

PROFESSIONAL ETHICS

CSE 4201: Ethical Issues and
Professional Practice in Computing

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Professional Ethics

- ▶ What is Professional Ethics?
- ▶ When applied to computing and information technology (IT), *professional ethics* is
a field of applied ethics concerned with moral issues that impact computer/IT professionals.
- ▶ Why a Separate Category of Professional Ethics?

Why a Separate Category of Professional Ethics?

- ▶ Some ethicists argue that professionals in some fields have special moral obligations that exceed those of ordinary individuals.
- ▶ Others ethicists argue that some of the moral issues affecting certain professions are sufficiently distinct and specialized to warrant a separate field of study.
- ▶ An adequate analysis of these arguments requires an understanding of what is meant by terms such as *profession* and *professional*.

What is a Profession?

- ▶ Harris, Pritchard, and Rabins (2009) note that the term “profession” has evolved from a concept that was once associated with people professing a religious or monastic life to one that now has a more secular meaning.
- ▶ Later, the term came to refer to anyone who “professed to be duly qualified.”
- ▶ “Profession” has now come to mean an “occupation in which one professes to be skilled in and to follow.”
- ▶ Michael Davis (2015) notes that the term “profession” has at least four senses in its everyday usage.
 - For example, it can mean a(n):
 1. vocation (or calling),
 2. occupation,
 3. “honest occupation” (that one may “openly admit to profess”),
 4. “special kind of honest occupation.”

Who is a Professional?

- ▶ *Professionals* who comprise a given profession also tend to have certain defining attributes and requirements.
- For example, medical doctors, lawyers, etc., often find themselves in situations in which their decisions and actions can have significant social effects; their roles and responsibilities can exceed those of ordinary individuals.
- Sometimes these roles and responsibilities can *differentiate* professionals from others (see, for example, Buchanan, 2004).

Who is a Computer/IT Professional?

- ▶ A computer/IT professional might be viewed as anyone who is employed in the computer, IT, or information/communications fields.
- ▶ A computer/IT professional might be also be viewed in more narrow terms, in which case only software engineers would be included.
- ▶ A computer/IT professional could be defined in a way that includes mainly software engineers and their teams.
 - For example, teams comprising software quality analysts, technical writers, network administrators, and software managers and supervisors.
- ▶ A *software engineering team* can include those who participate directly in the analysis, specification, design, testing, development, and maintenance of software systems.

Do Computer/IT Professionals Have Special Responsibilities?

- ▶ Gotterbarn (2001) points out that software engineers and their teams are have significant opportunities to:
 - I. do good or cause harm;
 - II. enable others to do good or cause harm;
 - III. influence others to do good or cause harm.

Critical-Safety Software

- ▶ Gotterbarn suggests that the roles and responsibilities involved in the development of *safety-critical systems* is a *differentiating* factor.
- ▶ A "safety-critical system" refers to computer systems that can have a direct life-threatening impact.
- ▶ Examples of safety-critical software systems and applications typically include:
 - aircraft and air traffic control systems
 - mass transportation systems
 - nuclear reactors missile systems
 - medical treatment systems.

Additional Safety-Critical Systems

- ▶ Bowyer (2001) extends the range of safety-critical applications to include software used in the:
 - design of bridges and buildings;
 - election of water disposal sites;
 - development of analytical models for medical treatment.

Professional Codes of Ethics

- ▶ Many professions have established professional societies, which, in turn, have adopted *codes of conduct*.
- ▶ The medical profession established the AMA (American Medical Association), while the legal profession established the ABA (American Bar Association).
- ▶ Both associations have formal codes of ethics/conduct for their members.

Professional Codes for Computer/IT Societies

- ▶ The computing/IT profession also has professional societies, which include:
 - The Association for Computing (ACM)
http://web.mit.edu/afs/athena.mit.edu/course/2/2.95j/Codes-of-Ethics/ACM-Code-of-Ethics.html?fbclid=IwAR2vmTOUntjVR_Jd6yPoYemuPbLXTo44WqrFYSFE1qNUQt-wyswya-zqbvQ;
 - The British Computer Society;
https://www.bcs.org/category/6030?fbclid=IwAR0IA7ra8ULHqgEcOydLIjPF34PL38NngHkM3rPMoc50PUh0_nwxZmvN158
 - The Institute for Electrical and Electronics Engineers (IEEE) <https://www.ieee.org/about/corporate/governance/p7-8.html>
 - IEEE Computer Society (IEEE-CS)
https://www.computer.org/education/code-of-ethics?fbclid=IwAR0cErAJfn0L-01KEEZacwKLHmluGd_sNKll_78sXa49OWlRdDUg9xlWVSI
 - (ISC)² Code Of Ethics
https://www.isc2.org/Ethics?fbclid=IwAR1bqgVlUIY4Mp4lP7uCj_lBrZZZCUmFz_2n3v7suhHilzZlVZz0epwZ8fs

Case: Bay Area Rapid Transport Project

- ▶ *1972: 3 engineers responsible for the creation of an automatic guided train system are dismissed*
- ▶ *They have been expressing their doubts about the safety of the system via internal memos since 1969 and the response is “don’t make trouble”*
- ▶ *In 1971 they bring their concerns in confidence to the members of the board of directors, thus bypassing their immediate superiors*
- ▶ *Despite the confidentiality promised by their superiors, two days after their encounter the full story is published in Contra Costa Times*
- ▶ *The three engineers, once their involvement is confirmed, are fired without any appeal*
- ▶ *They subsequently take the matter to court*

The involvement of IEEE

- ▶ *IEEE (Institute of Electrical and Electronic Engineers) decides to send to the law courts an amicus curiae letter*
 - ▶ *According to the IEEE's professional code, engineers are responsible for the "safety, health and welfare of the public"*
 - ▶ *The professional code is an implicit aspect of the employment contract*
- ▶ *If this argument has been accepted by the judge then it would have meant that employees acting in accordance with the professional code may not be simply dismissed*

- ▶ *October 2, 1972 a train system accident occurs and several passengers are injured*
- ▶ *Despite this, the 3 engineers accept an out-of-court settlement reported to be \$25,000 per person*
- ▶ *The presumed reason is that they have lied in the first instance about their involvement in the matter which has weakened their case*
- ▶ *The dismissals have been very detrimental for the careers of all 3 engineers*
- ▶ The 3 engineers acted out of a sense of **professional responsibility** (codified in the IEEE code of conduct)
- ▶ Although their professional organization (IEEE) supported their behavior, it could not prevent them from being dismissed
- ▶ What is hence the **role of codes of conduct** in engineering?

Purpose of Professional Codes

- ▶ Professional codes of ethics are often designed to motivate members of an association to behave in certain ways.
- ▶ Four primary functions of codes are to:
 - 1) *inspire*,
 - 2) *guide*,
 - 3) *educate*,
 - 4) *discipline* the members.

Criticisms of Ethical Codes

- ▶ Ladd (1995) argues that ethical codes rest on a series of “confusions” that are both “intellectual and moral.”
 - His argument can be analyzed in terms of three main criticisms of codes:
 - 1) ethics is basically an “open-ended, reflective, and critical intellectual activity” (that cannot be simply codified);
 - 2) specific codes of ethics introduce confusions with respect to *micro-ethics* vs. *macro-ethics* (within a profession);
 - 3) because codes can have a disciplinary function, they become more like legal requirements than ethical rules.

In Defense of Professional Codes

- ▶ Gotterbarn argues that we need to distinguish among three aspects of professional codes, because they can function as:
 - ▶ *Codes of ethics* are "aspirational," because they often serve as mission statements for the profession and thus can provide vision and objectives.
 - ▶ *Codes of conduct* are oriented more toward the professional and the professional's attitude and behavior.
 - ▶ *Codes of practice* relate to operational activities within a profession.

Table 4-1: Some Strengths and Weaknesses of Professional Codes

Codes inspire the members of a profession to behave ethically.	Directives included in many codes tend to be too general and too vague.
Codes guide the members of a profession in ethical choices.	Codes are not always helpful when two or more directives conflict.
Codes educate the members of a profession about their professional obligations.	A professional code's directives are never complete or exhaustive.
Codes discipline members when they violate one or more of the code's directives.	Codes are ineffective (have no "teeth") in disciplinary matters.
Codes "sensitize" members of a profession to ethical issues and alert them to ethical aspects they otherwise might overlook.	Directives in codes are sometimes inconsistent with one another.
Codes inform the public about the nature and roles of the profession.	Codes do not help us distinguish between micro-ethics issues and macro-ethics issues.
Codes enhance the profession in the eyes of the public.	Codes can be self-serving for the profession.

Shawn Carpenter

Leak: Existence of Chinese hackers infiltrating U.S. government computers (2005)

As network security analyst at Sandia National Laboratories, Carpenter's job was to detect and prevent intrusions into the weapon lab's network. But when he traced a massive infiltration of government computers back to Chinese cyber agents, he was told to stick to Sandia's systems and ignore everything else. Instead Carpenter went to army intelligence and later the FBI, which used his research in a case they called Titan Rain. After learning of his work for the FBI, Sandia fired him. Carpenter sued for wrongful termination and **won a \$4.3 million settlement.**

<https://www.infoworld.com/article/2606763/106630-Geeks-and-Leaks-Top-10-tech-whistleblowers-of-all-time.html#slide12>

Conflicts of Professional Responsibility: Employee Loyalty and Whistle-blowing

- ▶ What, exactly, is *employee loyalty*?
- ▶ Do employees and employers have a special obligation of loyalty to each other?
- ▶ Should loyalty to one's employer ever preclude an employee from "blowing the whistle" in critical situations?
- ▶ In which cases can whistle-blowing be justified?
- ▶ Do Employees Have a Special Obligation to Employers?
 - ▶ Some believe we have a *prima facie* obligation of loyalty in employment contexts.
 - ▶ In other words, all things being equal, an employee should be loyal to his or her employer and *vice versa*.

Employer Loyalty

- ▶ Consider some examples of employer loyalty where an employer either:
 - a) keeps an employee on the payroll even though that employee has a chronic illness, which causes her to miss several months of work.
 - b) retains several employees, despite the fact that their medical conditions have caused the corporation's health insurance costs to increase significantly, thereby reducing the company's overall earnings.
- ▶ Also, consider a case involving the owner of Malden Mills, whose physical plant in Massachusetts was destroyed by fire.
- ▶ The mill's proprietor, Aaron Feuerstein, could have elected to rebuild his facility in a different state or country where employees would work for lower wages.
- ▶ Instead, Feuerstein continued to pay and provide benefits for his employees while a new facility was being built in Massachusetts.

Do Employees Have Special Obligations of Loyalty to Their Employers?

- ▶ Employees have to balance their obligation of loyalty owed to an employer against other obligations of loyalty they also may have?
- ▶ Loyalty is not something that an employee must give exclusively or blindly to one's employer.
- ▶ Loyalty should also be seen as an obligation that employees, as ordinary individuals, have to society as a whole, especially where safety and health issues are at stake.
- ▶ Divided loyalties can result in serious conflicts for employees.
- ▶ In certain cases, the moral dilemmas these conflicts generate are so profound that an employee must determine whether or not to "blow the whistle."

Whistle-blowing

- ▶ What, exactly, is whistle-blowing?
- ▶ There is no “standard” or universally agreed upon definition of this controversial activity.
- ▶ A plausible definition has been put forth by John Boatright (2000), who describes whistle blowing as:

...the voluntary release of nonpublic information, as a moral protest, by a member or former member of an organization outside the channels of communication to an appropriate audience about illegal and/or immoral conduct in the organization that is opposed in some significant way to the public interest.

Whistle-blowing (Continued)

- ▶ Boatright's definition identifies three key requirements regarding the nature of the *information* revealed in a whistle-blowing act,
- ▶ The information must be:
 1. nonpublic,
 2. voluntarily disclosed by a member, or former member, of an organization,
 3. presented to an “appropriate” audience.
- ▶ Other definitions of whistle blowing include explicit references to the role that negligence can play.
- ▶ For example, Sisela Bok (2003) defines a whistle blower as an individual who makes
“revelations meant to call attention to negligence, abuses, or dangers that threaten the public interest.”

Whistle-blowing (Continued)

- ▶ Bok notes that whistle blowers “sound an alarm” from within the organizations in which they work.
- ▶ She also notes that whistle blowing can be viewed as a form of *dissent*, because those who blow the whistle make public their disagreement with their employers or with some authority.
- ▶ While dissent can include all forms of disagreement (e.g., religious, political, etc.), whistle blowing has the “narrower aim of casting light on negligence or abuse, or of alerting the public to a risk.”

Whistle-blowing (Continued)

- ▶ Heinz Luegenbiehl (2015) and Richard De George (2010) both draw helpful distinctions for differentiating some relevant categories of whistle blowing.
- ▶ Luegenbiehl distinguishes between what he calls “open” and “anonymous” whistle blowing, noting that the identity of the whistle blower is known in the former type but not in the latter.
- ▶ De George articulates three contrasting sets of concepts affecting whistle blowing:
 - 1) internal vs. external,
 - 2) personal vs. impersonal,
 - 3) governmental vs. nongovernmental.

Whistle-blowing (Continued)

- ▶ In the context of engineering, whistle-blowing incidents often occur in attempts to alert the public to a potentially unsafe product.
- ▶ They can occur because of either:
 - a) overt wrongdoing* (where an employee informs the public about the immoral or illegal behavior of an employee or supervisor);
 - b) negligence* (e.g., where one or more individuals in an organization have failed to act).

When Should an Employee “Blow the Whistle”?

- ▶ Colleen Rowley, an FBI employee, came forth to describe the way in which critical messages had failed to be sent up the FBI’s chain of command in the days immediately preceding the terrorist attacks of September 11, 2001.
- ▶ Was it appropriate for this individual to blow the whistle on her supervisor?
- ▶ Was she also possibly being disloyal to her supervisor and fellow employees in doing so?
- ▶ Should individuals in positions of authority in corporations such as Enron and WorldCom have blown the corporate whistle about the illegal accounting practices in those firms?
- ▶ One could argue that failing to blow the whistle in the Enron incident resulted in thousands of individuals losing their retirement savings, and in some cases their entire life savings.

Cases Where Whistle-blowing Could Have Saved Human Lives

- ▶ Consider three (now) classic cases where whistle blowing could have saved lives:
 - The Challenger Space Shuttle (problems with faulty O-rings);
 - Ford Pinto (problems with a faulty gas tank).
 - Bay Area Rapid Transport Project

The problem of O-rings

- ▶ *Morton Thiokol (NASA supplier) was the company responsible for the construction of the rocket boosters designed to propel the Shuttle into space*
- ▶ *In January 1985 Roger Boisjoly (an engineer at Morton Thiokol) has aired its doubts about the reliability of O-rings*
- ▶ *In July 1985 he had sent a confidential memo to the Morton Thiokol management board expressing concerns about the effectiveness of O-rings at low temperatures*
- ▶ *A project group was set up to investigate the problem but with insufficient funding and information to investigate the problem*
- ▶ *One of the group managers had sent a memo headed "Help: this is a red flag!" to MT's vice-chairman*
- ▶ *Nothing concrete was actually undertaken*

The night before the fatal flight

- ▶ *The launching was delayed 5 times (partly for weather related reasons: very low temperatures in the night)*
- ▶ *NASA engineers confessed to remembering having heard that it would be not safe to launch at very low temperatures*
- ▶ *They had a telephone conference with representatives of Morton Thiokol, including Boisjoly: the Morton Thiokol engineers recommended not to go ahead with the launch below 11degrees Celsius (O-rings never tested in sub-zero conditions)*
- ▶ *NASA claimed that the data were insufficient to the declare the launching - extremely important to NASA - unsafe*

The decision

- ▶ *A brief consultation session was decided so that the data could once again be examined*
- ▶ *While the connection was broken the General Manager of Morton Thiokol commented that a management decision had to be made*
- ▶ *Later on several employees stated that shortly after the launching NASA would make a decision regarding a possible contract extension*
- ▶ *For Morton Thiokol it was too much a political and financial risk to postpone the launch*
- ▶ *The 4 managers present, engineers excluded, put it to vote*
- ▶ *They were reconnected to NASA and Morton Thiokol announced, ignoring the advice of Boisjoly, its positive recommendations (no NASA's higher management level was informed)*

The Disaster

- ▶ NASA's space shuttle Challenger accident was a devastating tragedy that killed seven astronauts and shocked the world on Jan. 28, 1986.
- ▶ As the shuttle ascended, one of the seals on a booster rocket opened enough to allow a plume of exhaust to leak out. Hot gases bathed the hull of the cold external tank full of liquid oxygen and hydrogen until the tank ruptured.
- ▶ At 73 seconds after liftoff, at an altitude of 9 miles (14.5 kilo- meters), the shuttle was torn apart by aerodynamic forces.
- ▶ The two solid-rocket boosters continued flying until the NASA range safety officer destroyed them by remote control.
- ▶ The crew compartment ascended to an altitude of 12.3 miles (19.8 km) before free-falling into the Atlantic Ocean.

The Presidential Commission and beyond

- ▶ *It determined that the whole disaster was due to inadequate communication at NASA*
- ▶ *At the same time it argued for a change in the system that would ensure transparency (the entire space program was stopped for 2 years)*
- ▶ *MT did not lose its contract with NASA but helped, instead, to work on finding a solution to the O-ring problem*
- ▶ *Engineers were given more of a say in matters: in the future they will have the power to halt a flight if they had doubts*
- ▶ This disaster and the history behind it is paradigmatic to illustrate the concept of responsibility
- ▶ Whenever something goes wrong then the question who is responsible for it often quickly arises

When should Whistle-blowing Be Not Be Permitted?

- ▶ Sisela Bok (2003) defends whistle blowing in certain cases, i.e., where alternatives have been “considered and rejected.”
- ▶ She also believes that it should remain as a “last alternative,” due to its “destructive side effects.”
- ▶ George Brenkert (2010) notes that the whistle blower’s act of (voluntary) disclosure or revelation must also be *deliberate*; i.e., it cannot be accidental.
- ▶ Review Scenario 4-2 in the text (the Snowden case).
 - Does it meet all of the criteria for whistleblowing?
 - Can it be justified?

Criteria for Blowing the Whistle in an Engineering Context

- ▶ Richard De George (1999) offers some specific conditions for when an engineer is either:
 - a) permitted to blow the whistle;*
 - b) obligated to do so.*

When an Engineer is *Permitted* to Blow the Whistle

- ▶ In De George's model, one is permitted to blow the whistle when the:
 - 1) harm that will be done by the product to the public is serious and considerable.
 - 2) engineers (or employees) have made their concerns known to their superiors.
 - 3) engineers (or employees) have received no satisfaction from their immediate supervisors and they have exhausted the channels available within the corporation, including going to the board of directors.

When an Engineer is *Required* to Blow the Whistle

- ▶ Two additional conditions are needed for an engineer to be required to blow the whistle:
 - 4) The engineer has documented evidence that would convince a reasonable, impartial observer that his/her view of the situation is correct and the company policy wrong.
 - 5) There is strong evidence that making the information public will in fact prevent the threatened serious harm.
- ▶ Ladd (1991) believes that requiring engineers to blow the whistle in non-extraordinary cases (such as in De George's conditions 1-3) can be undesirable from an ethical point of view because it demands that these individuals be "moral heroes."

Responsibility, Liability, and Accountability

- ▶ *Traditional models of responsibility* require that two conditions be satisfied:
 - i. *causality*,
 - ii. *intent*.
- For example, some agent, *X*, is held morally responsible for an act, *Y*, if *X* caused *Y* (or intended to cause *Y*).
- ▶ A person could be held responsible for causing some outcome, even if he or she did not intend the outcome.
 - For example, a person who carelessly left a camp fire burning, which started a major forest fire, could be held responsible for causing the fire.
- ▶ Agents can also be held responsible when they *intend* for something to happen, even if they ultimately fail to cause (or bring about) the intended outcome.

Liability vs. Responsibility

- ▶ *Liability* is a legal concept.
- ▶ It is sometimes used in the narrow sense of "strict liability."
- ▶ To be strictly liable for harm is to be liable to compensate for it even though the party that is liable one did not necessarily bring it about through faulty action (e.g., when a someone is injured on a person's property).
- ▶ In liability incidents, the moral notion of "blame" may be left out.

Accountability (vs. Liability and Responsibility)

- ▶ Nissenbaum (2007) argues that responsibility is only part of what is covered by the (broader) notion of *accountability*.
- ▶ For Nissenbaum, accountability means that someone, or some group of individuals, or even an entire organization is *answerable*.
- ▶ Nissenbaum points out that in cases of accountability,
 - ...there will be someone, or several people *to answer* not only for malfunctions in life-critical systems that cause or risk grave injuries and cause infrastructure and large monetary losses, but even for the malfunctions that cause individual losses of time, convenience, and contentment.

The Problem of “Many Hands” in a computing Context

- ▶ Because computer systems are the products of engineering teams or of corporations, as opposed to the products of a single programmer working in isolation, “many hands” are involved in their development (Nissenbaum, 2007).
- ▶ It is difficult to determine who, exactly, is responsible whenever one of these computer or safety-critical system failures/accidents results in personal injury/harm to individuals.

The Problem of Assigning Responsibility when “Many Hands” are Involved

- ▶ Two problems for assigning responsibility using the classic model of responsibility (as apparent in the classic Therac-25 incident described in Scenario 4-2 in the textbook) are that we tend to think of responsibility:
 - I. as something that applies (only) to *individuals* but not to groups (or “collectivities” such as organizations);
 - II. in *exclusionary* terms, such that: If X is responsible, then Y is not, and *vice versa*.

Accountability vs. Responsibility

- ▶ *Accountability* is a broader concept than responsibility because it:
 - a) is non-exclusionary,
 - b) can apply to groups, as well as to individuals.

Do Some Computer Corporations Have Special Moral Obligations?

- ▶ Arguably, some computer corporations, in virtue of the scope and impact of their products and services, have some special moral obligations to society.
- ▶ Consider the case of companies that develop autonomous systems and robots.
- ▶ Do they have any special obligations?
- ▶ If so, what are they?

Special Responsibilities for Companies that Develop Autonomous Systems

- ▶ The Royal Academy of Engineering's 2009 Report notes that *autonomous systems* - from “unmanned vehicles and robots on the battlefield, to autonomous robotic surgery devices, applications for technologies that can operate without human control, learn as they function and ostensibly make decisions” - will soon be available.
- ▶ The report also points out that these systems raise a number of “social, legal, and ethical issues.”
- ▶ Arguably, these systems also raise some *professional-responsibility-related* issues.

Responsibilities for Companies that Develop Autonomous Systems (Continued)

- ▶ Wallach and Allen (2009) describe an actual case that closely mirrors one kind of concern anticipated in the Royal Academy's report.
- ▶ They describe an incident in which a prototype of an autonomous system (designed to make decisions “independent of human oversight”) has already malfunctioned and resulted in human casualties.
- ▶ Arguably, companies that develop these machines should be held responsible for “moral-decision-making software code” that they build into them.

Do Other Kinds of Computer Corporations also have any Special Responsibilities?

- ▶ There may indeed be other kinds of computer corporations that also have special responsibilities to society in light of the significant social impacts of their products and services.
- ▶ For example, major search engine companies may have special social responsibilities.
- ▶ Concerns of this type may be more appropriately analyzed under the category “business ethics.”
- ▶ But to the extent that these concerns particularly affect computer/IT professionals, they also warrant discussion within the context of cyberethics-and-professional-responsibility-issues as well.