Ethics in Computing

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Disclaimer

- I am not an expert in ethics
- I have taken many classes that touch on it
- I have taken a class on computer ethics
- I’m going to introduce some topics and try to foster conversation
- In order to have interesting conversations, we need to feel comfortable
  - Be kind
  - Be thoughtful about what you say
  - Try to expect the best from each other
  - This class is not recorded

ACM General Ethical Principles

1. Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing
2. Avoid harm
3. Be honest and trustworthy
4. Be fair and take action not to discriminate
5. Respect the work required to produce new ideas, inventions, creative works, and computing artifacts
6. Respect privacy
7. Honor confidentiality

Hacking

What is a hacker?

What is a hacker?

Definition - Hacker

A person skilled in information technology who uses their technical knowledge to achieve a goal or overcome an obstacle, within a computerized system by non-standard means

Common Vulnerabilities

- Denial-of-Service (Dos)/Distributed Denial-of-Service (DDos)
- Code injection
- Side-channel attack
- “Confused Deputy”
- Privilege Escalation
- “Buffer overflow”
- Social Engineering

Types of hackers

- We define hackers by the color of their hat
  - Based on old hollywood westerns
- “White Hat”
  - “Ethical” hacker
  - Looks for vulnerabilities to prevent attacks
  - Given consent by system admin
- “Black Hat”
  - Violates laws or ethical standards
  - Exploits vulnerabilities for their own gain
- “Grey Hat”
  - May violate law and ethical standard
  - Will not exploit vulnerabilities they find

White Hat

- Often employed by company to check system
- Given explicit permission to “hack”
- Look for vulnerabilities in:
  - The software
  - The hardware
  - The people
- Usually paid pretty well

Black Hat

- Looks for new or known vulnerabilities in systems
- Applies vulnerabilities to system
- Why?
  - Money
  - Power
  - Personal/Political vendettas
  - Fun

Grey Hat

- Uses black hat tactics to achieve white hat goals
- Finds vulnerability
- Brings vulnerability to attention of group
  - Potentially by exploiting the vulnerability
- Sometimes receives compensation

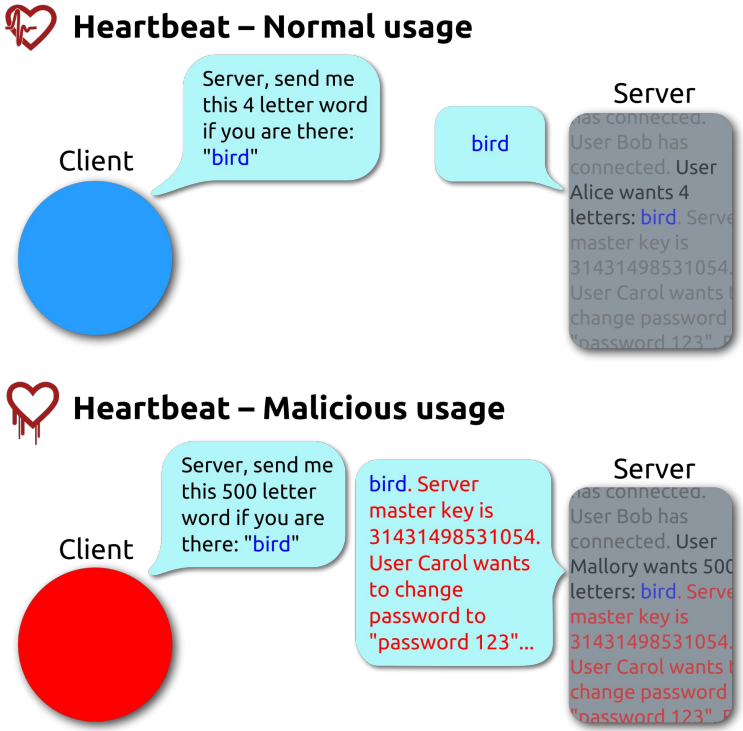
Is gray hat hacking ethical?

Famous Hacks

ILOVEYOU aka Love Bug (2000)

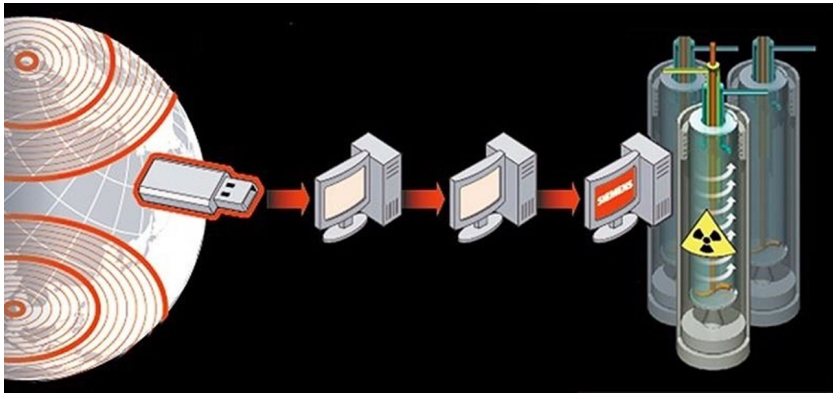
- Vulnerability: Windows hides extensions
- User receives email with file
  - “LETTER-FOR-YOU.TXT.vbs”
- Opening file unleashes virus
  - Wrote over random files
  - Looked at email list
  - Sent itself to people on list

Heartbleed (2012-2014)



Stuxnet (2005?-2010)

- Vulnerability: 4 different “0 day”s
- Target: Nuclear enrichment facilities
- Virus spreads to connected machines
- Activates if conditions are met
- When conditions are met
  - Alters centrifuges
  - Causes system to break over time
  - Makes things appear normal



Machine Learning

Moral Machine

https://www.moralmachine.net/

How should self driving vehicles act?

Fairness

- Can ML be biased?
- Machine learning operates by identifying patterns in data
- Can data be biased?
- How can we remove bias from data?
- Can we prove something isn’t biased?

Proving Fairness (or unfairness)

- Given features, ML model makes a decision
- What is we had some “protected” features that shouldn’t affect outcome?
- If we show the model will not change decision based on features, it is “fair”

Proving Fairness (or unfairness)

Fig. 6: Original images at the top. Counter-examples for ϕ_{Δ}^{face} in the middle. Counter-examples for ϕ_{ϵ}^{face} at the bottom.

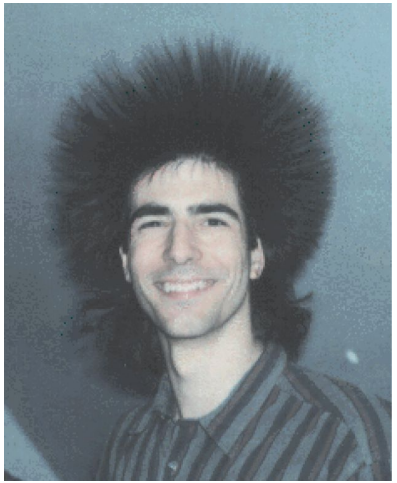
Proving Fairness (or unfairness)

Fig. 7: Original images at the top. Counter-examples for ϕ_{Δ}^{hair} in the middle. Counter-examples for ϕ_{ϵ}^{hair} at the bottom.

Privacy

Cookies!

- A way to keep track of users
- Authentication cookies
  - Given when you log into a site
  - Allows you to revisit without logging in again
- Tracking cookies
  - Given when you visit a site
  - Like breadcrumbs, show where you've been



Lou Montulli
(Creator)

Thanks
Wikipedia

HTTP cookies share their name with a popular baked treat.

Implications

- Websites can track where you've been
- Can sell this information to advertisers

The good, the bad, and the odd

- The good news
  - You can clear cookies
  - The EU is pushing for laws to protect you
- The bad news
  - You probably can’t clear them fast enough
- The odd news
  - Your friends browsing habits may influence **your** ads

My question to you:
Does it matter?

Follow-up:
Do you care?