

CS150 – Intro to Programming

## SECURITY AND PRIVACY

1

---

---

---

---

---

---

---

---

## Definitions

- What is security?
  - Protection of information and property from theft, corruption, or natural disaster
  - Allowing the information and property to remain accessible and productive to its intended users.
- What is privacy?
  - The desire of personal privacy concerning the storing, repurposing, providing to third-parties
  - Displaying of information via the Internet.

2

---

---

---

---

---

---

---

---

## Why do we need security?

- To protect money
  - Banks, Financial transactions
- To protect information
  - Government agencies
- To ensure personal safety
  - Airlines, trains, bridges
- To keep the bad guys out
  - Or just the nosy...

3

---

---

---

---

---

---

---

---

## What is the price of security?



---

---

---

---

---

---

---

---

## Ease of use

- With more security comes:
  - More checks
    - Is what you are doing is legit?
  - More chances for error
    - Entering wrong password
  - Differing rules
    - One site wants letters and numbers
    - Another wants a special character
  - More frustration

---

---

---

---

---

---

---

---

## Performance

- The more security you have in place
  - The more activities your computer is doing to check things
  - These activities take resources
  - And your computer slows down...
- You are entering more information to authorize
  - And your performance slows down...

---

---

---

---

---

---

---

---

## Inability to act

- Sometimes you just can't do what you are entitled to do,
  - Forgotten password
  - System imposed restrictions
    - 3 times enter incorrect password
- Security servers are often different than content servers
  - Differing point of failure

7

---

---

---

---

---

---

---

---

## Who are the bad guys?



8

---

---

---

---

---

---

---

---

## Malware

- Short for malicious software
- Programs designed to
  - Disrupt or deny operation
  - Gather information
  - Gain unauthorized access
- Software is considered malware based on the intent of the programmer

9

---

---

---

---

---

---

---

---

## Virus

- A computer virus attaches itself to a program or file
- Enables it to spread from one computer to another, leaving infections as it travels.
- Viruses can increase their chances of spreading to other computers by infecting files on a network file system or a file system that is accessed by another computer

10

---

---

---

---

---

---

---

---

## Worm

- Similar to a virus by design and is considered to be a sub-class of a virus.
- Worms spread from computer to computer, but unlike a virus, it has the capability to travel without any human action.
- A worm takes advantage of file or information transport features on your system, which is what allows it to travel unaided.

11

---

---

---

---

---

---

---

---

## Trojan Horse

- At first glance will appear to be useful software
  - Do damage once installed or run on your computer.
- Results vary
  - From the merely annoying to causing serious damage
  - Can also create a backdoor on your system
  - Backdoors used to create botnets
- Unlike viruses and worms, Trojans do not reproduce by infecting other files nor do they self-replicate.

12

---

---

---

---

---

---

---

---

## Spyware

- **Collects** small pieces of information about users without their knowledge.
  - Surfing habits
- Can install additional software
  - Keyloggers
- Change web browser activity
  - Home page
- **SLOWS DOWN YOUR SYSTEM**
  - Additional activity
  - Change computer settings

13

---

---

---

---

---

---

---

---

## Adware

- Software which displays advertisements
- User-consented
  - Alternative to registration fees.
- The other kind...
  - Displays advertisements related to what it finds from spying on users.
  - Example is Gator from Claria Systems.
    - Visited Web sites frequently install Gator on clients
    - It directs revenue to the installing site and to Claria by displaying advertisements to the user.
    - You get pop-up advertisements

14

---

---

---

---

---

---

---

---

## Back to security..



15

---

---

---

---

---

---

---

---

## How do we achieve security?

- Physical
  - Lock it down
- Authentication
  - Are you who you say you are?
- Authorization
  - Are you allowed to do what you are trying to do?

16

---

---

---

---

---

---

---

---

## Physical security

- Armed guards, gates, etc.
  - Not so good
- Possession
  - Adequate for most of us
- Lock and keys, badges
  - Good for large things
  - Computer lab

17

---

---

---

---

---

---

---

---

## Authentication

- Badges, passports
  - Physical possession
- Passwords
  - Differing degrees of difficulty
- Biometrics
  - Fingerprints, retinal scans
- Captcha keys
  - Are you a bot?
- Digital certificates
  - Am I talking to the real site?

18

---

---

---

---

---

---

---

---

## Authorization

- Access control
  - Tying an object to permissions
  - Can be done individually or to a role
  - Can be logical or physical
- Role-based access control
  - Person is assigned "roles"
  - The roles are assigned permissions
  - Much easier to administer

19

---

---

---

---

---

---

---

---

## Privacy



20

---

---

---

---

---

---

---

---

## What is privacy?

- The ability to keeping information from being shared without your approval
  - Personally Identifying Information (PII)
    - Name
    - Social Security number
    - Bank account number
  - Non-PII information
    - Surfing habits
    - Purchasing habits

21

---

---

---

---

---

---

---

---

## What type of info?

- Healthcare records
- Criminal justice investigations and proceedings
- Financial institutions and transactions
- Biological traits, such as genetic material
- Residence and geographic records
- Ethnicity, gender, sexual preference
- Many, many more

22

---

---

---

---

---

---

---

---

## Does privacy exist anymore?

- Unfortunately, the horses have left
  - We can close the barn door, but...
  - We were in such a rush to make the data available, privacy was short-circuited
- A lot of factors are not under your control
  - Other people's data
- Significant number of experts believe that privacy no longer exists

23

---

---

---

---

---

---

---

---

## Why has privacy disappeared?

- On-line shopping, surfing
  - Habits are recorded
- Identifying information
  - IP addresses, PIP
- Public surveillance
  - Cameras, facial recognition software
- Legislation
  - Terrorism, public right to know

24

---

---

---

---

---

---

---

---



## Is it hopeless?

- Small subset of people with access
  - Like to believe those people require authorization
- Keep that subset small
  - Keep your info out of the bad guys hands
    - Guard your personal information
    - Don't be afraid to question someone's right to know
- Information on the net is permanent

25

---

---

---

---

---

---

---

---

## How to fight back...



26

---

---

---

---

---

---

---

---

## Passwords

- Social engineering
  - Have differing degrees of passwords
  - Don't share your important passwords
- Passwords guessers
  - Combine numbers, letters, special characters
  - Use the phrase method
    - Michelle Took Bobby Out For 4 Beers
    - MTBOF4B

27

---

---

---

---

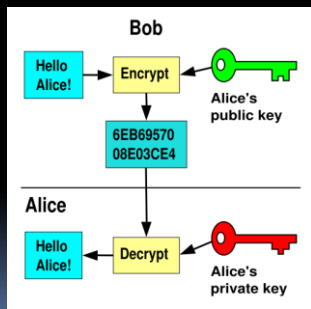
---

---

---

---

## Encryption




---

---

---

---

---

---

---

---

## Backups

- Back your systems up regularly
  - Automated software
  - Built into Macs, Windows
- Can backup to portable hard drive
  - Very inexpensive these days
- If a virus attacks you, you can recover
  - Reload from backups

---

---

---

---

---

---

---

---

## Personal habits

- Be careful about posting PII
  - Who can see it?
  - What is their privacy policy?
- Use differing levels of e-mail addresses
  - Keep one for shopping, surveys
  - Keep one for professional
  - Keep one for personal

---

---

---

---

---

---

---

---

## Personal habits

- Change your passwords regularly
  - Every 90 days or so
  - Do NOT use your birthday...
- Watch your bank accounts
  - Easy to log in and verify transactions
  - Programs like Quicken will download
- Use encryption
  - https://

31

---

---

---

---

---

---

---

---

## Personal habits

- Verify on-line sites
  - Don't give your CC# unnecessarily
  - Ensure it is a legitimate business
- NEVER respond to phishing
  - They will clean out your account in seconds
- Run virus checkers
  - Norton, MacAfee, ClamXav
- Backup your system regularly

32

---

---

---

---

---

---

---

---

## References

1. [http://en.wikipedia.org/wiki/Computer\\_security](http://en.wikipedia.org/wiki/Computer_security)
2. <http://www.webopedia.com/DidYouKnow/Internet/2004/virus.asp>
3. [http://en.wikipedia.org/wiki/Internet\\_privacy](http://en.wikipedia.org/wiki/Internet_privacy)
4. <http://en.wikipedia.org/wiki/Malware>
5. <http://en.wikipedia.org/wiki/Spyware>
6. <http://www.buzzle.com/articles/computer-security-authentication.html>

33

---

---

---

---

---

---

---

---