equifax, Experian, and TransUnion) and correct any errors.
13. Request a free copy of your medical records once a year from the Medical Information Bureau.
14. Limit the amount of information you provide to Web sites. Just fill in required information.
15. Install a cookie manager to filter cookies.
16. Clear your history file when you are finished browsing.
17. Set up a free e-mail account. Use this e-mail address for merchant forms.
18. Turn off File and Print Sharing on your Internet connection.
19. Install a personal firewall.
20. Sign-up for e-mail filtering through your Internet service provider or use an anti-spam program such as Brightmail.
21. Do not reply to spam for any reason.
22. Surf the Web anonymously with programs such as Freedom or through an anonymous Web site such as Anonymizer.

## Electronic profile



## Cookie

- Small file that Web server stores on your computer
- Typically contains data about you
- Web site can read data only from its own cookie file
- Some Web sites sell or trade information stored in your cookie to advertisers

Track user preferences

Track how regularly you visit site and Web pages you visit when at site

Target advertisements to your interests and browsing habits

## How can cookies track user preferences?

Personal information you enter in form is converted to codes, which are stored in cookie on your hard disk

Cookie for MSNBC saved in Cookies folder on hard disk

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## How can you set your browser to control cookies?

- Set browser to accept cookies automatically, or prompt you if you wish to accept cookie, or disable cookie use
- Many Web sites do not allow you to access features if you disable cookie use

Internet Options

Content Advisor

Move the slider to select a policy setting for the Internet Zone.

**Medium**

- It blocks most pop-up cookies that do not have a consent policy.
- It blocks frequently cookies that are personally identifiable information without your explicit consent.
- It restricts third party cookies that are personally identifiable information without explicit consent.

Input Advanced Cancel

Web Filter

To override cookie handling for individual Web sites, click the Edit button.

Edit

OK Cancel

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## Cookie manager

- Software program that selectively blocks cookies

COOKIE MANAGERS	
Program Name	Function
AdSubtract SE	Block advertising and cookies
Cookie Cruncher	View, edit, and delete cookies
Cookie Crusher	Accept or reject cookies by Web site – tells you the purpose of each cookie (tracking, shopping cart, etc.)
Guidescopes™	Advertising and cookie blocker that allows you to block or allow cookies based on their domain names
IEClean, NSClean	Delete cookies; also can delete cache, history files, and other browsing files
WebWasher™	Block advertising banners and associated cookies
Window Washer™, MacWasher™	Delete cache, history, and cookie files

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## Computing Issues

Part III: Current issues and Controversies

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## Information privacy

- Right of individuals and companies to deny or restrict collection and use of information about them
- More difficult to maintain today because huge databases store this data in online databases

Is data about an individual really private?

Should employers monitor your computer usage and e-mail messages?

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## What privacy laws have been enacted?

- Many federal and state laws regarding storage and disclosure of personal data, such as:

### Child Online Protection Law

Penalizes those who distribute material deemed harmful to children

### Computer Abuse Amendments Law

Outlaws viruses

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## What is employee monitoring?

- Using computers to observe employee's computer use, including e-mail, keyboard activity, and Web sites visited
- Legal for employers to use monitoring software programs

### Privacy for Consumers and Workers Act

Proposed law that employers monitoring electronic communications must notify employees

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## Spyware

- Program placed on computer without user's knowledge
- Secretly collects information about user
- Can enter computer as virus or as a result of installing new program

### Adware

Spyware used by Internet advertising firms to collect information about user's Web browsing habits

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## How can you control spam?

### E-mail filtering

Service that blocks e-mail messages from designated sources

Collects spam in central location that you can view any time

### Anti-spam program

Attempts to remove spam  
Sometimes removes valid e-mail messages

## One of the most controversial issues surrounding the Internet

- Availability of objectionable material such as racist literature and obscene pictures

### The 1996 Communications Decency Act

Made it a criminal offense to distribute indecent or patently offensive material online

Declared unconstitutional in June 1997 by Supreme Court

## Filtering software

- Can restrict access to specified Web sites
- Some filter sites use specific words
- Others filter e-mail messages and chat rooms

## Computing Issues

Part IV: Emerging Technologies

## Tomorrow Hardware: Faster, Cheaper, Connected

- Moore's Law
  - ◆ Computers double in power roughly every 18 months, but cost half as much.
- Metcalfe's Law
  - ◆ A Network's social and economic value increases steeply as more people connect to it.

## Artificial Intelligence

- Application of human intelligence to computers
- Can sense actions and, based on logical assumptions and prior experience, take appropriate action to complete task

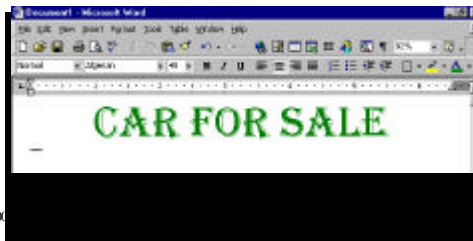


## Voice Recognition

- The computer's capability of distinguishing spoken words



Step 6:  
Say, "Green" and then say,  
"End".



## References

- Computers in Your Future (Ch. 10)
- Introduction to Computing (Ch. 10 – 12)
- Discovering Computers World 2003 (Ch. 3, 12)