



Security

Computer Security Risks

What is a **computer security risk**?

- Action that causes loss of or damage to computer system



Computer Viruses, Worms, and Trojan Horses

What are **viruses**, **worms**, and **Trojan horses**?

Virus is a potentially damaging computer program

Can spread and damage files

Worm copies itself repeatedly, using up resources and possibly shutting down computer or network

Trojan horse hides within or looks like legitimate program until triggered

Does not replicate itself on other computers

Payload (destructive event) that is delivered when you open file, run infected program, or boot computer with infected disk in disk drive

Computer Virus

- **Biological virus**
- **Computer virus**
 - **piggyback** on some other program or document in order to get executed

Computer Viruses, Worms, and Trojan Horses

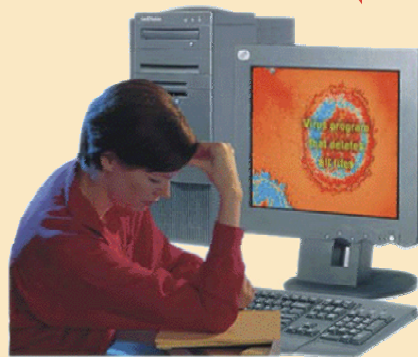
How can a virus spread through an e-mail message?

Step 1. Unscrupulous programmers create a virus program. They hide the virus in a Word document and attach the Word document to an e-mail message.



Step 2. They use the Internet to send the e-mail message to thousands of users around the world.

Step 3a. Some users open the attachment and their computers become infected with the virus.



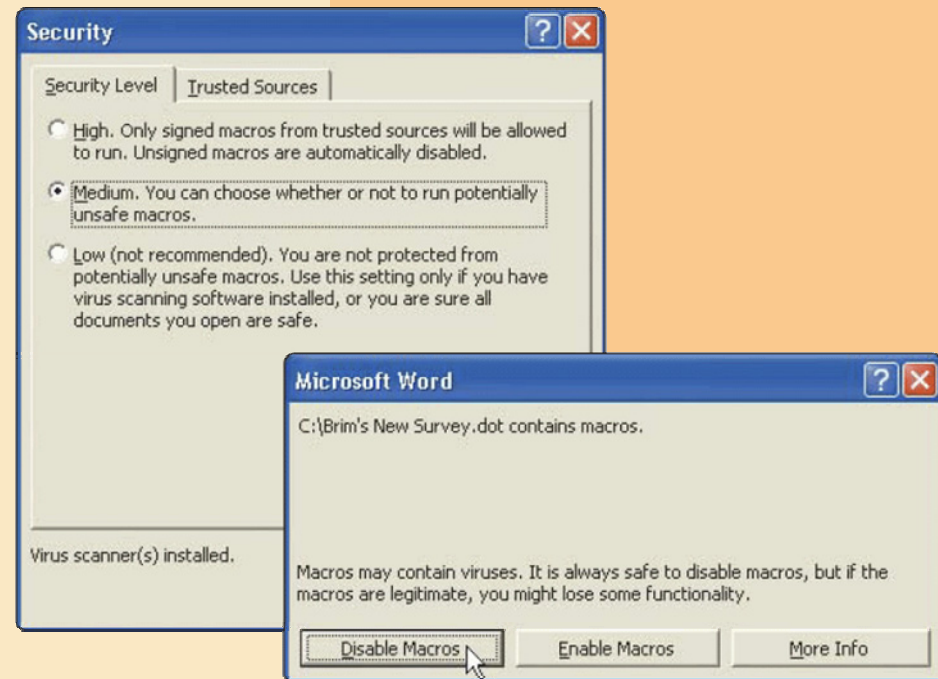
Step 3b. Other users do not recognize the name of the sender of the e-mail message. These users do not open the e-mail message. Instead they delete the e-mail message. These users' computers are not infected with the virus.



Computer Viruses, Worms, and Trojan Horses

How can you protect your system from a macro virus?

- Set macro security level in applications that allow you to write macros
- At medium security level, warning displays that document contains macro
 - **Macros** are instructions saved in an application, such as word processing or spreadsheet program



Computer Viruses, Worms, and Trojan Horses

What is an **antivirus program**?

- **Identifies and removes computer viruses**
- **Most also protect against worms and Trojan horses**

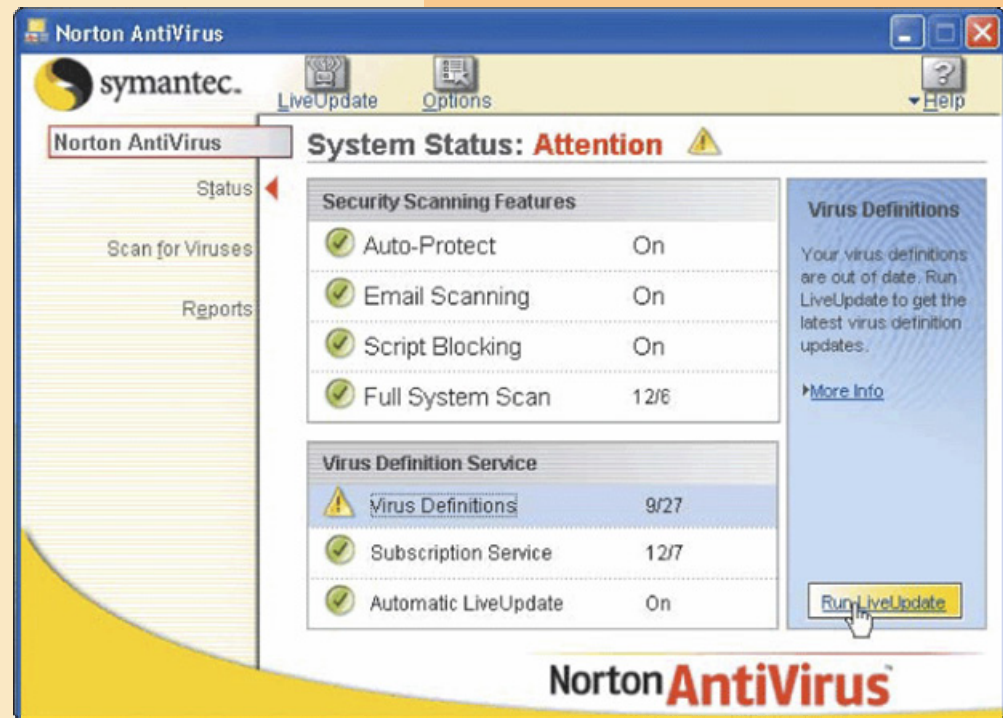
POPULAR ANTIVIRUS PROGRAMS

AVG AntiVirus
Command AntiVirus
eTrust InoculateIT
F-Secure Anti-Virus
McAfee VirusScan
Norton AntiVirus
RAV AntiVirus
Trend Micro PC-cillin

Computer Viruses, Worms, and Trojan Horses

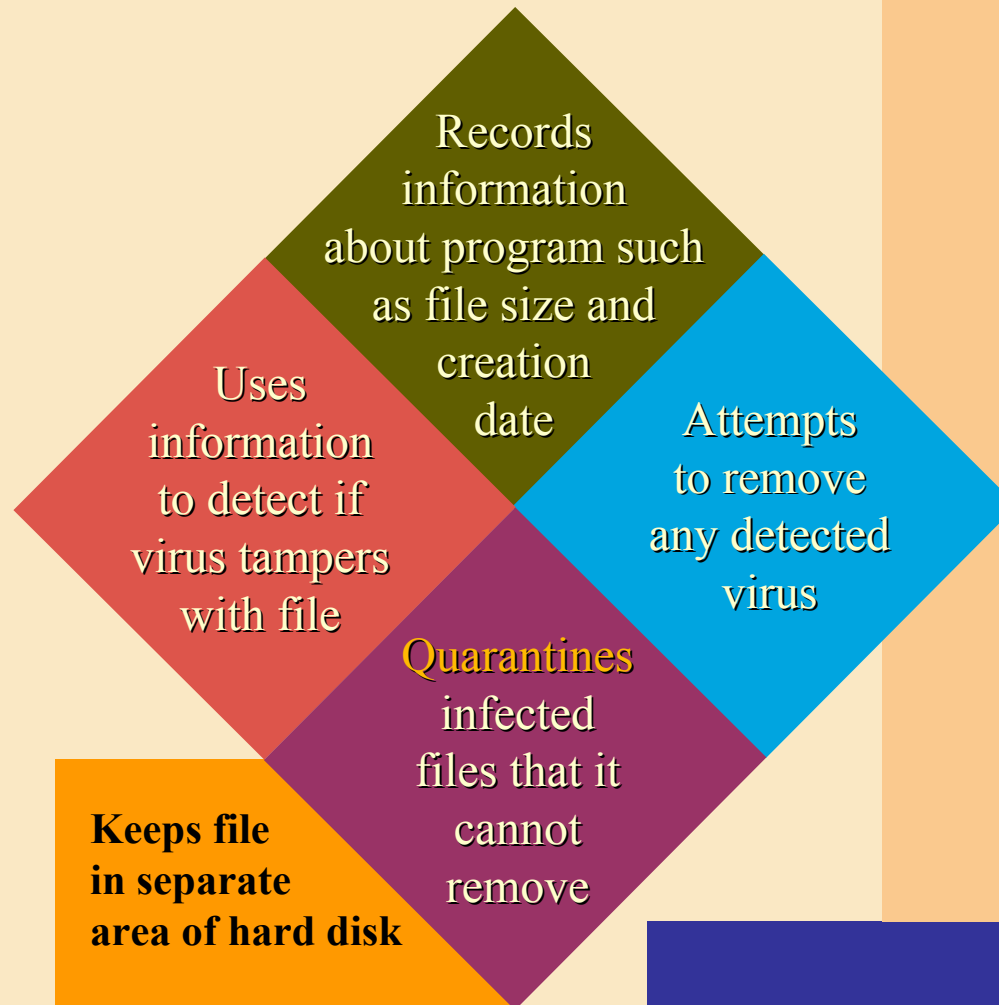
What is a **virus signature**?

- Specific pattern of virus code
 - Also called **virus definition**
- Antivirus programs look for virus signatures



Computer Viruses, Worms, and Trojan Horses

How does an antivirus program **inoculate** a program file?



Computer Viruses, Worms, and Trojan Horses

What is a **recovery disk**?

Removable disk that contains uninfected copy of key operating system commands that enables computer to restart

- Also called **rescue disk**

Once computer restarts, antivirus program can attempt to repair damaged files

Computer Viruses, Worms, and Trojan Horses

What are some tips for preventing virus, worm, and Trojan horse infections?

Set the macro security in programs so you can enable or disable macros

Install an antivirus program on all of your computers

Never open an e-mail attachment unless you are expecting it and it is from a trusted source

If the antivirus program flags an e-mail attachment as infected, delete the attachment immediately

Check all downloaded programs for viruses, worms, or Trojan horses

Back up your files regularly

Unauthorized Access and Use

What is **unauthorized access** and how is it achieved?

Use of a computer or network without permission

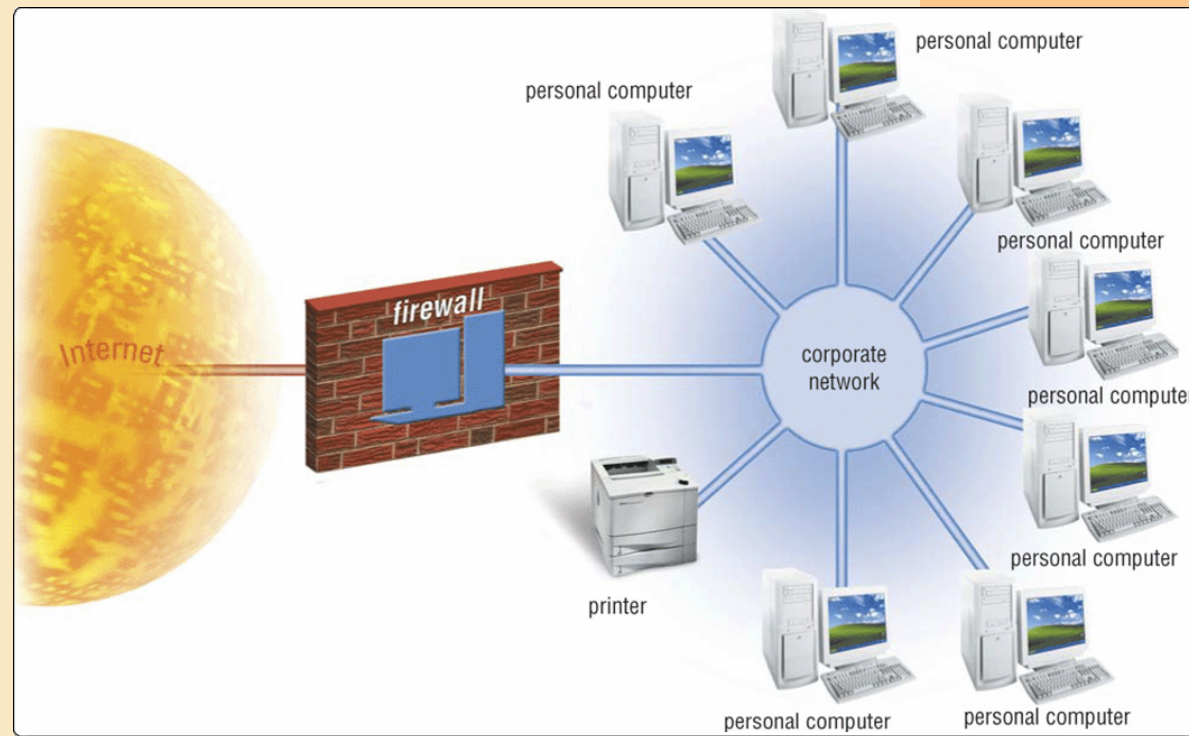
Hackers typically break into computer by connecting to it and then logging in as a legitimate user

Hacker, or cracker, is someone who tries to access a computer or network illegally

Unauthorized Access and Use

What is a **firewall**?

- Security system consisting of hardware and/or software that prevents unauthorized network access



Unauthorized Access and Use

What is a **personal firewall**?

- Program that protects personal computer and its data from unauthorized intrusions
- Monitors transmissions to and from computer
- Informs you of attempted intrusion

PERSONAL FIREWALL SOFTWARE

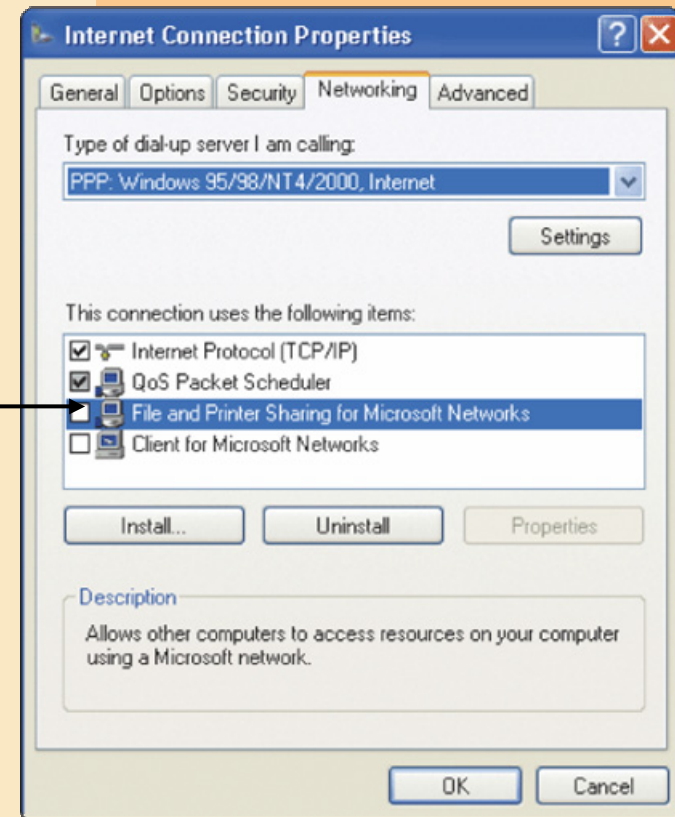
BlackICE PC Protection
McAfee Firewall
Norton Personal Firewall
Sygate Personal Firewall
Tiny Personal Firewall
ZoneAlarm

Unauthorized Access and Use

What are other ways to protect your personal computer?

- **Disable file and printer sharing on Internet connection**
- **Use online security service**—Web site that evaluates computer to check for Web and e-mail vulnerabilities

File and printer sharing turned off



Unauthorized Access and Use

How can companies protect against hackers?

Intrusion detection software analyzes network traffic, assesses system vulnerabilities, and identifies intrusions and suspicious behavior

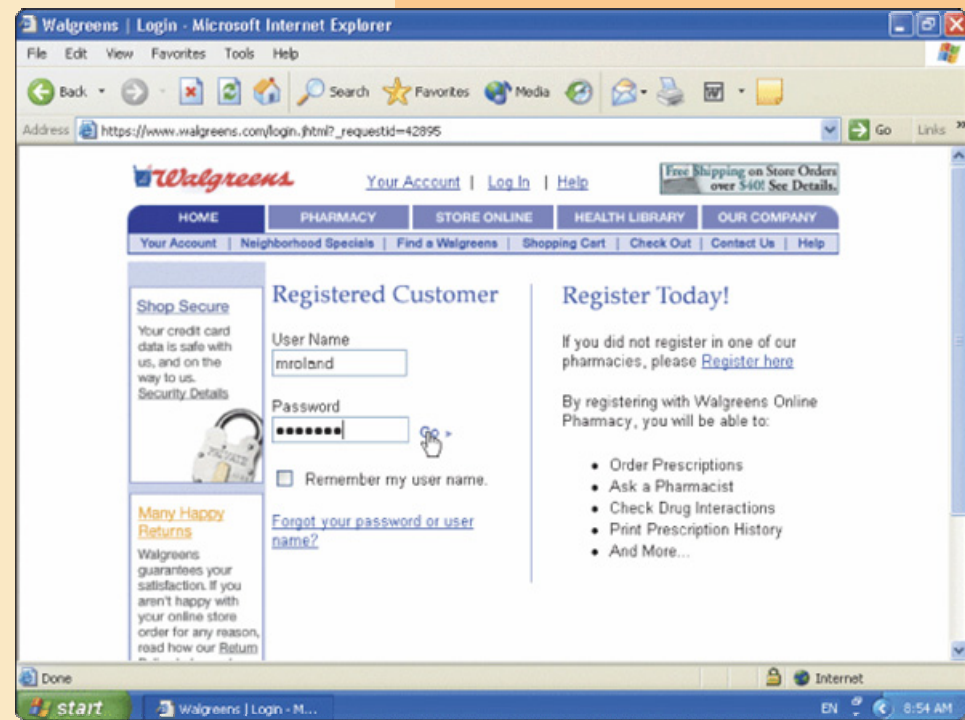
Access control defines who can access computer and what actions they can take

Audit trail records access attempts

Unauthorized Access and Use

What is a **user name**?

- **Unique combination of characters that identifies user**
- **Password is private combination of characters associated with the user name that allows access to computer resources**



Unauthorized Access and Use

How can you make your password more secure?

- **Longer passwords provide greater security**

PASSWORD PROTECTION

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

Unauthorized Access and Use

What is a **possessed object**?

- Item that you must carry to gain access to computer or facility
- Often used with numeric password called **personal identification number (PIN)**



Unauthorized Access and Use

What is a **biometric device**?

- **Authenticates person's identity using personal characteristic**
 - Fingerprint, hand geometry, voice, signature, and iris



Unauthorized Access and Use

What is a **callback system**?

User connects to computer only after the computer calls that user back at a previously established telephone number

Some networks utilize callback systems as an access control method to authenticate remote or mobile users

Callback systems work best for users who regularly work at the same remote location, such as at home or branch office

Hardware Theft and Vandalism

What are **hardware theft** and **hardware vandalism**?

- **Hardware theft** is act of stealing computer equipment
 - Cables sometimes used to lock equipment
 - Some notebook computers use passwords, possessed objects, and biometrics as security methods
 - For PDAs, you can password-protect the device
- **Hardware vandalism** is act of defacing or destroying computer equipment



Software Theft

What is **software theft**?

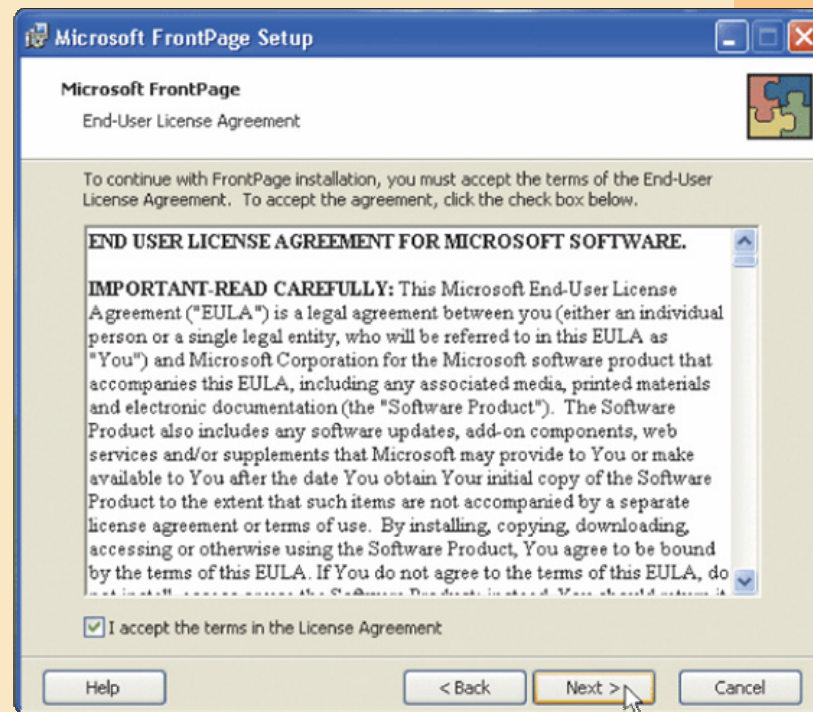
Act of stealing or illegally copying software or intentionally erasing programs

Software piracy is illegal duplication of copyrighted software

Software Theft

What is a **license agreement**?

- **Right to use software**
- **Single-user license agreement** allows user to install software on one computer, make backup copy, and sell software after removing from computer



Software Theft

What are some other safeguards against software theft?

Product activation allows user to input product identification number online or by phone and receive unique installation identification number

Business Software Alliance (BSA) promotes better understanding of software piracy problems

Information Theft

What is **encryption**?

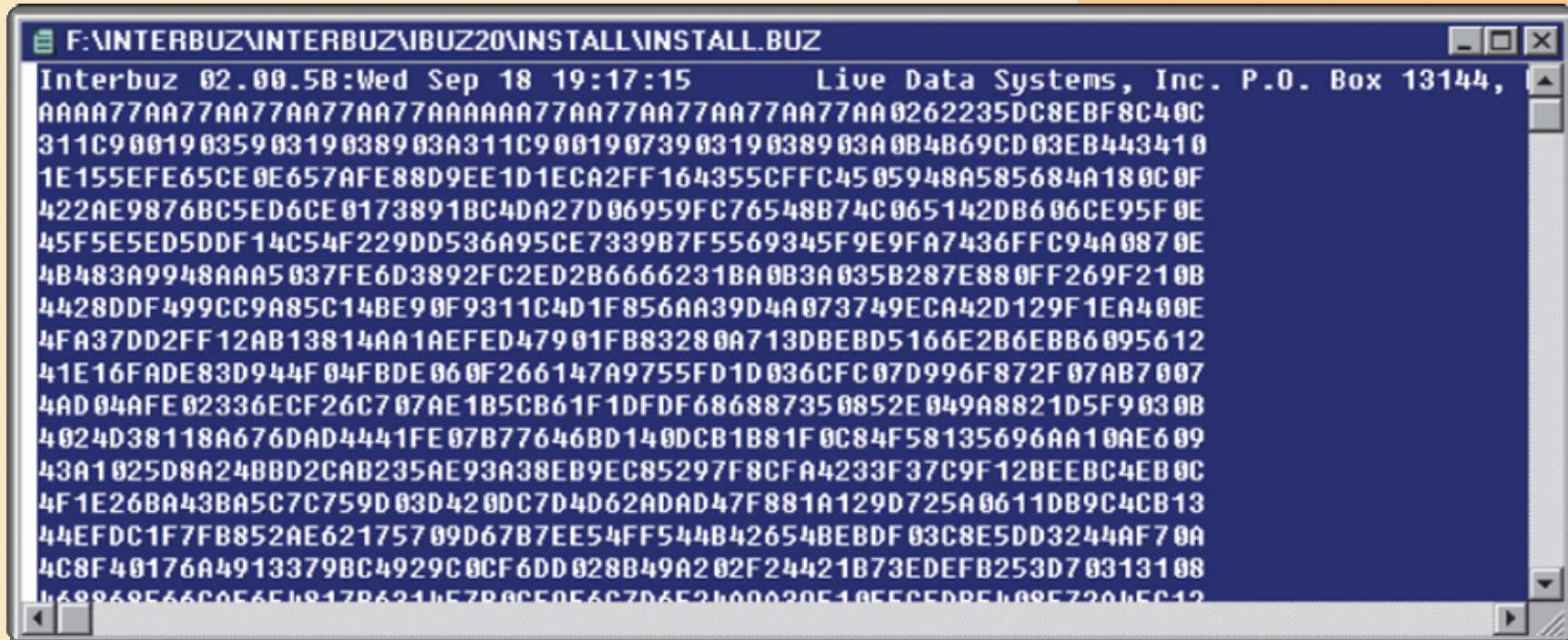
- Safeguards against information theft
- Process of converting **plaintext** (readable data) into **ciphertext** (unreadable characters)
- **Encryption key** (formula) often uses more than one method
- To read the data, the recipient must **decrypt**, or decipher, the data

SAMPLE ENCRYPTION METHODS

Name	Method	Plaintext	Ciphertext	Explanation
Transposition	Switch the order of characters	PASSWORD	APSSOWDR	Adjacent characters swapped
Substitution	Replace characters with other characters	ACCESS	DRROY Y	Each letter replaced with another
Expansion	Insert characters between existing characters	VIRUS	XVXIXRXUXS	Letter X inserted before each character
Compaction	Remove characters and store elsewhere	IDENTIFICATION	IDNTFIATON	Every third letter removed (E, I, C, I)

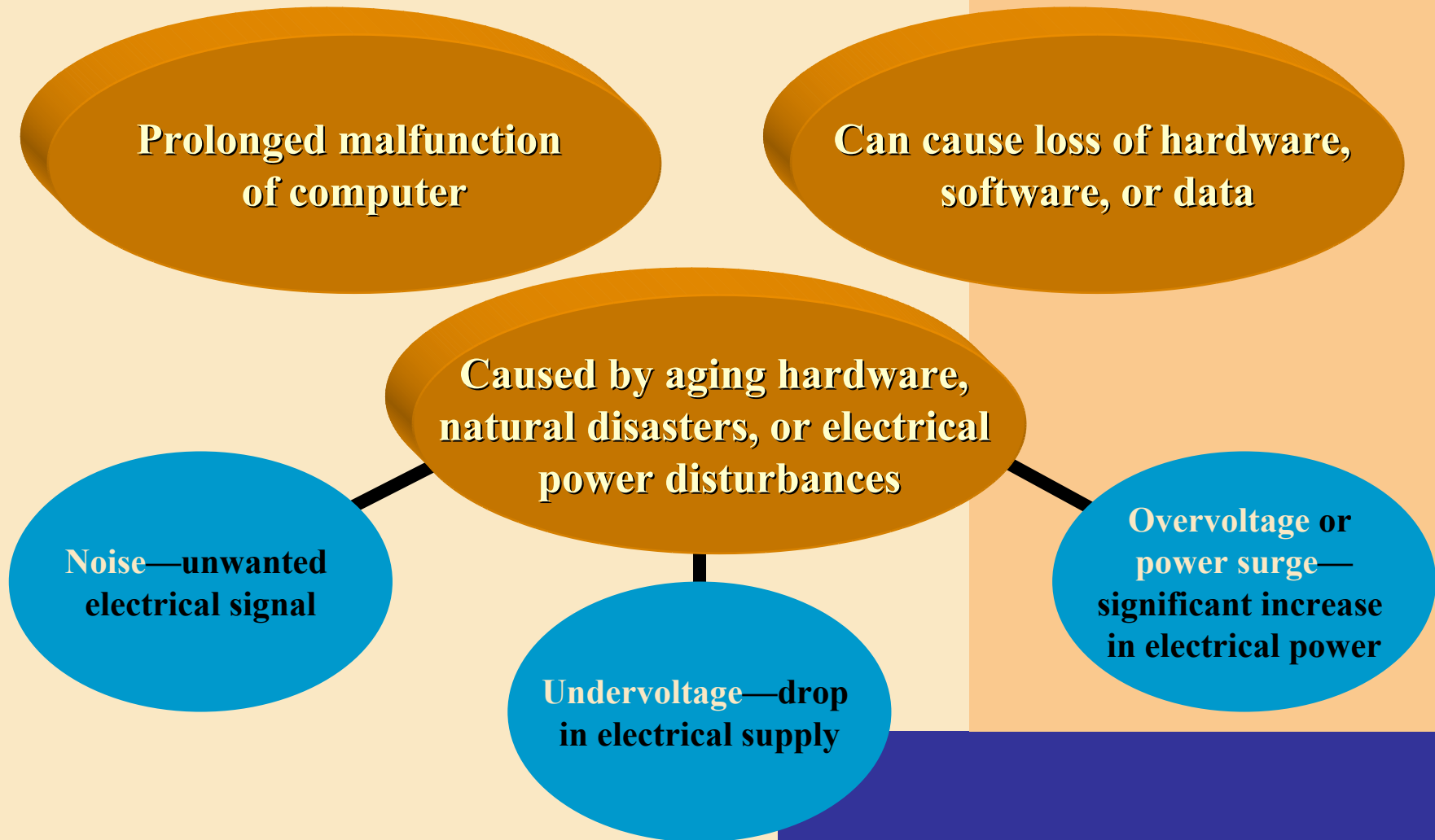
Information Theft

What does an encrypted file look like?



System Failure

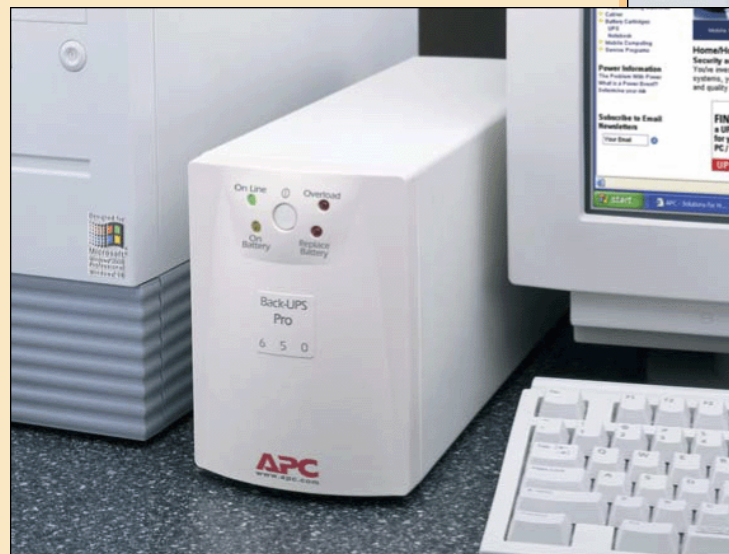
What is a **system failure**?



System Failure

What is a **surge protector**?

- Protects computer and equipment from electrical power disturbances
- **Uninterruptible power supply (UPS)** is surge protector that provides power during power loss



Backing Up — The Ultimate Safeguard

What is a **backup**?

Duplicate of file, program, or disk

Full backup
all files in computer

Selective backup
select which files
to back up

Three-generation
backup
preserves
three copies of
important files

In case of system failure or corrupted files,
restore files by copying to original location

Internet Security Risks

How do Web browsers provide secure data transmission?

Many Web browsers
use encryption

Secure site
is Web site that uses
encryption to secure data

Digital certificate is notice that
guarantees Web site is legitimate

Internet Security Risks

What is a **certificate authority (CA)**?

- **Authorized person or company that issues and verifies digital certificates**
- **Users apply for digital certificate from CA**



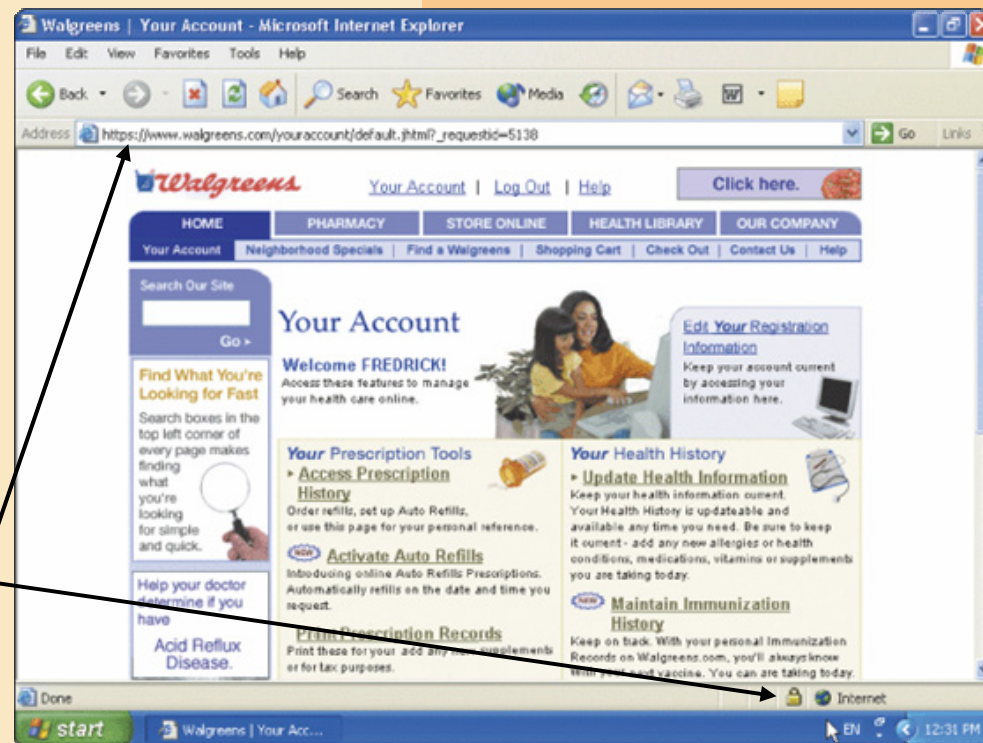
Internet Security Risks

What is **Secure Sockets Layer (SSL)**?

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

- Web addresses beginning with “https” indicate secure connections

Indicates
secure
Web page



Internet Security Risks

What are methods for securing e-mail messages?

**Pretty Good
Privacy (PGP)**
is popular
e-mail encryption
program

Digital signature
is encrypted
code attached to
e-mail message
to verify identity
of sender

**Freeware for
personal, non-
commercial use**

Ethics and Society

What are **computer ethics**?

Moral guidelines that govern use of computers and information systems

Unauthorized use of
computers and
networks

Software theft

Information accuracy

Intellectual property
rights—rights to which
creators are entitled for
their work

Codes of conduct

Information privacy

Ethics and Society

What is an IT **code of conduct**?

- **Written guideline that helps determine whether computer action is ethical**
- **Employers can distribute to employees**

IT CODE OF CONDUCT

1. Computers may not be used to harm other people.
2. Employees may not interfere with others' computer work.
3. Employees may not meddle in others' 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 others' computer resources without authorization.
8. Employees may not use others' intellectual property as their own.
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.

Information Privacy

What is **information privacy**?

Right of individuals and companies to restrict collection and use of information about them

Difficult to maintain today because data is stored online

Employee monitoring is using computers to observe employee computer use

Legal for employers to use monitoring software programs

Information Privacy

What are some ways to safeguard personal information?

Fill in necessary information on rebate, warranty, and registration forms

Avoid shopping club and buyers cards

Inform merchants that you do not want them to distribute your personal information

Limit the amount of information you provide to Web sites; fill in only required information

Install a cookie manager to filter cookies

Clear your history file when you are finished browsing

Set up a free e-mail account; use this e-mail address for merchant forms

Turn off file and print sharing on your Internet connection

Install a personal firewall

Sign up for e-mail filtering through your Internet service provider or use an antispam program, such as Brightmail

Do not reply to spam for any reason

Surf the Web anonymously with a program such as Freedom Web Secure or through an anonymous Web site such as Anonymizer.com

Information Privacy

What is an **electronic profile**?

- **Data collected when you fill out form on Web**
- **Merchants sell your electronic profile**
- **Often you can specify whether you want personal information distributed**

Leaving these options blank indicates you do not want to be contacted

The screenshot shows a web browser window with the address bar displaying a URL from PCMag.com. The page content includes a section titled "PC Magazine's TrendWatch" with a sub-header "Trends and insight from the most experienced editors in the business; exclusive coverage of beta products, more." Below this, there are two checkboxes: "HTML" (unchecked) and "Text" (checked). A section titled "Please indicate your e-mail contact preferences:" contains three checkboxes, all of which are unchecked. The first checkbox is accompanied by the text: "I am willing to participate in ongoing research sponsored by Ziff Davis. Your opinions are valuable to us. We will contact you from time to time for your opinions about this site and other products and services." The second checkbox is accompanied by: "Send me new product announcements and other news from Ziff Davis. We have got a lot going on here at Ziff Davis and this is how you can hear about it first!" The third checkbox is accompanied by: "I am interested in receiving special offers from other companies. You will receive relevant offers of products and services from carefully-selected companies." Below these options, a "Please Note" section states: "You must be at least 13 years of age to register. By clicking 'Finish' or 'Complete Member Profile' you agree to our Terms of Use and will have completed initial registration. Click here to learn more about Ziff Davis Media's Privacy Policy. To continue with registration, click on 'COMPLETE YOUR MEMBER PROFILE.'" At the bottom of the form, there are buttons for "CLEAR", "CANCEL", "FINISH", and "COMPLETE MEMBER PROFILE". The "FINISH" button is highlighted with a mouse cursor. At the bottom of the browser window, the status bar shows "javascript:onSubmit('finish');" and the system tray displays the time as 12:53 PM.

Information Privacy

What is a **cookie**?

User preferences

Small file on your computer that contains data about you

How regularly you visit Web sites

Interests and browsing habits

Some Web sites sell or trade information stored in your cookies

Set browser to accept cookies, prompt you to accept cookies, or disable cookies

Information Privacy

How do cookies work?

Step 1. When you type Web address of Web site in your browser window, browser program searches your hard disk for a cookie associated with Web site.



Step 2. If browser finds a cookie, it sends information in cookie file to Web site.

Step 3. If Web site does not receive cookie information, and is expecting it, Web site creates an identification number for you in its database and sends that number to your browser. Browser in turn creates a cookie file based on that number and stores cookie file on your hard disk. Web site now can update information in cookie files whenever you access the site.



Information Privacy

What is a **cookie manager**?

- **Software program that selectively blocks cookies**

Program Name	Function
AdSubtract SE	Blocks advertising and cookies
CookieCop	Accepts or rejects cookies, blocks offensive Web sites and advertisements, disables pop-up windows
Cookie Cruncher	Views, edits, and deletes cookies
Cookie Crusher	Accepts or rejects cookies by Web site, tells you the purpose of cookie (tracking, shopping cart, etc.)
Guidescope	Allows you to block or allow cookies and advertising based on their domain names
IEClean, NSClean	Deletes cookies; also can delete cache, history files, and other browsing files
WebWasher	Blocks advertising banners and associated cookies
Window Washer	Deletes cache, history, and cookie files

Information Privacy

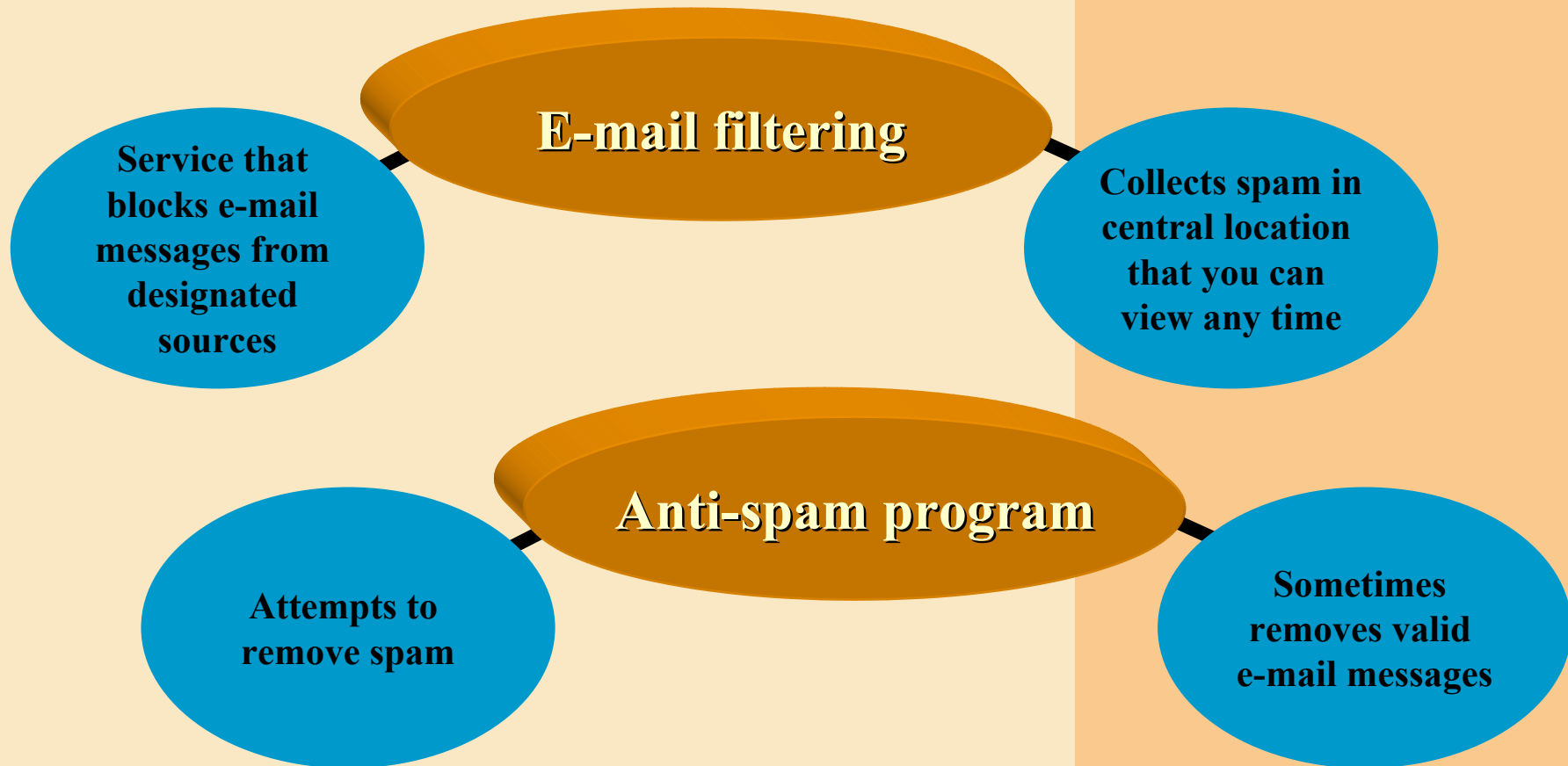
What are **spyware** and **spam**?

- **Spyware** is program placed on computer without user's knowledge
 - Secretly collects information about user
- **Spam** is unsolicited e-mail message sent to many recipients



Information Privacy

How can you control spam?



Information Privacy

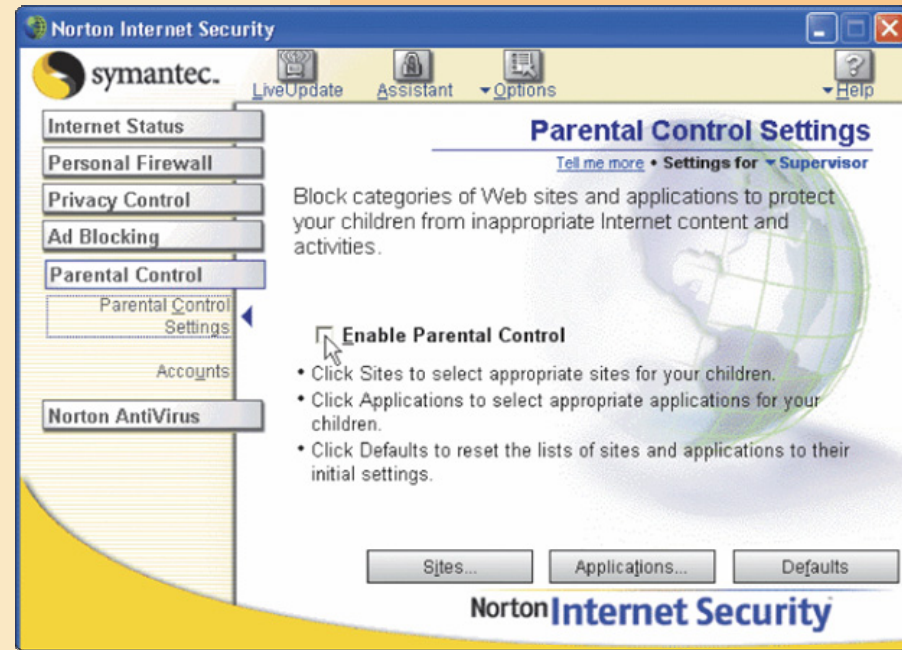
What privacy laws have been enacted?

Date	Law	Purpose
2001	Provide Appropriate Tools Required to Intercept and Obstruct Terrorism (PATRIOT) Act	Gives law enforcement the right to monitor people's activities, including Web and e-mail habits.
1998	Digital Millennium Copyright Act (DMCA)	Makes it illegal to circumvent antipiracy schemes in commercial software; outlaws sale of devices that copy software illegally.
1997	No Electronic Theft (NET) Act	Closes a narrow loophole in the law that allowed people to give away copyrighted material (such as software) on the Internet without legal repercussions.
1996	National Information Infrastructure Protection Act	Penalizes theft of information across state lines, threats against networks, and computer system trespassing.
1994	Computer Abuse Amendments Act	Amends 1984 act to outlaw transmission of harmful computer code such as viruses.
1992	Cable Act	Extends the privacy of the Cable Communications Policy Act of 1984 to include cellular and other wireless services.

Information Privacy

What is **content filtering**?

- **Process of restricting access to certain material**
- **Internet Content Rating Association (ICRA) provides rating system of Web content**
- **Web filtering software restricts access to specified sites**



Health Concerns of Computer Use

What are some health concerns of computer use?

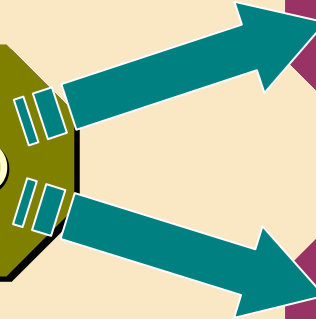
Computer vision syndrome (CVS)—eye and vision problems

Repetitive strain injury (RSI)

Computer addiction—when computer consumes entire social life

Carpal tunnel syndrome (CTS)—inflammation of nerve that connects forearm to palm

Tendonitis—inflammation of tendon due to repeated motion



Health Concerns of Computer Use

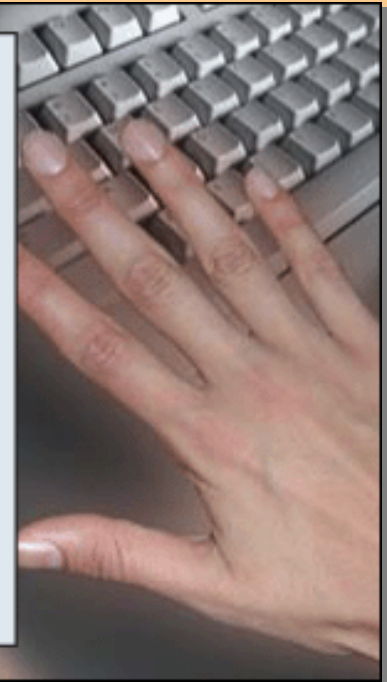
What precautions can prevent tendonitis or carpal tunnel syndrome?

- **Take frequent breaks during computer session**
- **Use wrist rest**
- **Exercise hands and arms**
- **Minimize number of times you switch between mouse and keyboard**

Spread fingers apart for several seconds while keeping wrists straight.

Gently push back fingers and then thumb.

Dangle arms loosely at sides and then shake arms and hands.



Health Concerns of Computer Use

How can you ease eyestrain when working at the computer?

Every 10 to 15 minutes, take an eye break.

- Look into the distance and focus on an object for 20 to 30 seconds.
- Roll your eyes in a complete circle.
- Close your eyes and rest them for at least one minute.

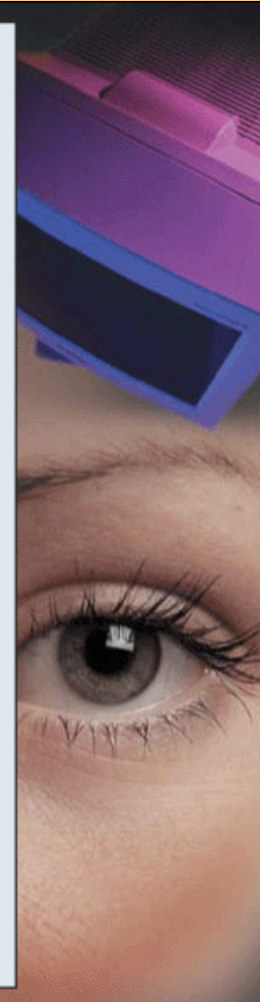
Blink your eyes every five seconds.

Place your display device about an arm's length away from your eyes with the top of the screen at eye level or below.

Use large fonts.

If you wear glasses, ask your doctor about computer glasses.

Adjust the lighting.



Health Concerns of Computer Use

What is **ergonomics**?

- Applied science devoted to **comfort, efficiency, and safety** in workplace



Health Concerns of Computer Use

What is **green computing**?

- **Reducing electricity and environmental waste while using computer**

1. Use computers and devices that comply with the ENERGY STAR program.
2. Do not leave the computer running overnight.
3. Turn off the monitor, printer, and other devices when not in use.
4. Use paperless methods to communicate.
5. Recycle paper.
6. Buy recycled paper.
7. Recycle toner cartridges.
8. Recycle old computers and printers.
9. Telecommute (saves gas).

