Professional Ethics for Computer Scientists

Who are these guys and what are their purported ethical lapses?

Ethical Drivers

- Legal
  - Government regulations, intellectual property, health and safety, data protection
- Professional
  - ACM/IEEE/BCS code of conduct
- Broader personal values
  - Individual moral issues

Legal Examples

- Legislation still a moving target
  - Stop Online Piracy Act (SOPA)
    - Postponed Jan. 2012 after widespread concerns, especially from search engines
- Existing legislation
  - Digital Millennium Copyright Act
    - Criminalizes production and dissemination of technology, devices, or services intended to circumvent measures that control access to copyright works

Government and Privacy

- Patriot Act on collecting personal information
- HIPAA requires encryption of health data
- European Union Data Protection Directive
  - Notice. Users should be given notice when their data are being collected.
  - Purpose.   Data should only be used for the purpose stated and not for any other purposes.
  - Consent. Data should not be disclosed without the data subject's consent.
  - Security. Collected data should be kept secure from any potential abuses.
  - Disclosure. Users should be informed as to who is accessing their data.
  - Access.   Users should be allowed to access their data and make corrections to any inaccurate data.
  - Accountability. Users should have a method available to them to hold data collectors accountable for following the above principles.

ACM Code of Ethics and Professional Conduct

- General Moral Imperatives
  - Contribute to society and general well being
  - Avoid harm to others
  - Be honest and trustworthy
  - Be fair and do not discriminate
  - Honor property rights
  - Give credit where due
  - Respect privacy of others

ACM Code of Ethics

- More Specific Professional Responsibilities
  - Strive to achieve the highest quality, effectiveness and dignity in both the process and products of professional work
  - Acquire and maintain professional competence
  - Know and respect existing laws pertaining to professional work
  - Accept and provide appropriate professional review
  - Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks
  - Honor contracts, agreements, and assigned responsibilities
  - Improve public understanding of computing and its consequences
  - Access computing and communication resources only when authorized to do so

ACM Code of Ethics

- Organizational Leadership Imperatives
  - Articulate social responsibilities of members of an organizational unit and encourage full acceptance of those responsibilities
  - Manage personnel and resources to design and build information systems that enhance the quality of working life
  - Acknowledge and support proper and authorized uses of an organization's computing and communication resources
  - Ensure that users and those who will be affected by a system have their needs clearly articulated during the assessment and design of requirements; later the system must be validated to meet requirements
  - Articulate and support policies that protect the dignity of users and others affected by a computing system
  - Create opportunities for members of the organization to learn the principles and limitations of computer systems

Ethics

- Code of ethics is good, but they are general principles

- There are many personal and societal issues related to computing and information

- Decisions regarding these issues should be well-informed and well-reasoned. What is a more general approach to make such decisions?

Ethical Reasoning Techniques

- Utilitarian Consequentialism
- Deontological Arguments
- Analogies
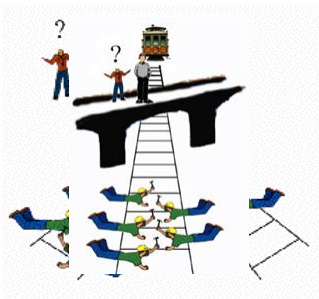
A runaway trolley is hurtling down the tracks toward five people who will be killed if it proceeds on its present course. You can save these five people by diverting the trolley onto a different set of tracks, one that has only one person on it, but if you do this that person will be killed. Is it morally permissible to turn the trolley and thus prevent five deaths at the cost of one?

Case Studies

- <u>Case 1</u>: The story of MP3 – compression codes, musicians, and money

- <u>Case 2</u>: PGP: The U.S. Government vs. Phil Zimmermann

- <u>Case 3</u>: Hackers: Public enemies or gadflies?

Case 1: The Story of MP3 – Compression Codes, Musicians, and Money

- MP3 protocol
  - Compresses digital files that store audio information
- Napster
  - Enabled peer-to-peer file sharing
  - Allowed users to share music files with other users and obtain music files from other users

Case 1: The Story of MP3 – Compression Codes, Musicians, and Money

- Recording companies filled a suit against Napster on grounds of copyright infringement
- Napster lost the case and subsequent appeals
- Ethical question
  - Is it ethically right to swap copyrighted MP3 files?
- Ethics
  - The study of how to decide if something is morally right or wrong

Case 1: The Story of MP3 – Compression Codes, Musicians, and Money (continued)

- A consequentialist focuses on the consequences of an act to determine if the act is good or bad

- Utilitarians

  - The most well-known consequentialists

  - Focus on the consequences of an act on everyone to determine if it is good or bad

Utilitarians

- Cosmic calculator that can measure happiness of all humans
- Act in question is good if:
  – Happiness_After > Happiness_Before
- Otherwise, the act is bad

- "The needs of the many outweigh the needs of the few or the one"

Case 1: The Story of MP3 – Compression Codes, Musicians, and Money (continued)

- <u>Utilitarian argument #1</u>: MP3 copying is OK

- <u>Utilitarian argument #2</u>: MP3 copying is not OK

Case 1: The Story of MP3 – Compression Codes, Musicians, and Money (continued)

- A dialectic
  - Move back and forth between different viewpoints, criticizing each and trying to learn from each
  - <u>Goal</u>: both sides move closer to the truth from two different perspectives
  - Check the facts for MP3 case, sales up or down?

Case 2: PGP: The U.S. Government vs. Phil Zimmermann

- Phillip Zimmermann

  - Concerned about bills introduced in the U.S. Congress to allow the government to restrict the use of encryption

  - Developed the PGP (Pretty Good Privacy) encryption algorithm

  - Made PGP freely available to anyone

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- U.S. Government started a criminal investigation against Zimmermann

    - Claim: Zimmermann had released a technology that would allow criminals and terrorists to avoid detection by law enforcement agencies

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- Ethical question
    - Was it right for Zimmerman to distribute his encryption program, or was the government right to try to prohibit its distribution?
- Analogies can be used to explore the similarities and differences of ethical questions
    - Have to make sure the analogy is appropriate

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- A dialectic argument that uses analogies

  - One analogy supports a particular view of the situation

  - Another analogy supports an opposing view of the situation

  - The participants in the discussion explore the strengths and weaknesses of each argument

21

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- Simplification for exploring the PGP controversy using analogies
  - The discussion is limited to the use of the PGP algorithm for email security

- Analogy #1: Email is like a private conversation

- Analogy #2: Email is like phone conversations

- Analogy #3: Email is like the postal system.

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- Analogies give a better understanding of the ethical issues behind the PGP debate

  - A decision about PGP affects security and privacy

    - Catching criminals and stopping terrorists are two good things

    - Having personal privacy is a good thing

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- The utilitarian perspective:

  - What would be the consequences of enforcing a ban on PGP? In its most fundamental form, PGP is just an idea.

  - What would be the consequences of allowing people to use PGP?

Case 2: PGP: The U.S. Government vs. Phil Zimmermann (continued)

- Using analogies and a utilitarian analysis:

  – The increased security of a PGP ban would be bought at a very high price

Case 3: Hackers: Public Enemies or Gadflies?

- Definition of "hacking" for this discussion

  – Gaining unauthorized access to someone else's computer system

- Ethical question

  – Is there an ethical case to be made in support of computer hackers?

Case 3: Hackers: Public Enemies or Gadflies? (continued)

- Analogy

  - Breaking into a computer is like breaking into someone's house

- The similarities and differences between burglars and hackers should be analyzed

- Utilitarian analysis

  - What is gained/lost when a computer is hacked

Case 3: Hackers: Public Enemies or Gadflies? (continued)

- Two challenges when using a utilitarian argument

  - It is sometimes hard to predict consequences with any accuracy

  - There seems to be a distinction between "good hackers" and "bad hackers"

28

14

Case 3: Hackers: Public Enemies or Gadflies?

- A deontological argument can be used to try to meet these challenges that may arise in a dialectic utilitarian argument

- Deontological arguments focus on

    - Intent of an act

    - How that act is/is not defensible

    - Not the result of the act

- Kant: Never treat a fellow human merely as a means to an end. Actions are morally wrong if they are inconsistent with the status of a person as a free and rational being, and that, conversely, acts that further the status of people as free and rational beings are morally right

Case 3: Hackers: Public Enemies or Gadflies? (continued)

- Hacker Ethic
    - Information sharing is a powerful positive good, and it is the ethical duty of hackers to facilitate access to information and computing resources wherever possible
    - System cracking for fun and exploration is ethically OK as long as the cracker commits no theft, vandalism, or breach of confidentiality
- Deontological perspective on hacking
    - Is the act of hacking into another person's computer system inherently unethical?
- At the end of the analysis, questions are raised about the claims of the hacker ethic

Thinking Straight about Technology and Ethics

- A "paramedic method" for computer ethics

  - Goal is not to become a research ethicist, but to gain skills in:

    - Recognizing ethical questions regarding computing

    - Reasoning carefully about answers to those questions

31

Thinking Straight about Technology and Ethics (continued)

- Questions to ask in dealing with an ethical problem

  1. Who are the stakeholders in this situation?

  2. What does each stakeholder have to gain or lose?

  3. What duties and responsibilities in this situation are important to the stakeholders?

Thinking Straight about Technology and Ethics (continued)

- Questions to ask in dealing with an ethical problem (continued)

    4. Can you think of an analogous situation that does not involve computing? If so, does that analogous situation clarify the situation that does involve computing?

    5. Either make a decision or revisit the steps

What We Covered

- Existing codes of ethics for software professionals
- Introduced a few of the issues involving technology and society
- Discussed how to apply the following to computer ethics
    - Utilitarian ideas
    - Deontological ideas
    - Analogies

34

Example – Stopping Music Piracy

- You work for a music company and people are pirating your music
  - Supposed to only copy music files a limited number of times
- Proposed technical solution
  - Include a player on music CD's that when installed, also installs a superuser program
  - Superuser program enforces copy limitations and hides itself to prevent the user from removing it
- Is this an ethical approach?

Example – Collecting System Info

- Your application can experience problems depending on the state of the user's system
  - To better refine your app you could write a second program that is installed with your app that collects usage info, system info, and anonymously sends this data to your server
  - Programmers can analyze the received data and make improvements
- Is this an ethical approach?