8. CYBERSECURITY

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8.1: Cybercrime

8.1: Cybercrime

8.2: Cybersecurity

8.3: Common Threats

Learning Objectives

- Know the definitions of cybercrime and cybersecurity
- Describe cybercriminals
- List four categories of computer crimes
- Explain why you should care about cybercriminal
- Describe the difference between C*omputer as a Tool* and C*omputer as a Target*

Terminology

- **Cyber:** Relating to the **culture** of computers, information technology, and virtual reality
- **Cyberspace:** The online world of computer networks

Terminology (2)

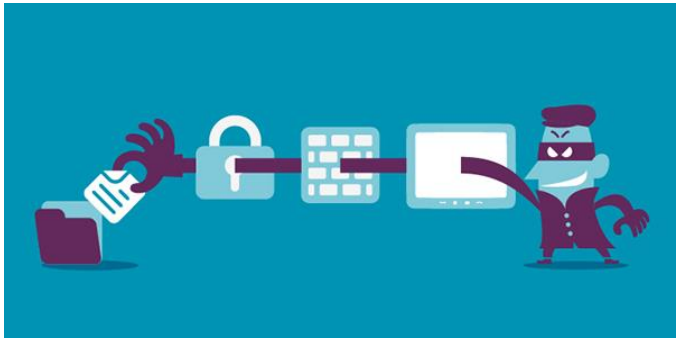
- **Cybercrime:** Criminal activities carried out using computers or the internet

Terminology (3)

- **Cybersecurity, computer security, or IT security:** Measures taken to protect a computer against unauthorized access or attack

Do I need to worry about cybersecurity?

- Hackers are getting more sophisticated… and more effective!
- Hackers run successful international enterprises
- Hackers hack for a living
  - That what they do, and they're very good at it!



Cybercrime is not New

- Computers have been hacked since their inception
- The first spam email took place in 1978 when it was sent out over **ARPANET**
- The first virus was installed on an Apple computer by a high school student 1981

Cybercriminals – No Rules!

- Steady increase in cybercrime
- Many nations refuse to investigate and prosecute
- Hackers and governments can access your unprotected data
- Ransomware is increasing – because it works!

What do cybercriminals do?

- Apply all sorts of techniques to **steal personal or financial data**
- Work silently in the background
  - They are stealthy
- Use stolen data for their gain

Who are the cybercriminals?

- Crackers and Hackers
  - Computer-savvy programmer who create attack software
- Script Kiddies
  - Unsophisticated computer users who know how to execute programs created by the crackers
- Criminals
  - Create & sell bots to generate spam
  - Sell credit card numbers, etc…

Cybercriminals

Cracker / Hacker:
Computer-savvy programmer creates attack software

Posts to

Hacker Bulletin Board
SQL Injection
Buffer overflow
Password Crackers
Password Dictionaries

Script Kiddies:
Unsophisticated computer users who know how to execute programs

Downloads

Reports

Successful attacks!
Crazyman broke into …
CoolCat penetrated…

Criminals:
Create & sell bots to generate spam;
Sell credit card numbers, etc…

Posts to

What do cybercriminals want?

- Make their living through cybercrimes
  - Money
  - Information
- Notoriety
  - Status, fame

Categories of Computer Crimes

- Computer as a Tool
- Computer as the Target
- Selling Illicit Goods
- Offensive content or Harassment

Computer as a Tool

- Using a computer **to target an individual**
  - Spam, phishing scams, cyber theft, fraud (deception), identity theft, etc.
- These cyberthieves are scammers, not technical experts

Computer as a Target

- Targeting a computer or system to commit a crime
  - Viruses or malware
  - Destruction or theft of information
  - Unauthorized access of a computer or account
- A select group of people with technical knowledge commit these crimes

Selling Illicit Goods

- Using a computer to sell illicit goods
  - Drugs trafficking
  - Counterfeit products
  - Stolen items
  - Weapons

THURSDAY JUNE 13 2013 NEWS Sun 3

N$12m fake goods seized

According to police information, 6 277 baby products valued at N$1,2 million, 11 385 cosmetic items valued at N$6.2 million and 14 000 pirated, branded goods valued at N$5,6 million were confiscated.

- Organized crime groups commit these crimes

Offensive Content or harassment

- The content of online information may be distasteful, obscene or offensive for a variety of reasons
  - Hate speech
  - Against a group based race, religion, ethnic origin, disability, etc.
- Harassing someone through cyberspace
  - Stalking, threats of violence, cyberbullying

Common Types of Cybercrime

- **Phishing:** Using fake email messages to get personal information from internet users
- **Identity theft** (misusing personal information)
- **Illegal pornography**
- **Hacking:** Shutting down or misusing websites or computer networks
- **Spreading hate** and inciting terrorism;
- **Grooming:** making sexual advances to minors.

Cybercrime Legislation Worldwide

- A worldwide fight against cybercrimes
- 138 countries have created laws to fight cybercriminals
- However, 20% of countries do not have any legislation

Cybercrime Summary

- **Cybercrime** is any criminal activity carried out using computers or the internet
- **Cybersecurity** is taking measures to protect a computer from unauthorized access
- **Cybercriminals** exploit others for their personal gain
- **Cybercrime categories:** Computer as a tool, as the target, selling illicit goods, offensive content and harassment
- **Computer as a tool:** When an individual is a primary target
- **Computer as a target:** When a computer is a target

8.2: Cybersecurity

8.1: Cybercrime

8.2: Cybersecurity

8.3: Common Threats

Learning Objectives

- Define the goal of cybersecurity
- Describe easy targets
- Explain general guidelines of protection against cyber threats
- Describe why pirated software is not safe
- State why software updates are important
- Describe the difference between a password and a passphrase

Cybersecurity Goal

- Your goal is to make it **as difficult as possible** to dissuade a hacker from getting your data or from being a victim of cybercrime
- Cybercriminals go after **easy targets** unless the victim has something of great value

Good Line of Defense

- Can you prevent from being a victim of cybercrime?
  - If a professional hacker or government surveillance wants your information, they will get it.
- **Make them work them for it**! In doing so, they might give up and move on to an easier target
  - Minimizes the chances of being a victim

Password Cracking Example

- Hackers use “Brute-Force” Password Crackers
- One group cracked 2700 “bad” passwords in 30 seconds
  - The crack program ran for 48 hours more and did not crack the 250 remaining “good” passwords
- Do the hackers keep trying to get the remaining 250 passwords? Or do they find easier targets?
- **Your goal:** Be one of the 250

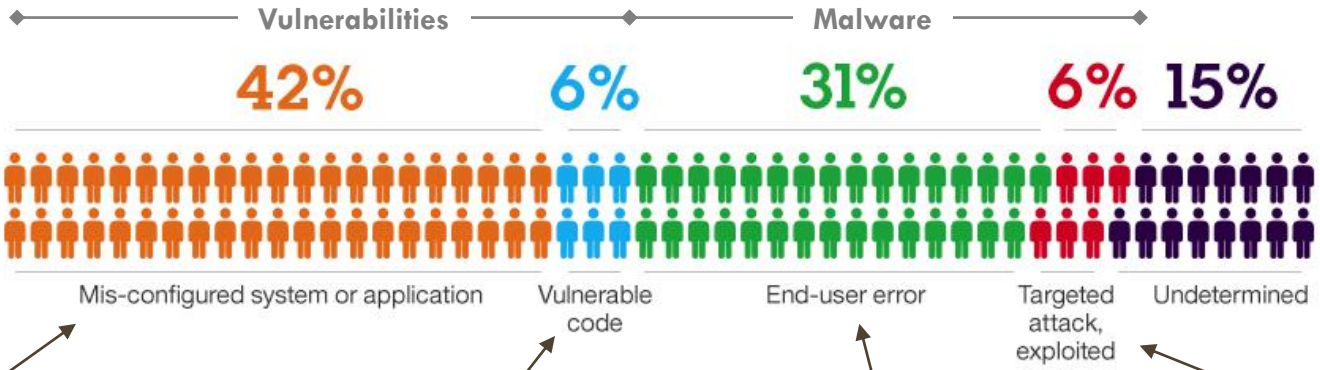
Are you a target?

- Most victims are not specifically targeted
- They are bystanders or part of a larger cybercrime operation
  - A lot of information is out of your control
  - Logins from a website you use is hacked and your password was leaked
- Control what you can control

Who are the easy targets?

- Easy Targets
  - Use weak passwords
  - Reuse passwords
  - Respond to spam
  - Click links in emails
  - Visit shady internet sites
  - Run pirated software
- Difficult Targets
  - Security conscious
  - Understand the dangers and risks
  - Use encryption
  - Use Two-Factor Authentication (2FA)

Why do Breaches Happen?



- Configuration Errors
- "Weak" defaults
- Easy passwords

- "Bugs"
- Input validation

- Installing suspect applications
- Clicking malicious links

- Phishing Emails

General Protection Guidelines

- Use official software (not pirated)
- Do not visit shady websites
- Update software regularly
- Use a reputable antivirus program
- Use strong passwords
- Do not reuse passwords

Pirated Software

- Pirated software is software that has been copied or distributed for free against the wishes of the creator
- Popular choices
  - Windows 7/10
  - Microsoft Office
  - Kaspersky Lab
  - Adobe products

Pirated Software (2): Created by Criminals

- Crackers hack software for a living
  - They **do not** do it for the goodwill of the community
  - They are not Robin Hood
- If they crack software, they do so to help their criminal enterprise
  - They can control the computers of those who install it

Pirated Software (3): Risks

- Pirated software contains backdoors
- Cybercriminals use your computer in many ways
  - Mine for Bitcoins or cryptocurrencies
  - Send spam
  - Launch cyber attacks
  - Monitor communications for financial information

Pirated Software (4): Assumptions

- All pirated software **is compromised**
- All cracking software used to hack official versions **contains malware**

Pirated Software (5): Assumptions

- Free download sites **can be dangerous**, even for free software, such as Adobe PDF
- Could contain unofficial versions of the software with malware

Pirated Software (6): Food for Thought

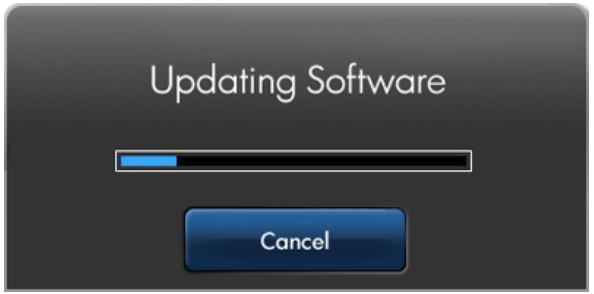
- Would you install a **free lock** on your door from a mafia street vendor?
  - What are the risks?
- Similarly, **why would you trust a hacker** with your computer and data?

Pirated Software (7): Alternatives

- Only download software from official sources
  - microsoft.com; adobe.com; google.com; mozilla.org;
- Do not use cracking software to unlock software
- Use free alternatives
  - GIMP - GNU Image Manipulation Program
  - Linux
  - FreeOffice
  - Google Drive

Software Updates: Are they important?

- Crackers find new exploits all the time
  - Write software to exploit these
- Script kiddies and cybercriminals purchase the hacker's software to use the exploits
- Running up-to-date software patches these vulnerabilities



Passwords

- Bad passwords easily guessed by a computer program
  - Qwerty; 123456; password; superman; p@ssword
- Good passwords are long and have special characters and numbers.
  - They do not make sense, such as:
  - KN%6hGYgEqdVvAt7#W!cVk31

Passwords (2): Passphrase

- Use a passphrase if you need to memorize your password
  - Strong passwords require a password safe
- Memorize a passphrase (can use special letters)
  - **Positive message:** I want 2 smile more :)
  - **Random words:** Yellow-green pancakes 4bfast
  - **Some phrase:** Te@ is better with milk
  - **A memory:** Remember Turkey 2017?

Final point to ponder

- Someone will always have your data
  - You give them permission to read the emails and your documents by using the service
  - Do you trust them?
- Who do you trust more not to abuse your data?
  - mail.ru/.kz
  - Gmail.com
  - yandex.ru/.kz
  - any-email-address /.com/.ru/.cn/.eu/.abc

Cybersecurity Summary

- **Goal**: Be a difficult target
- **Easy targets**: People with a low awareness of cybersecurity; don't take measures to protect themselves online
- **Protection guidelines**: Use official software that automatically updates, do not visit shady websites, and choose strong passwords
- **Pirated software**: Are tools of hackers
- **Software updates**: Fix recent exploits in software
- **Password**: UecX6JxZJ^cJ$;
- **Passphrase**: I like d33p blue!

8.3: Common Threats

8.1: Cybercrime

8.2: Cybersecurity

8.3: Common Threats

Learning Objectives

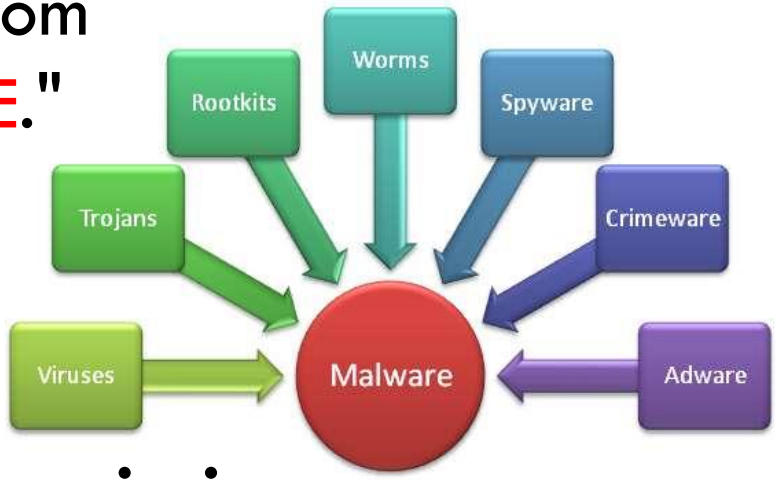
- Describe the common cyber threats
- Understand how malware works
- List the ways that malware infects computers
- Describe how to protect against data leaks
- Explain the dangers links in unsolicited email
- Describe security risks when using public WiFi

Common Cyber Threats

- Malware
- Data Leaks
- Unsolicited Email
- Open WiFi Networks

Malware

- The word "malware" comes from the term "MALicious softWARE."
- Malware is any software that infects and damages a computer system **without the owner's knowledge or permission**

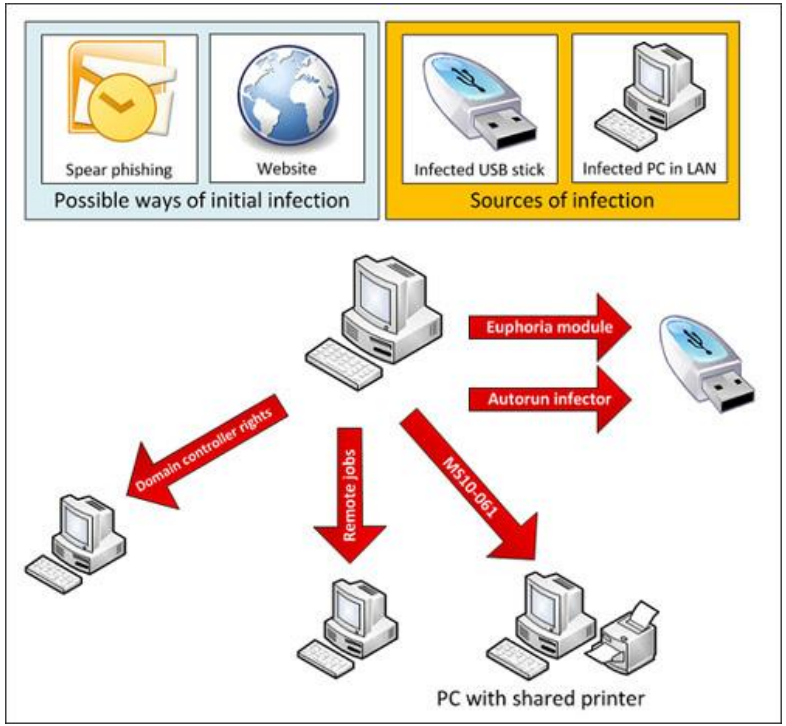


Malware (2): How Malware Operates

- The malicious code attaches itself to a program, file, or disk
- When the program executes, the virus activates and replicates itself
- The virus works in background, often without knowledge of the user

Malware (3): Infection Methods

- Untrusted websites
  - Clicking a link in email
  - Downloading a file
  - Malicious JavaScript
- Email attachments
- Pirated software
- Flash drives
- Another computer on the network



Malware (4): What They Do

- **Worms** self-replicate but do not cause harm
- **Viruses** can cause the computer crashes, loss of data,
- **Trojan horses** steal data and provide a backdoor for the cybercriminal
- **Spyware** collects data from the infected machine
- **Keyloggers** record all of a user's keystrokes
- **Fake antivirus** software allows malware to remain undetected
  - This is true for pirated/hacked antivirus software

Malware (5): Ransomware

- Encrypts your entire computer
- Only way to get access to your files is to pay the cybercriminal

Malware (6): Infected Computers

- Antivirus software can clean some malware**, but not all**
- Might require the user to reinstall the operating system
- User's data may or **may not be salvaged**

Malware (7): Protect Against

- Use a reputable antivirus program
- Keep your computer up to date
- Do not visit untrusted websites
  - Do not click unknown links in an email
  - Do not download files from unknown sources
- Do not use pirated software
  - Most pirated software contains malware

Data Leaks

- Release of secure information to an untrusted environment
- Cybercriminals frequently post hacked usernames and passwords from websites
  - One online hacker's database has 1.4 billion usernames and passwords

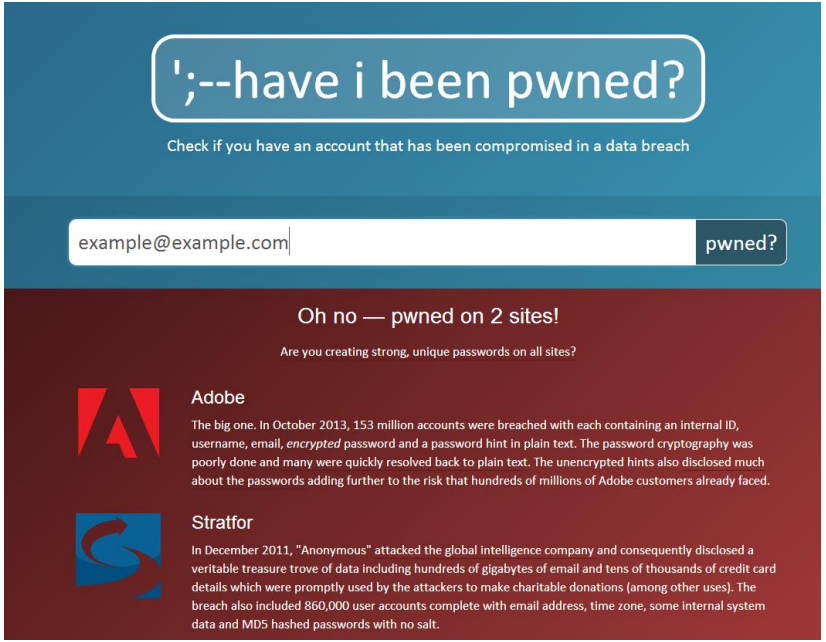
Data Leaks (2): Data from Websites

Data Leaks (3)

- You cannot prevent data leaks
- Instead, plan for your username, password, and other sensitive data to be leaked online

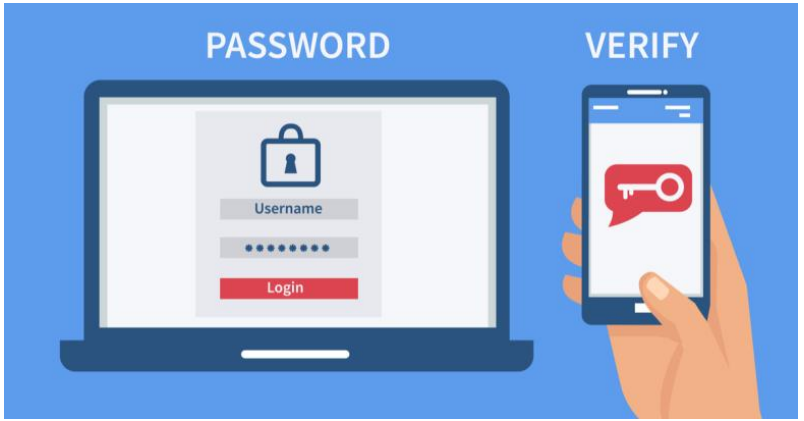
Data Leaks (4)

- Cybercriminal plan on users using the same username and password for multiple accounts



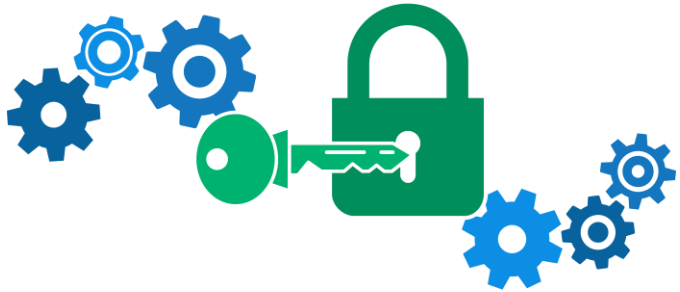
Data Leaks (5): How to Plan

- Use a unique username and password combination for each account
- Use a password manager
  - LastPass
  - 1Password
  - KeePass
- Use two-factor authentication



Data Leaks (6): Encryption

- Encrypt sensitive data
  - Secure Folder (Samsung)
  - BitLocker (Windows 7/10 Pro)
  - VeraCrypt (Windows)
  - 7zip encrypts compressed files (Any)
    - The easiest to use
    - You will learn how to use 7zip in a lab



Unsolicited Email

- Unsolicited email is a favorite way for cybercriminal to get access to a computer or an account
  - **Phishing:** Tricking the user to giving account information
  - **Click Here:** The link takes a user to a malicious website

Unsolicited Email (2)

- **Infected attachments**: A doc, pdf, or another file that contain malicious software
- **Self-replicating**: Once you are infected, the malware uses your account to send the infected email to everyone in your address book

Unsolicited Email (2): Click Here

- If you click a malicious link or fall for a phishing scam, it might be too late…
  - **Drive-by downloads**: Malicious software can install just by visiting a website (virus, ransomware, keylogger)
  - **Ransomware**: 93% of all phishing emails are now ransomware

Unsolicited Email (3): Protection

- In addition to the malware protection guidelines:
  - Know how to identify fake email or spam
  - Never click a link in an email, not even from a friend, unless you know it is safe
  - Never click a password reset link. Instead, go to the website directly
  - Mouse over a link to verify the URL

Open WiFi Access Points

- **Any data** transmitted through an **unsecured WiFi** connection **can be easily collected**
  - Intercepting login credentials
  - Only use SSL/HTTPS when logging into your sites

- Understand the risks and use with care
  - Virus threat from infected users
- Better to use mobile data through your phone

Common Threats Summary

- Common cyber threats
  - malware, data leaks, unsolicited email, and public WiFi
- Malware is malicious software that runs the background
  - From: untrusted websites, email attachments, pirated software, infected flash drives, or infected computers on a network
- Data leaks publish private data online
- Harmful websites automatically install malware when visited
- Public WiFi expose unencrypted data, such as passwords