Lecture 11.1 – Professional Ethics

CS 230
Ethical Issues in Computing
Fall 2020
Dr. Henderson
BSU

Very Important Day

National Sandwich Day!!

Announcements

- LA-8 due tonight
- LA-8 retakes open tomorrow morning
- LA-9 due Thursday, November 12
  - Quiz (23 questions, 3 incorrect allowed)
  - Video Post
  - Available Thursday
- LA-9 Challenges available today
  - Earn 3 certificates
  - Analyze SECEPP

Last Time

- Computer Reliability
  - Data input errors
  - Data processing errors
  - System Failures
    - Ariane 6 delayed to 2Q 2022
- Computer Simulations
- Software Engineering
- Software warranties

Today

- Computing Professions
- Software Engineering Code of Ethics
- Analysis of Code of Ethics

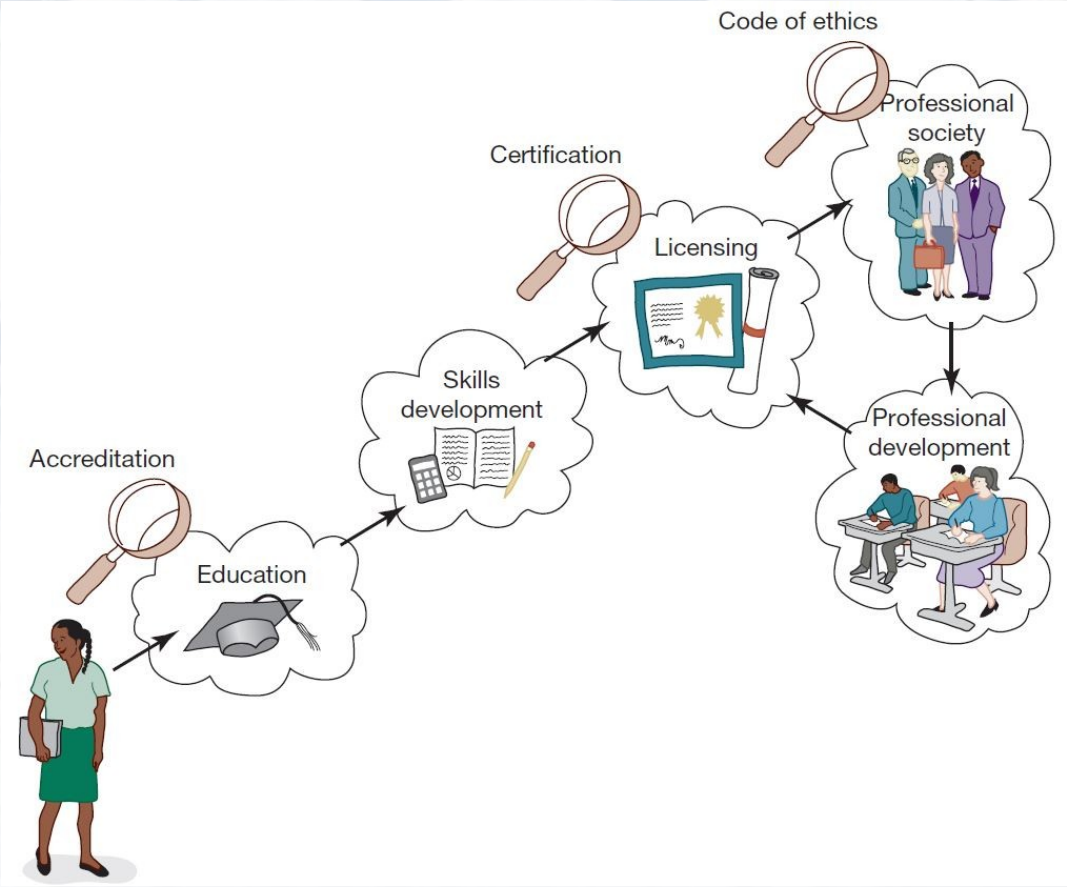
Professionals

- Informally, profession a vocation requiring…
  - High level of education
  - Practical experience
  - vs. trade or craft
- We pay professionals well
  - Doctors
  - Lawyers
- We trust professionals to…
  - Correctly ascertain and treat problems
  - Take actions for the good of their clients

Characteristics of a Profession

- Initial professional education
- Accreditation
- Skills development
- Certification
- Licensing
- Professional development
- Code of ethics
- Professional society

Attributes of a Mature Profession



Case Study: Certified Public Accountants

- Bachelor's degree
  - 150+ semester hours
  - 24+ hours of accounting-related classes
- Two years' experience working under supervision of CPA
- CPA exam
- To retain certification
  - Continuing education
  - Follow code of ethics

How Do Computer-Related Careers Stack Up?

- Certification and licensing not required
- College degree not required
- Apprenticeship not required
- Membership in professional society optional
- No specific requirements for continuing education
- Most computer programmers, system analysts, etc. are part of teams

Software Professional Societies

- Association for Computing Machinery
  - Founded 1947
  - 75k members
  - SE Special Interest Group (SIG)
- IEEE Computer Society (IEEE-CS)
  - Founded 1946
  - 100k members
  - Largest society in IEEE

Status of Certification and Licensing

- Software engineer: someone engaged in development or maintenance of software, or teaches in this area
- Path to certification was attempted: similar to path taken by engineers in other disciplines, such as civil engineering
  - Four years of post-college work experience
  - Pass Fundamentals of Engineering (FE) exam
  - Pass discipline-specific Principles and Practice of Engineering (PE) exam
- Only 81 people nationwide took exam in first five years; exam has been discontinued

Other Certifications

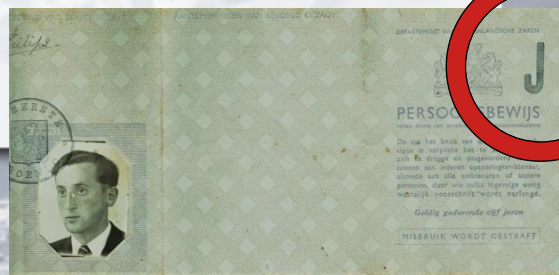
- Why certify?
  - Some positions have certification requirements
  - Enhances your resume
  - Level-up
- Available Certifications
  - IEEE Certificate Program
  - ISQTB Software Testing Cert
  - NCSA Certificates
  - Cisco, Microsoft, etc.
  - Coursera, Udemy, Udacity

Ability to Harm Public

- Many computer professionals hold responsibilities similar to those held by members of mature professions
- Therac-25 killed or gravely injured at least six people
- Millions rely upon software rather than accountants to prepare their tax returns
- Millions of people rely on system administrators to keep their work-related information secure

Lentz and the Nazis

- Jacobus Lentz, Dutch civil servant
- Developed a “forge-proof” ID card
- Rejected by Dutch government
- May 1940, neutral Netherlands invaded by Germany
- Lentz proposes ID card to Nazis who embrace it
- 1941 every Dutch citizen required to have ID
- Jewish ID cards stamped with “J”



The Importance of Taking Personal Responsibility

The ability to cause harm to members of the public is a powerful reason why those in computer-related careers must act according to ethical principles. Without universal certification and licensing and other components of a well-developed profession to rely upon, those in computer-related careers must take more personal responsibility for developing their ethical decision-making skills.

Code of Ethics

- IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices
- Short version summarizes abstract aspirations
- Full version includes examples and details of their application

Preamble of Code

- Software engineers have opportunities to do good or do harm
- Software engineers ought to be committed to doing good
- Eight principles identify key ethical relationships and obligations within these relationship
- Code should be seen as a whole, not a collection of parts
- Concern for the public interest is paramount

Eight Principles Identify Morally Responsible Relationships

- PUBLIC: act consistently with the public interest
- CLIENT AND EMPLOYER: act in the best interest of client and employer consistent with the public interest
- PRODUCT: ensure that products and related modifications meet the highest professional standards possible
- JUDGMENT: maintain integrity and independence in professional judgment
- MANAGEMENT: managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance
- PROFESSION: advance the integrity and reputation of the profession consistent with the public interest
- COLLEAGUES: be fair to and supportive of colleagues
- SELF: participate in lifelong learning regarding the practice and promote an ethical approach to the practice

Act Consistently with Public Interest

- 1.01 “Accept full responsibility for own work”
- 1.02 Balance competing interests
- 1.03 Approve software only if it is safe
- 1.04 Disclose actual/potential dangers
- 1.05 “Cooperate in efforts to address” public concerns
- 1.06 “Be fair and avoid deception in all statements”
- 1.07 Consider factors that diminish access to software
- 1.08 “Volunteer professional skills to good causes”

Act in Best Interest of Client, Employer

- 2.01 Act within areas of competence
- 2.02 Don’t use software obtained illegally
- 2.03 Only use property in authorized ways
- 2.04 Ensure documents are approved
- 2.05 Respect confidentiality
- 2.06 Promptly report problems with project
- 2.07 Report issues of social concern
- 2.08 Refuse outside work detrimental to job
- 2.09 Put employer’s/client’s interests first, unless overriding moral concern

Ensure Products Meet Highest Standards

- 3.01 Aim for “high quality, acceptable cost and a reasonable schedule,” making trade-offs clear
- 3.02 “Ensure proper and achievable goals”
- 3.03 Face up to “ethical, economic, cultural, legal and environmental” issues
- 3.04 Ensure you are qualified for proposed work
- 3.05 Use appropriate project methodologies
- 3.06 Follow the most appropriate professional standards
- 3.07 “Strive to fully understand the specifications”
- 3.08 Ensure the specifications are correct and approved

Ensure Products Meet Highest Standards

- 3.09 “Ensure realistic quantitative estimates of cost, scheduling, personnel, quality and outcomes”
- 3.10 “Ensure adequate testing, debugging, and review of software and related documents”
- 3.11 “Ensure adequate documentation”
- 3.12 Develop software and documents that respect privacy of those affected by software
- 3.13 Use only accurate data appropriately acquired
- 3.14 Maintain data integrity
- 3.15 Use same standards for software maintenance as software development

Maintain Integrity in Professional Judgment

- 4.01 “Temper all technical judgments by the need to support and maintain human values”
- 4.02 Understand and agree with documents before endorsing them
- 4.03 Remain objective when evaluating software or related documents
- 4.04 Do not engage in deceptive financial practices
- 4.05 Disclose conflicts of interest
- 4.06 Do not participate in decisions in which you, your employer, or your client has a potential conflict of interest

Promote Effective Project Management

- 5.01 Ensure good project management procedures
- 5.02 Ensure software engineers know standards
- 5.03 Ensure software engineers know policies and procedures for protecting confidential information
- 5.04 Take employees' abilities into account before assigning work
- 5.05 Ensure reasonable estimates are made
- 5.06 Give full and accurate information to potential employees

Promote Effective Project Management

- 5.07 Pay employees fairly
- 5.08 Do not unjustly prevent a qualified person from taking a job
- 5.09 Work out fair intellectual property agreements
- 5.10 Provide employees charged with misconduct due process
- 5.11 Do not ask someone to do anything violating the Code
- 5.12 “Do not punish anyone for expressing ethical concerns about a project”

Advance the Profession

- 6.01 Help create an environment supporting ethical conduct
- 6.02 “Promote public knowledge of software engineering”
- 6.03 Participate in professional activities
- 6.04 Support others who are trying to follow this Code
- 6.05 Do not promote self-interest at expense of profession, client, or employer
- 6.06 Obey all laws unless there is an overriding public interest
- 6.07 Do not deceive others regarding the characteristics of software

Advance the Profession

- 6.08 Take responsibility for finding, correcting, and reporting errors in software and documentation
- 6.09 Ensure others know you are committed to the Code and what that means
- 6.10 Do not associate with businesses and organizations that are in conflict with Code
- 6.11 Understand violating the Code is inconsistent with being a professional
- 6.12 Share concerns about Code violations with the people involved
- 6.13 “Blow the whistle” when no alternative to reporting significant Code violations

Be Fair to and Supportive of Colleagues

- 7.01 “Encourage colleagues to adhere to this Code”
- 7.02 “Assist colleagues in professional development”
- 7.03 Give others the credit they deserve
- 7.04 Be objective when reviewing the work of others
- 7.05 Give colleagues a fair hearing
- 7.06 Help colleagues remain aware of work practices
- 7.07 Do not unfairly interfere with another’s career, but protect the public interest
- 7.08 Bring in experts for situations outside your own area of competence.

Participate in Lifelong Learning

- 8.01 Stay current with developments in field
- 8.02 Improve ability to create high quality software
- 8.03 Improve ability to produce high quality documentation
- 8.04 Improve understanding of software and documentation used in work
- 8.05 Improve knowledge of relevant standards
- 8.06 Improve knowledge of this Code and its application
- 8.07 Do not treat others unfairly because of prejudices
- 8.08 Do not influence others to break the Code
- 8.09 “Recognize that personal violations of this Code are inconsistent with being a professional software engineer”

Analysis of Preamble

- No mechanical process for determining if an action is right or wrong
- Should not take an overly legalistic view of the Code
  - If Code doesn't forbid something, that doesn't mean it is morally acceptable
  - Judgment required
- Code reflects principles drawn from multiple ethical theories

Alternative, Discipline-Independent List of Fundamental Principles

- Be impartial.
- Disclose information that others ought to know.
- Respect the rights of others.
- Treat others justly.
- Take responsibility for your actions and inactions.
- Take responsibility for the actions of those you supervise.
- Maintain your integrity.
- Continually improve your abilities.
- Share your knowledge, expertise, and values.

Summary

- System administration, computer programming not yet formal, full-fledged professions like medicine or law
  - No certification and licensing required
- However, computer professionals have responsible positions because their actions can harm public
- Software Engineering Code of Ethics and Professional Practice an important tool, but good judgment still required

Next Time

- Case Studies, Whistleblowers
  - Read 9.5 – 9.6