Week 14 - Wednesday

COMP 4290

Last time

- What did we talk about last time?
- Information and the law
- Employee and employer rights
- Software failures

Questions?

Project 3

Late Project 3 Submissions

Assignment 5

Nfaly Toure Presents

Computer Crime

Computer crime

- Computer crime needs new definitions for crime
  - Traditional crime focuses on crimes against people (murder) or crimes against objects (theft)
- Copying software is not traditional theft because no tangible object is missing
- Computer trespassing has a similar problem
- Evidence of computer crime is difficult to authenticate

Value of data and privacy

- Early cases did not recognize the value of confidentiality and integrity of data
  - Instead, the crimes had to be put in terms of stolen time on a computer system
- Newer laws and precedents protect privacy, but not as broadly as they should
- Old cases considered the value of data the same as the paper it was printed on
- Newer standards have given data significant monetary value
  - But how much is any given data really worth?
- Civil suits tend to move faster than criminal cases in updating standards

Difficulties in prosecuting computer crime

- Lack of understanding
  - Judges, lawyers, police, and jurors may poorly understand computers
- Lack of physical evidence
  - No bloody murder weapon
- Lack of recognition of assets
  - Value of data is difficult to gauge
- Lack of political impact
  - No big headlines
- Complexity of cases
  - Hard to present technical details to a jury in order to make a case
- Age of defendant
  - Many computer criminals are young

Computer Statute Examples

Example statutes

- U.S. Computer Fraud and Abuse Act
  - Enacted in 1984 and covers:
    - Unauthorized access to a computer with national defense information
    - Unauthorized access to a computer containing banking data
    - Unauthorized access to a computer operated by the U.S. government
    - Accessing any "protected computer" without permission, a standard that now includes any computer connected to the Internet
    - Computer fraud
    - Transmitting code that damages computer systems
    - Trafficking computer passwords
- U.S. Economic Espionage Act
  - Enacted in 1996 to prevent use of a computer to do espionage for a foreign government

Example statutes

- U.S. Electronic Funds Transfer Act
  - Prohibits trafficking in stolen or counterfeit debit instruments (credit card numbers, bank account information) for interstate or foreign commerce
- U.S. Freedom of Information Act
  - Requires government departments to disclose information about their workings unless it would pose a national security risk or violate personal privacy
- California Breach Notification
  - Requires companies doing business in California to notify any California citizens whose data has been compromised in an attack
  - Many states now have similar laws

Privacy acts (mentioned already)

- U.S. Privacy Act
  - Enacted in 1974 to limit the amount and uses of personal information the government collects
- U.S. Electronic Communications Privacy Act
  - Enacted in 1986 to protect citizens from government wiretapping without a warrant
- Gramm-Leach-Bliley
  - Enacted in 1999 to protect the privacy of customers of financial institutions
- HIPAA
  - Enacted in 1996 to protect the privacy of individual medical records

More example statutes

- USA Patriot Act
  - Passed in 2001 in the wake of 9/11
  - Allows law enforcement to wiretap if they can show to a court that the target is *probably* the agent of a foreign power
  - Amended the U.S. Computer Fraud and Abuse Act to make damaging a protected computer a felony
- Controlling the Assault of Non-Solicited Pornography and Marketing (CAN SPAM) Act
  - Bans false or misleading SMTP headers
  - Prohibits deceptive subject lines
  - Requires commercial e-mails to give an opt-out method
  - Bans the sale or transfer of e-mails of those who have opted out
  - Requires commercial e-mails to be identified as advertisements
  - Has no effect on spam coming from overseas

Other Computer Crime Issues

Computer criminals are hard to catch

- Much of the crime is international, and there are no international computer laws
  - Although many countries cooperate to catch criminals, there are safe havens where they cannot be arrested
- Technical problems make them hard to catch
  - Attacks can be bounced through many intermediaries, each requiring their own search warrant
  - The right network administrators has to be given the warrant (and he or she might not keep good records)

Cryptography and the law

- Many countries have controls on the use of cryptography
  - Governments want cryptography they can break so that they can catch criminals
  - Laws are hard to enforce for individuals, especially now that the instructions for coding up AES are widely available
- Until 1998, export of cryptography in the US was covered under laws preventing the export of weapons of war
  - This definition changed, although there are still export restrictions
  - There were never any restrictions on the *use* of cryptography in the US
  - Absurdly, the government said that object code was subject to export restriction, but printed source code was an idea and therefore not

Escrowed cryptography

- The government made proposals to relax export rules for **escrowed encryption**
  - With escrowed encryption, the government is given copies of all the keys used to protect all transmissions, but promises to use them only with court authorization
- Three well known proposals for these systems were Clipper, Capstone, and Fortezza
- These proposals were not adopted because of public distrust of what the government might do with all the keys

Current cryptographic policies

- In 1996, the National Research Council made the following recommendations:
  - No law should ban the use of any encryption inside the US
  - Export controls should be relaxed
  - 56-bit DES (and similar levels of encryption) should be easily exportable
  - Escrowed encryption isn't a mature technology
  - Laws should be enacted to punish the use of encryption to commit crimes
- In 1998, the government
  - Allowed export of DES virtually everywhere
  - Allowed unlimited size encryption to 45 industrial countries for financial institutions, medical providers, and e-commerce
  - Made applying for permission to export a simpler process
- Registration with the US Bureau of Industry and Security is still required for the export of "mass market encryption commodities, software and components with encryption exceeding 64 bits"

Ethics and Computers

Law vs. ethics

- We can't make laws to cover every single case
- We rely on **ethics** and **morals** to help
- An **ethic** is an objectively defined standard of right and wrong
  - A set of ethical principles make an **ethical system**
- We will not distinguish between ethics and morals here
  - Some authors use the terms interchangeably or distinctly

Laws vs. ethics

- Laws:
  - Apply to everyone
  - Courts determine which law applies or if one supersedes another
  - Laws and courts define what is right (legal) and what is wrong (illegal)
  - Laws are enforced
- Ethics:
  - Are personal
  - Ethical positions often come into conflict with each other
  - There is no universal standard of right and wrong
  - There is no systematic enforcement for ethical decisions

Issues with ethics

- Ethics are a set of principles for justifying what is right or wrong in a situation
  - Religion affects ethics because it makes strong statements about moral principles
  - However, two people with the same religion can have different ethical philosophies and two people with different religions can have the same
- Ethical values vary from society to society and within a society
- Ethics do not provide answers
  - Opposed positions may be ethically justifiable
  - This is called **ethical pluralism**
  - There is no ultimate ethical authority

Why study ethics?

- People make ethical judgments all the time
- If you know what is right to do and what is wrong to do in a situation, ethics can help you justify your choice
- If you don't know what to do, a study of ethics can help you find the right choice

Examining an ethical choice

1. Understand the situation
   - Learn all the facts about the situation first
2. Know several theories of ethical reasoning
   - There may be many ways to justify different choices
3. List the ethical principles involved
   - What different philosophies could be applied?
4. Determine which principles outweigh others
   - This is the hard part where you have to make a subjective valuation

Consequence-based principles

- One school of ethical thought examines that good (or bad) that could result from actions
  - This is called the **teleological** theory of ethics
- In a consequence-based system of ethics, you must weigh the positive consequences against the negative consequences
- **Egoism** is the form of teleology that seeks to maximize the good for the person taking the action
- **Utilitarianism** is the form that seeks to maximize the good for everyone

Rule-based principles

- Another school of ethical reasoning is **deontology**, which assumes that some things are good in and of themselves
- Individuals have a duty to promote these things
- Examples of intrinsically good things in some deontological systems:
  - Truth, knowledge, understanding, wisdom
  - Justice
  - Pleasure, satisfaction, happiness, life
  - Peace, security, freedom
  - Good reputation, honor, love, friendship
  - Beauty

Rule-deontology

- **Rule-deontology** proposes that there are universal natural laws that we should adhere to
  - In so doing, we ensure the rights of others
- Some examples of these duties:
  - Truthfulness
  - Making up for a previous wrongful act
  - Thankfulness
  - Distribution of happiness according to merit
  - Helping other people
  - Not harming others
  - Improving oneself
- Your system of duties might come from a religion or be even more individualized

Ticket Out the Door

Upcoming

Next time…

- Finish ethics in computer security
- AI and cybersecurity
- Ahmed Mohamed presents

Reminders

- Work on Project 3
  - Try to attack the other projects
- Work on Assignment 5
  - Due next Monday
- Read section 13.1