L14

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Overview of This Lecture

- Professional Ethics, Responsibilities, and Social Implications
  - Recommended textbook: Sara Baase. "From A Gift of Fire", Second Edition, 2008, *Prentice Hall*.
- American *ACM/IEEE Computing Curriculum*
  - http://www.computer.org/education/cc2001/index.htm

Outline

- Ethics
- Guidelines for software developers and decision makers
- The ACM Code and the ACM/IEEE computing curricula
- The Increasing General Public Awareness on Ethical Aspects of Technology
- Social implications

Ethics

- Study of right vs. wrong acts
- Ethical views
  - Deontological - rules are to be followed regardless of consequences (e.g., never lie)
  - Utilitarianism – right if it the consequences are good (ok to lie if it saves a life)
    - Hard to measure
    - No protection for individuals
  - Natural rights – let people make their own decisions within limits
    - Act is ethical if freely made without deception

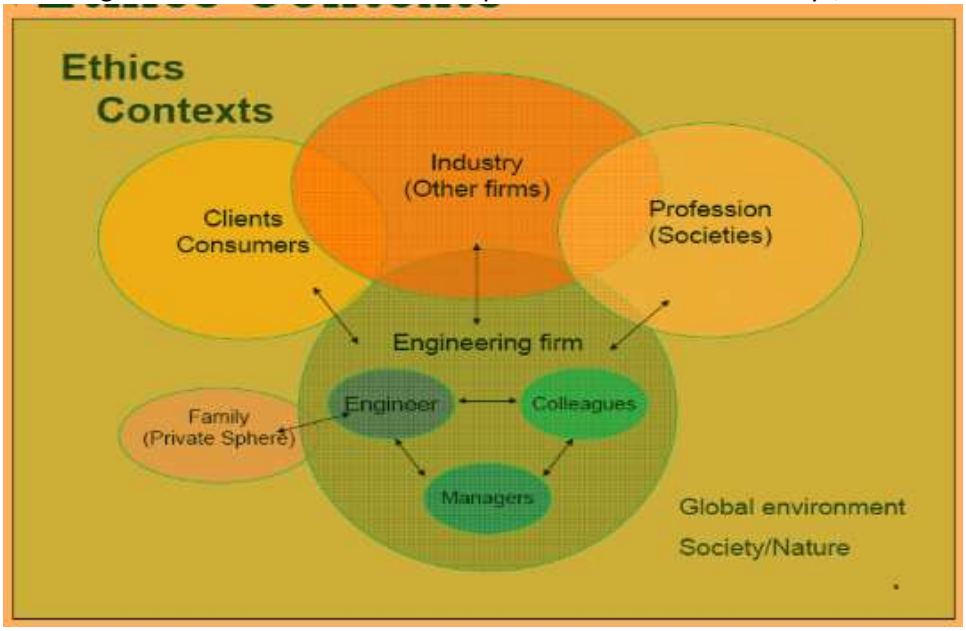
- Natural rights – let people make their own decisions within limits
  - Act is ethical if freely made without deception
  - Implies that stealing, killing, deception are unethical

- ...lots of guidelines and ethics
- The software engineering Code – 8 responsibilities
  1. The public
     i. Accept full responsibility for own work
     ii. Moderate interests of the software engineer, employer, client and user w/ public good
     iii. Approve software only if …
     iv. Disclose right ppl abt dangers
     v. Coop to address stuff of public concern
     vi. Be fair, no deception
     vii. Issues of disabilities and eco disadvantages
     viii. Professional skills to good causes
  2. The client and employer
     i. Service in areas of competence, honest
     ii. Illegal/unethical software
     iii. Property of client/employer in ways properly auth and their approval
     iv. Doc which rely on is approved by someone auth to approve it
     v. Private info private
     vi. Id doc and give evidence if project likely to fail
     vii. Id, doc, and report issues
     viii. Accept no outside work hurting primary work
     ix. Don't promote interest diff to client
  3. The product
     i. High quality, acceptable cost, reasonable schedule
     ii. Good/achievable goals
     iii. Id, define, and address issues
     iv. Ensure qualified for project
     v. Ensure appropriate method used for any project
     vi. Follow professional standards
     vii. Fully understand specifications for software
     viii. Be real abt costs, scheduling, …
     ix. Ensure adequate testing, debugging and review of software and related docs
     x. Ensure adequate documentation, and probs and solutions
     xi. Dev software related to docs
     xii. Careful to use only accurate data, ethical and lawful
     xiii. Keep integrity of data
     xiv. All forms of software maintenance same professionalism as new dev
  4. Professional judgment
     i. Judgments support and keep human vals
     ii. Endorse docs preped under supervision / in areas of agreement
     iii. Keep prof objectivity w/ respect to software / related docs
     iv. Not do deceptive finance
     v. Be open to right ppl abt conflict interests
     vi. Don't be part of private/gov/prof thing where possible undisclosed potential conflicts of interest
  5. Management
     i. Good management for any project, effective procedures
     ii. All informed of standards

iii. Know employer's policies and procedures for passwords, files, …
iv. Give work only after thinking abt contributions of edu and experience
v. Realistic quantitative estimates of cost, …
vi. Attract workers only w/ accurate description
vii. Fair and just
viii. Give ppl right jobs by qualifications
ix. Fair agreement abt ownership
x. Due process
xi. Don't ask something inconsistent of code
xii. No punishment for raised ethical concerns abt project

6. The profession
   i. Help dev an org env for ethical actions
   ii. Public knowledge abt software
   iii. Extend knowledge by participation in prof org
   iv. Support other soft engin
   v. Not promote own interest over profession
   vi. Obey laws
   vii. Accurate sharing of chars of software on work
   viii. Responsible for correcting/detecting/reporting errors
   ix. Clients/employers know commitment to Code of ethics
   x. Avoid associations w/ businesses and orgs which conflict the code
   xi. Violation of code = not professional
   xii. Concern to ppl when violation of code
   xiii. Report significant violation of code to auth
7. Colleagues
   i. Encourage follow code
   ii. Help
   iii. Credit
   iv. Review
   v. Fair hear opinions
   vi. Help understand standards of work
   vii. No unfair intervene
   viii. If outside own area, get help from others
8. self
   i. Make others knowledgeable abt stuff during the phases
   ii. Improve readability to make safe, reliable, quality software
   iii. Improve ability to make accurate info and well-written doc
   iv. Improve understanding of software and related docs, and env to be used in
   v. Improve knowledge of good standards and law governing software and related docs
   vi. Relevant standards and law
   vii. Knowledge of code, interpretation, application
   viii. No unfair treatment
   ix. No influence others to do anything outside of code
   x. Violation of the code = not professional

- ACM Code
  - 24 statements abt:
  - General moral imperatives
  - Prof respon
  - Org leadership imperatives
  - Compliance w/ the code
- Computing Curricula

- 1. Social context of computing
  2. Methods and tools of analysis of ethical argument
  3. Professional and ethical responsibilities
  4. Risks and liabilities of safety-critical systems
  5. Intellectual property
  6. Privacy and civil liberties
  7. Social implications of the Internet
  8. Computer crime
  9. Philosophical foundations of ethics
- Inc general public awareness on ethical aspects of tech
  - High lvl of media attention to comp-related disasters in tech sys, inc interest in Comp ethics
- 

- **Engineering as Social Experimentation**

  "All products of technology present some potential dangers, and thus engineering is an inherently risky activity. In order to underscore this fact and help in exploring its ethical implications, we suggest that engineering should be viewed as an experimental process. It is not, of course, an experiment conducted solely in a laboratory under controlled conditions. Rather, it is an experiment on a social scale involving human subjects."

  Ethics in Engineering, Martin MW and Schinzinger R, McGraw-Hill, 1996

- Social Importance of Engineering
  - Engineering has direct and vital effect on quality of life of ppl
  - Accordingly, services given by engineers must be dedicated to protect of public safety, health, and welfare
- Why prof ethics important for comp sci / engineers
  - Prof ethics part of edu for every socially important profession, rep one of the essential constituents of meaning of term professionalism
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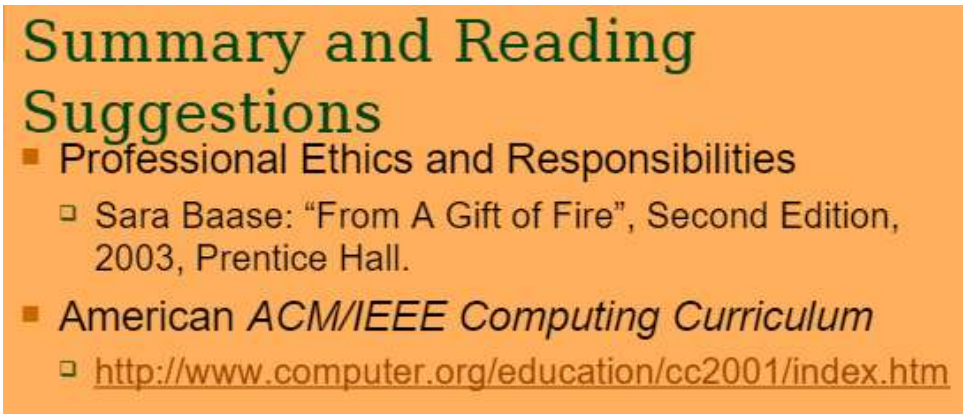
- 

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L14 Assessment

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Question 1
10 Points

Enumerate the ethical views. Give comments over their definitions, social implications, by comparing different ethical views.

A:
Deontological – rules are to be followed regardless of consequences
- This is the strictest view of ethics and truth, where the truth is spoken at all costs.
- The social implications is that this could harm if certain information was requested that was not needed to be given.

Utilitarianism – right if the consequences are good
- This is a little bit more relaxed than the deontological, but is stricter than natural rights.
- The social implications is that this might lead to a big "gray zone". In this, I mean that certain actions would be viewed in many different ways, leading to different actions and judgements, all of which would be confused with right and wrong.

Natural Rights – let people make their own decisions within limits
- This is the most relaxed ethical view.
- This has the social implication of defining any action as a natural right. If something brings them pleasure, or an action is done for safety, this would be regarded as right, no matter how unjust the action may seem.

Question 2
10 Points

What are the main responsibilities expected for a computer professional?

A:
The main responsibilities includes minimizing risks to:
Privacy, security of data, safety, reliability, and ease of use.

Question 3
10 Points

Which international institutions have formulated the software engineering code of ethics and professional practice?

A: The ACM and the IEEE Computer Society have created a code of ethics and professional practice.

Question 4
10 Points

What are the guidelines for software developers and decision makers? Give comments.

A:

1. Include users in the design and testing stages
    a. This is to make the systems safe and useful.
    b. Without this, the system might not be what users expected/ wanted.
2. Be careful when planning and scheduling a project, writing bids / contracts
    a. This is a warning to be cautious with your most precious resources: time and money.
3. Design for real users (make it crash resistant)
    a. All humans make mistakes, but your software should be able to take that into account and let the user not suffer much consequences due to a minor error.
4. Don't assume existing software is safe
    a. This issue has caused many problems in the past.
    b. Many software's out there have been developed as theoretical models and have not been actually been put into use. It is up to the developers to use the code, but it is their responsibility to make sure their software is entirely safe, whether it be through various testing strategies, or by manually going through the software themselves.
5. Be open and honest about capabilities and limitations of software
    a. Making big boasts and then underdelivering is a quick way to lose trust and credibility.
6. Require a convincing case for safety
    a. Safety concerns should be taken with the highest priority. Software is meant to help, not harm.

Question 5
10 Points

Enumerate the principles of the software engineering code. Give comments.

A:

1. The public
    a. The main job of a software engineer to the public is maintaining a open and professional relation with the public. The software created should be safe and what the user wants, and should take in a variety of factors about the user.
2. The client and the employer
    a. The main role of a software engineer to their client and employer is to be honest and to be diligent at their work. This includes keeping their work well documented and secure, while also focusing primarily on their work.
3. The product
    a. The main job of software engineer to their product is to make the best product possible. Their product should be cost efficient, resource efficient, time efficient, and high quality, while identifying any possible issues with the project, including those working on it.
4. Professional judgment
    a. The main role of a software engineer for professional judgement is to respect others and their position to the project/company.
5. Management
    a. The main job of a software engineer for management would be to ensure their project is well accounted for. This includes evaluating risks, diagnosing issues, being knowledgeable about standards and policies, and being realistic about resources.
6. The profession
    a. The main role of a software engineer for their profession would be to maintain a respectable image for the field. This includes being knowledgeable about any current information, laws, the code, taking responsibility for all errors in the software, and complying to the code.

7. Colleagues
    a. The main job of a software engineer to their collogues would be being fair, honest, helpful, encouraging, and maintain integrity as credit should be given where it is due. Colleagues should also be well informed and encouraged to maintain the code.
8. Self
    a. The main role of a software engineer to themselves is primarily to follow the code, to maintain professionalism, and to be fair.

Question 6
10 Points

Explain the origins and reasons for increasing general public awareness on ethical aspects of technology.

A:
As technology grows, so does its applications. With more applications, there are more possible ways for software and technology to be used incorrectly and in ways that would make many consider if the technology was ethically correct to use.

Question 7
10 Points

Why engineering is an inherently risky activity? Explain why software engineering should be view as an experimental process.

A:
Engineering is a risky activity because it is an experimental process. This view is taken up due to the fact that engineering requires much testing and refining, though not all of the testing is done in controlled environments. Since it is nearly impossible to test every possible scenario for many complex systems, the environment shifts, which may lead to detrimental effects to the systems created and used by the engineers involved.

Question 8
10 Points

Enumerate some of social implications of software engineering. In which areas the services provided by engineers must be dedicated?

A:
Engineers have a direct and vital impact on the quality of life of people. So the services given by engineers must be dedicated to the protection of the public safety, health, and welfare of them.