Security, Privacy, and Cyber Crime

Privacy in Cyberspace

- Privacy refers to an individual's ability to restrict the collection, use, and sale of confidential personal information.
- The Internet is eroding privacy through the selling of information collected through registration forms on Web sites.
- Few laws regulate selling personal information.
- Technology is not only making it easier to invade someone's privacy, but it is also providing a means to protect against privacy invasion.

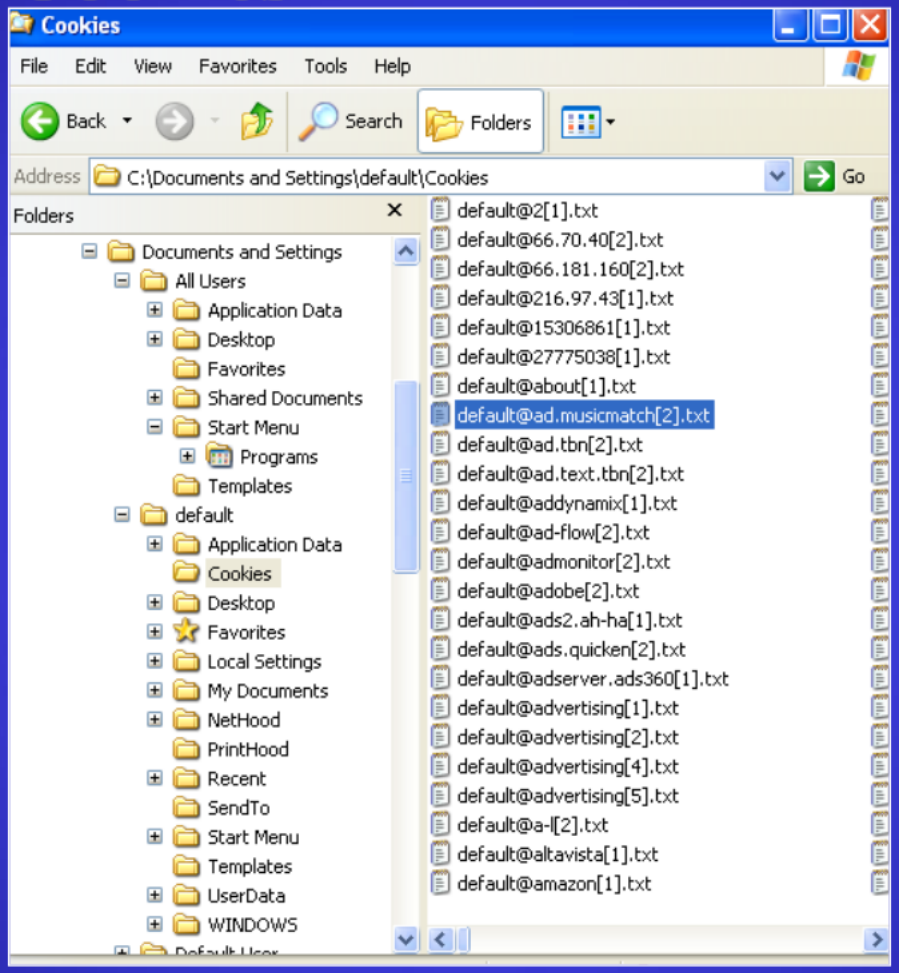
Technology and Anonymity

- **Anonymity** is the ability to convey a message without disclosing one's identity.
- It can be abused because it frees people from accountability.
- Computers and the Internet enable others to collect information in ways that are hidden from the user's view.
- Information technologies used on the Internet are:
  - Cookies
  - Global Unique Identifiers (GUIDs)

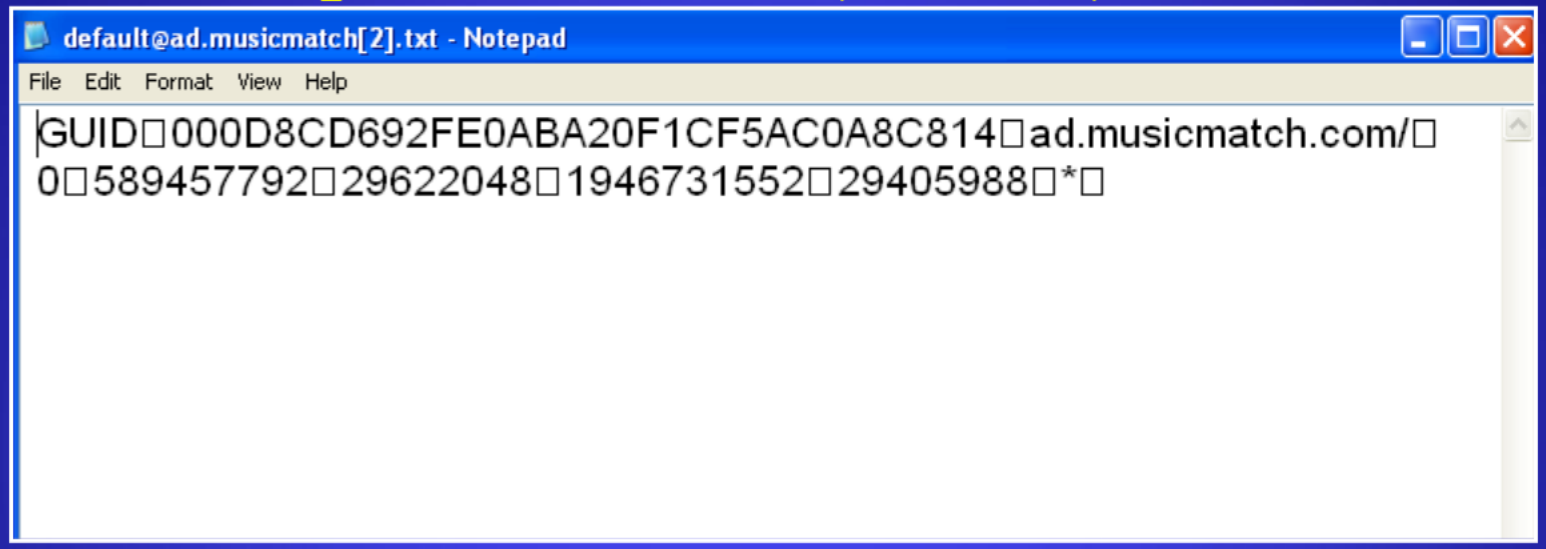
Cookies

- **Cookies** are small files that are written to an individual's hard drive whenever they visit a Web site.
- Legitimate purposes of cookies include recording information for future use; for example, retail sites using "shopping carts."
- Questionable practices include banner ad companies tracking a user's browsing actions and placing banner ads on Web sites based on those actions.

Example of Cookies



Global Unique Identifiers (GUIDs)



- A **GUID** is a unique identification number generated by hardware or a program.
- It is used to send user information back to the site that created it.

Global Unique Identifiers (GUIDs)

Example of GUIDs

- Intel Corporation placed a GUID in its Pentium III processors
- RealNetworks' RealJukeBox player sent information back to the company.
- Microsoft Word 97 and Excel 97 embedded GUID information in every document.

Protecting Your Privacy Online

- Browse anonymously by using Web sites such as www.anonymizer.com or www.the-cloak.com.
- Disable cookies on your Web browser.
- Use free e-mail addresses for information placed on Web sites.
- Tell children not to divulge personal information to online strangers.
- Make sure registration forms have a privacy policy statement.

Protecting Your Privacy At Home

Cell phones have GPS capability.

- Parents or EMS can find people.
- Capability is intrusive if an employer tracks an employee.

Protecting Your Privacy at Work

- Laws do not protect employees from being monitored by their employers.
- Companies are concerned about employees:
  - Giving trade secrets to competitors
  - Creating sexual harassment lawsuits by circulating offensive jokes via e-mail
- Three-quarters of large corporations monitor employees' phone calls, e-mail, Web browsing habits, and computer files.

Protecting Privacy at Work

Rules to follow while at work:

1. Do not use the employer's phone for personal calls.
2. Do not use the employer's e-mail for personal messages.
3. Assume everything you do at work is being monitored.

Computer Crime and Cybercrime

- Computer crimes occur when intruders gain unauthorized access to computer systems.
- **Cybercrime** is crime carried out over the Internet.
- **Cyberlaw** tracks and combats computer-related crime.

Computer Crime and Cybercrime

Types of Computer Crime

- Identity Theft
- Computer Viruses
- More Rogue Programs
- Fraud and Theft
- Forgery
- Blackmail

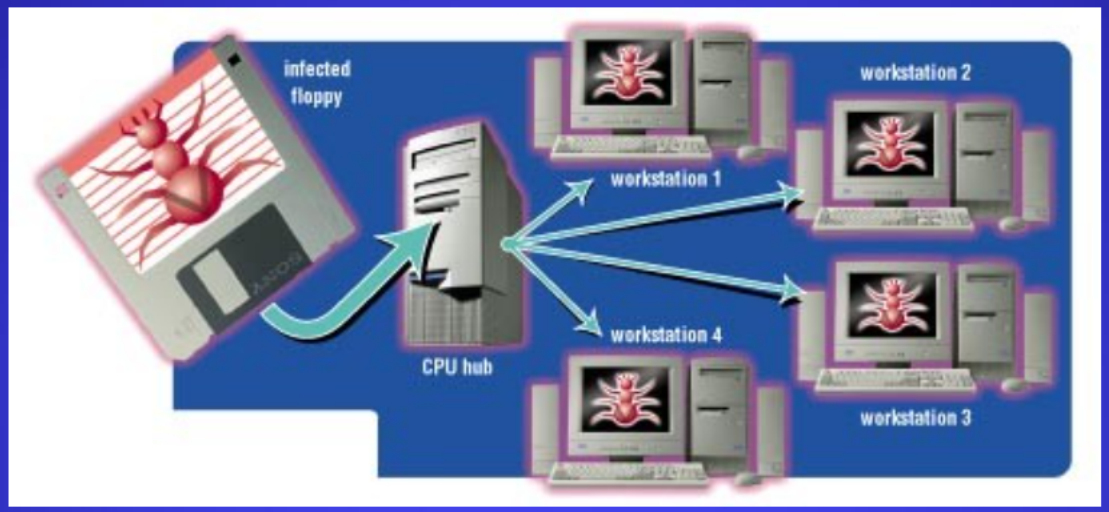
Identity Theft

- **Identity theft** is one of the fastest growing crimes in the United States and Canada.
- Identity theft occurs when enough information about an individual is obtained to open a credit card account in his or her name and charge items to that account.
- Examples of information needed are name, address, social security number, and other personal information.
- Laws limit liability to $50 for each fraudulent charge.
- An individual's credit report is affected by identity theft.

Computer Viruses

- **Computer viruses** are malicious programs that infect a computer system causing various problems with its use.
- Viruses replicate and attach themselves to programs in the system.
- There are more than 20,000 different computer viruses with the number growing daily.

How Virus Infections Spread



Virus Infections spread by:

- Inserting a disk with an infected program and then starting the program
- Downloading an infected program from the Internet
- Being on a network with an infected computer
- Opening an infected e-mail attachment

Types of Viruses

File Infectors

- Attach themselves to program files
- Spread to other programs on the hard drive
- Are the most common type of virus

Boot Sector Viruses

- Attach themselves to the boot sector of a hard drive
- Execute each time the computer is started
- May lead to the destruction of all data

Types of Viruses

Macro Viruses

- Infect the automatic command capabilities of productivity software
- Attach themselves to the data files in word processing, spreadsheet, and database programs
- Spread when the data files are exchanged between users

More Rogue Programs

Time Bombs

- Also called **logic bombs**
- Harmless until a certain event or circumstance activates the program

Worms

- Resemble a virus
- Spread from one computer to another
- Control infected computers
- Attack other networked computers

More Rogue Programs

Denial of Service Attack (DoS)

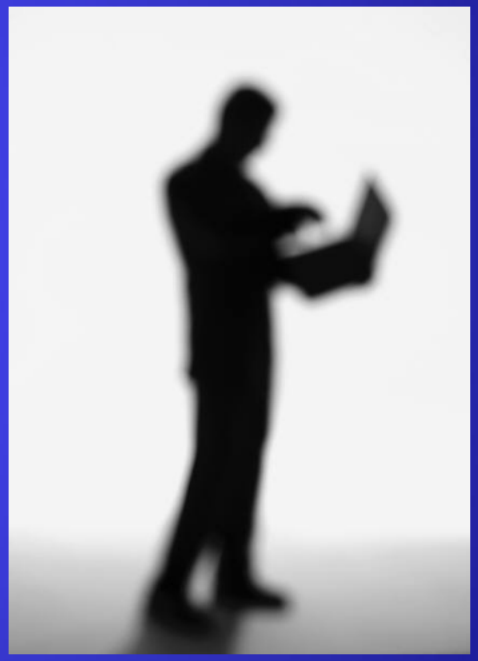
- Syn flooding
- Overload an Internet server with a large number of requests

Trojan Horses

- Disguise themselves as useful programs
- Contain hidden instructions
- May erase data or cause other damage

Fraud and Theft

- Selling social security numbers
- **Memory shaving –** taking RAM chips from computers
- **Salami Shaving**
  - Programmer alters a program to take a small amount of money out of an account.
- **Data Diddling**
  - Data is altered to hide theft.



Techniques to Obtain Passwords

- Password guessing
- Shoulder surfing
- Packet sniffing
- Dumpster diving
- Social engineering
- Superuser status

Forgery and Blackmail

- Forgery
  - Internet data can appear to be coming from one source when its really coming from another.
  - Forged e-mail and Web pages
- Blackmail
  - Adverse publicity fears

Meet the Attackers

- **Hackers**
  - Computer hobbyists
  - Find weaknesses and loopholes in computer systems
  - Rarely destructive
  - Adhere to the hacker's code of ethics
- **Cyber Gangs**
  - Bring crackers together by way of the Internet and meetings

Meet the Attackers

- **Crackers**
  - Also called black hats
  - Obsessed with entering secure computer systems
  - Rarely destructive
  - Leave calling cards on the systems they enter
- **Virus Authors**
  - Usually teenage males
  - Push the boundaries of antivirus software
  - Create viruses that are very damaging

More Attackers

- **Disgruntled Employees**
  - Sabotage their company's computer system
  - Create security holes called **trap doors**
  - May divulge trade secrets or destroy data
- **Swindlers**
  - Use the Internet to scam money from people
  - Use scams like **rip and tear**, **pumping and dumping,** and **bogus goods**
- **Spies**
  - Participate in corporate espionage
  - Are hackers or former employees
  - Involved in industrial espionage in 125 countries

More Attackers

- **Shills**
  - Use Internet auctions
  - Secret operatives who bid on a seller's item to drive up the bid
- **Cyberstalkers and Sexual Predators**
  - Use the Internet to repeatedly harass or threaten.
  - Children are at risk from sexual predators.

Security Risks

- **Computer security risk** is any event, action, or situation that leads to the loss of computer systems or their data.
- **Wireless Networks**
  - Inherently insecure
  - Information sent over airwaves
  - Individual can drive around looking for a signal
- **Corporate Espionage**
  - On the rise
  - Often ex-employees
  - Trap doors

Information Warfare

- **Information warfare** is the use of information technologies to corrupt or destroy an enemy's information and industrial infrastructure.
- An enemy attack would include:
  - Electronic warfare
  - Network warfare
  - Structural sabotage
- Information terrorism is a mounting threat.

Protecting Your Computer System

To protect a computer from power-related problems you should:

- Use programs that have an auto save/auto recovery function.
- Equip the system with an uninterruptible power supply, a battery-powered device that automatically turns on when the power is interrupted.

Controlling Access

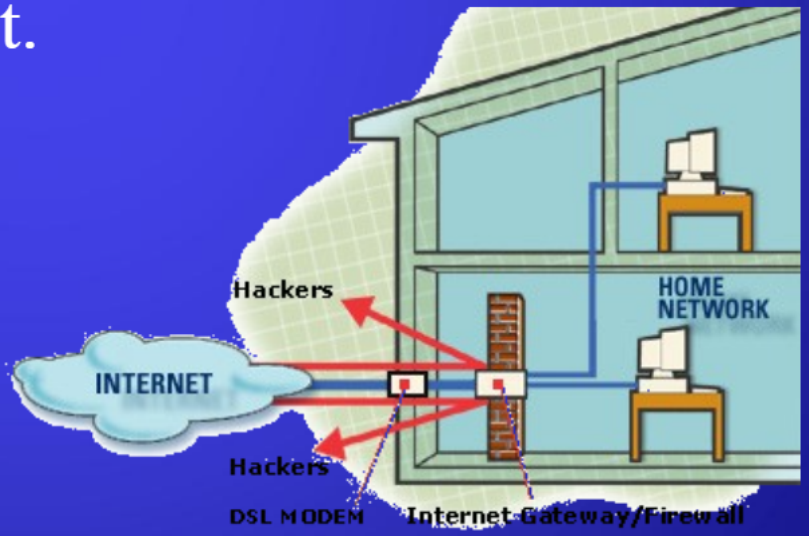
To control access to a computer:

- –Use **authentication** passwords.
- –Use **callback systems.**
- –Use **"know & have" authentication:**
  - » **Tokens** – Electronic devices that generate a logon code
  - » **Smart cards** – Credit card-sized devices with internal memory
  - » **Biometric authentication** – Voice recognition, retinal scans, thumbprints, and facial recognition

Using Firewalls

- **Firewalls** are programs that are designed to prohibit outside sources from accessing the computer system.

- A **personal firewall** is designed to protect home computers from unauthorized access while being connected to the Internet.



Avoiding Scams

- Only conduct business with established companies.
- Read the fine print.
- Don’t provide financial or personal information to anyone.
- Be skeptical about information received in chat rooms.

Preventing Cyberstalkers

- Don’t share personal information in chat rooms.
- Be extremely cautious about meeting anyone you’ve contacted online.
- Contact the police if a situation occurs that makes you feel afraid while online.

The Encryption Debate

- **Encryption** is the coding and scrambling process by which a message is made unreadable except by the intended recipient.
- Encryption is needed for electronic commerce.
- The potential for encryption's misuse troubles law enforcement officials.

Encryption Basics

- A readable message is called **plaintext.** I LOVE YOU
- An **encryption key** is a formula used to make plaintext unreadable.
- The coded message is called **ciphertext.** V YBIR LBH
- An encryption technique called **rot-13** is used in chat rooms and Usenet discussions.

Encryption Basics

- **Symmetric key encryption techniques** are encryption techniques that use the same key to encrypt and decrypt a message.
- **Strong encryption** refers to encryption methods that are used by banks and military agencies and are nearly impossible to break.

The Problem of Key Interception

- Rot-13 is not a secure encryption system.
- Symmetric key encryption systems are vulnerable to **key interception**, or having their key stolen.

Public Key Encryption

- **Public key encryption** uses two different keys.
  - Public key is the encryption key.
  - Private key is the decryption key.
- They are used in e-commerce transactions.
- A secure channel for information is provided when the keys are used.

Digital Signatures and Certificates

- **Digital signatures** are a technique used to guarantee that a message has not been tampered with.
- **Digital certificates** are a technique used to validate one's identity.
- **Secure Electronic Transactions (SET)** are online shopping security standards used to protect merchants and customers from credit card fraud.

Public Key Infrastructure (PKI)

A **public key infrastructure** is a uniform set of encryption standards that specify how public key encryption, digital signatures, and digital certificates should be implemented.

Encryption and Public Security Issues

- Encryption can be used for illegal as well as legitimate means.
- Encryption will devastate law enforcement's ability to fight crime.
- Law enforcement agencies are asking for laws enabling them to eavesdrop on encrypted messages:
  - **Clipper Chip**
  - **Key escrow plan**
  - **Key recovery**

Summary

- Many websites collect and store information about Web users.
- Cookies and GUIDs are used to collect data.
- Computer crime and cybercrime:
  - Identity theft
  - Computer viruses
  - Rogue programs
  - Forgery
  - Blackmail

Summary continued

- Computer criminals
  - Crackers
  - Cybergangs
  - Virus authors
  - Swindlers
  - Shills
  - Cyberstalkers
  - Sexual predators
- A computer security risk is any event, action, or situation that could lead to a loss or destruction of a computer or data.

Summary continued

- Prevent security problems.
  - Use an uninterruptible power supply to combat power-related problems.
  - Use good passwords.
  - Avoid scams and prevent cyberstalking.
- Encryption refers to coding or scrambling data.
- The US government's key recovery plan is a new system that allows investigators to decrypt messages.