Chapter 10
Computer Security, Ethics, and Privacy
Today

- **Security**
  - Internet and network attacks
  - Unauthorized use
  - Theft and vandalism
  - System failure

- **Ethics**

- **Privacy**  
  Things will come to this

- **Health concerns**
Think about it…

What are some of the greatest Internet security risks you experience today?
Computer Security Risks

What is a computer security risk?

- Action that causes loss of or damage to computer system
FBI and cyber-crime

Cyber crime

Common internet frauds

Report on internet frauds
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.
- Does not replicate itself on other computers.

**Trojan horse** hides within or looks like legitimate program until triggered.
- Does not replicate itself on other computers.
Warning Signs of Virus Infection

1. Your computer starts running sluggishly.
2. It shuts down unexpectedly or crashes frequently.
3. It experiences memory problems or runs out of disc space.
4. Unusual files or directories appear on your system.
5. Strange messages appear on your screen.
Internet and Network Attacks

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.
What is an **antivirus program**?

- Identifies and removes computer viruses
- Most also protect against worms and Trojan horses
Internet and Network Attacks

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

1. Never start a computer with removable media in the drives.
2. If the antivirus program flags an e-mail attachment as infected, delete the attachment immediately.
3. Check all downloaded programs for viruses, worms, or Trojan horses.
4. Install antivirus and antispyware programs on all of your computers.
5. Install a personal firewall program.
6. Never open an e-mail attachment unless you are expecting it and it is from a trusted source.
Internet and Network Attacks

What happens if an antivirus program identifies an infected file?

- Attempts to remove any detected virus
- Quarantines infected files that it cannot remove
- Keeps file in separate area of hard disk
Internet and Network Attacks

What is a firewall?

- Security system consisting of hardware and/or software that prevents unauthorized network access.
Virus creator vs. hacker

A 20-year-old Missouri hacker confessed that he had broken into the computer systems of two major corporations, collected passwords, and changed files. Prosecutors connected the hacker to the Internet Liberation Front, a group of hackers who oppose the commercialization of cyberspace.

- What motivates hackers?
- Are they idealistic heroes, intellectual adventurers, malicious busybodies, or high-tech thieves?
- Are their motivations different from those who create computer viruses?
- What, if anything, should be done to deter hackers?
Think about it…

What are some ways that intruders can gain unauthorized access to your computer?

How does software prevent unauthorized access?
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

p. 369 Fig. 10-6
Unauthorized Access and Use

How can you make your password more secure?

- Longer passwords provide greater security

<table>
<thead>
<tr>
<th>Number of Characters</th>
<th>Possible Combinations</th>
<th>Human</th>
<th>Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36</td>
<td>3 minutes</td>
<td>.000018 second</td>
</tr>
<tr>
<td>2</td>
<td>1,300</td>
<td>2 hours</td>
<td>.00065 second</td>
</tr>
<tr>
<td>3</td>
<td>47,000</td>
<td>3 days</td>
<td>.02 second</td>
</tr>
<tr>
<td>4</td>
<td>1,700,000</td>
<td>3 months</td>
<td>1 second</td>
</tr>
<tr>
<td>5</td>
<td>60,000,000</td>
<td>10 years</td>
<td>30 seconds</td>
</tr>
<tr>
<td>10</td>
<td>3,700,000,000,000,000</td>
<td>580 million years</td>
<td>59 years</td>
</tr>
</tbody>
</table>

- Possible characters include the letters A–Z and numbers 0–9
- Human discovery assumes 1 try every 10 seconds
- Computer discovery assumes 1 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 biometric device?

- Authenticates person’s identity using personal characteristic
  - Fingerprint, hand geometry, voice, signature, and iris
Computer theft

- Hardware theft
- Software theft
  - Piracy
- Data / information theft
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
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
What is **product activation**?

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

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**SAMPLE ENCRYPTION METHODS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Method</th>
<th>Plaintext</th>
<th>Ciphertext</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transposition</td>
<td>Switch the order of characters</td>
<td>SOFTWARE</td>
<td>OSTFAWER</td>
<td>Adjacent characters swapped</td>
</tr>
<tr>
<td>Substitution</td>
<td>Replace characters with other characters</td>
<td>INFORMATION</td>
<td>WLDIMXQUWIL</td>
<td>Each letter replaced with another</td>
</tr>
<tr>
<td>Expansion</td>
<td>Insert characters between existing characters</td>
<td>USER</td>
<td>UYSYEYRY</td>
<td>Letter Y inserted after each character</td>
</tr>
<tr>
<td>Compaction</td>
<td>Remove characters and store elsewhere</td>
<td>ACTIVATION</td>
<td>ACIVTIN</td>
<td>Every third letter removed (T, A, O)</td>
</tr>
</tbody>
</table>
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.
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
**Information Privacy**

**What are some ways to safeguard personal information?**

<table>
<thead>
<tr>
<th>Fill in only the necessary information on rebate, warranty, and registration forms</th>
<th>Install a cookie manager to filter cookies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid shopping club and buyers cards</td>
<td>Clear your history file when you are finished browsing</td>
</tr>
<tr>
<td>Inform merchants that you do not want them to distribute your personal information</td>
<td>Set up a free e-mail account; use this e-mail address for merchant forms</td>
</tr>
<tr>
<td>Limit the amount of information you provide to Web sites; fill in only required information</td>
<td>Turn off file and print sharing on your Internet connection</td>
</tr>
<tr>
<td></td>
<td>Install a personal firewall</td>
</tr>
<tr>
<td></td>
<td>Sign up for e-mail filtering through your Internet service provider or use an antispam program, such as Brightmail</td>
</tr>
<tr>
<td></td>
<td>Do not reply to spam for any reason</td>
</tr>
<tr>
<td></td>
<td>Surf the Web anonymously with a program such as Freedom Web Secure or through an anonymous Web site such as Anonymizer.com</td>
</tr>
</tbody>
</table>
Information Privacy

What is a **cookie**?

- Small file on your computer that contains data about you
- Some Web sites sell or trade information stored in your cookies
- Set browser to accept cookies, prompt you to accept cookies, or disable cookies

User preferences

How regularly you visit Web sites

Interests and browsing habits

Some Web sites sell or trade information stored in your cookies

Click to view Web Link, click Chapter 10, Click Web Link from left navigation, then click Cookies below Chapter 10

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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.
What is ergonomics?

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

- Keyboard height: 23” to 28”
- Elbows at 90° and arms and hands parallel to floor
- Adjustable backrest
- Adjustable seat
- Adjustable height chair with 5 legs for stability
- Feet flat on floor
Think about it...

Which of the techniques in Figure 10-17 (p. 379) are you currently practicing? Which are you likely (or unlikely) to adopt? Why?