# Ethics Exam Study Guide

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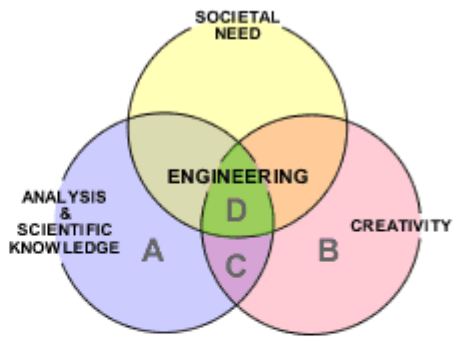
# Lecture 1

# Ethics

- **Definition of Ethics (from dictionary):**
  - 1. The study of the general nature of morals and of the specific moral choices to be made by the individual in his/her relationship with others.
  - 2. The rules or standards governing the conduct of members of a profession.

# The role of the engineer in society

- **Accreditation Board for Engineering and Technology's (ABET) definition for engineering is:**
  - "the profession in which knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind."
- **Consider the intersection of scientific knowledge with societal need as illustrated in this Venn diagram**
  - • Sector A – purely analytical talents within the engineering domain. This is engineering science, the ability to model complex systems and predict their response to various inputs under numerous conditions.
    • Sector B – creative capacity within the engineering domain. This is viewed as those sudden intuitive leaps that can result in revolutionary advances in technology.
    • Sector C – the intersection of knowledge and the need for both creative and analytical capabilities. This is engineering design, the ability to work at "real world" problem solving.
    • Sector D – the culmination of societal need, analysis, knowledge and creativity. This is the ideal role of engineering and the individual engineer.




Venn diagram: the relationship of engineering to societal need, scientific knowledge, analysis and creativity

TEXAS STATE

# Morality vs Ethics

- **Morality** usually implies a set of internally held values, quite often (but not necessarily) deontological, or deity-based. Many moral belief systems center on what are held to be intrinsic or universal values-Truth, Honesty, the "golden rule" or other measure of goodness. Ethics (in our sense of "professional ethics") on the other hand, is usually connected to a shared understanding of proper conduct guidelines among a group of people associated by means of their profession.

**Professional ethics** allows diverse, multidisciplinary, indeed multicultural teams to work in unison toward common goals guided by their shared code of ethical conduct, where individual morals might under some circumstances impede or disrupt team efforts.

# Is Engineering a Profession?

- **Not easy to decide without a definition of a profession.**
- **In this case, we are not using profession as synonymous with job. But rather in the sense that law or medicine is a profession. Also we are not looking at the difference between professional and amateur.**

- **Better definition of profession:**
  - 1) Work involves sophisticated skills, judgment, and discretion which is not routine or capable of mechanization.
  - 2) Requires extensive formal education. (Not necessarily practical training.)
  - 3) Special societies or organizations controlled by members of profession are allowed to play major role in setting standards for admission to profession, standards of conduct, etc.
  - 4) Serves some important aspect of the public good.

- **Obviously this is not clear-cut and some might consider theirs a profession which**

Really subjective but OKAY

# Is Engineering a Profession?

- **Is engineering a profession? By these definitions it is. However, there are some obvious differences between medicine and law, and engineering.**

- **E.g.,**
  - Engineers generally practice as employees of large companies, not as independen businesses.
  - We aren't as well paid.
  - Training is different (i.e., not a professional school).
  - Engineers don't have the social status that law or medicine do.
  - Not all engineers are members of societies.
  - Societies themselves are not particularly powerful (not like the AMA or ABA), organizations have no real sanctioning ability.
  - Don't need licensure/registration to practice many types of engineering.
  - If engineering was like law or medicine, how would this change the nature of the way engineering is practiced? (I.e., would companies employ as many engineers, would they be more independent, etc.)

# Principles of Professional Ethics

- **Impartiality; objectivity**
- **Openness; full disclosure**
- **Confidentiality**
- **Due diligence / duty of care**
- **Fidelity to professional responsibilities**
- **Avoiding potential or apparent conflict of interest**

# Principles of Global Ethics:

- **Global justice (as reflected in international laws)**
- **Society before self / social responsibility**
- **Environmental stewardship**
- **Interdependence & responsibility for the 'whole'**
- **Reverence for place**

# Principles of Personal Ethics

- **Principles of Personal Ethics include:**
  - Concern for the well-being of others
  - Respect for the autonomy of others
  - Trustworthiness & honesty
  - Willing compliance with the law (with the exception of civil disobedience)
  - Basic justice; being fair
  - Refusing to take unfair advantage
  - Benevolence: doing good
  - Preventing harm

# Principles versus Absolute Rules and Universality

- It is tempting to apply these principles selectively, or only within set boundaries, such as next-of-kin, race, gender, etc. This is called **cronyism**.
  - For example: a person is half Sicilian and half Gypsy. The Mafia will engage in despicable acts, but have a rigid code of honor within their own 'family'. Many a gypsy will have no qualms about picking your pocket, but would never pick that of a relative.
  - Limiting the application of ethical principles negates their value. They must *all* be applied to *everyone*.
- There are also selective violations of the principles that society considers acceptable.
  - Murder is illegal, unless we are fighting a (just) war.
  - Lying is wrong, unless we are telling a child about Santa Claus, or saving them from harm.
  - These interpretive variations cause people to conclude that there are no universal standards for ethics, and that moral responsibility is relative to cultural practices.

## What a code of ethics is:

- **Provides a framework for ethical judgement for a professional.**
- **Expresses the shared ethical commitments of a society's or profession's members.**
- **Acknowledges and articulates principles and standards already implicit in responsible engineering practice; expresses them in a coherent and comprehensive fashion.**
- **Defines role and responsibilities of an engineer.**
  - (Note: Just because something is not explicitly mentioned in a code, doesn't mean that it is ok.)

## What a code of ethics is not:

- **Not a recipe (only a framework.) Not a substitute for good judgement.**
- **Not a legal document (you won't necessarily be arrested for violating its provisions, although you might be thrown out of the organization.)**
- **Does not create moral or ethical principles, but rather spells out their relevance to professional practice.**

# Lecture 2 after this slide

# Codes that we should follow:

- **IEEE code of ethics**
- **NSPE**
- **Your specific field of work code of ethics**
- **Your employer's code of ethics**

# Moral Theories

- In engineering, we must have some theoretical framework for understanding ethical problems.
- Moral Theory- defines terms in uniform ways and links ideas/problems together in consistent ways.
- Three main moral theories that we will consider:
  - Utilitarianism
  - Virtue Ethics
  - Respect of Persons (RP)
    - Duty Ethics
    - Rights Ethics

# Utilitarianism:

- Utilitarianism: Those actions are good which serve to maximize human well-being. (Kind of a collectivist approach.)
- Problem with utilitarianism:
  - 1) sometimes what is best for everyone may be bad for a particular individual.
    - Example: WIPP
    - It's good for society as a whole to have a place to store nuclear wastes. It's perhaps not good for certain people who live near the site or who live along the routes where the material is transported.
  - 2) Depends on knowing what will lead to the most good. Sometimes this is not possible.
- Utilitarianism is very basic to engineering analysis: cost/benefit analysis is based on utilitarianism.

# Virtue Ethics

- **Virtue Ethics-** interested in what kind of people we should be. Good actions support good character traits (virtues), bad actions support bad character traits .
- Focuses on such words as
  - responsibility, honesty, competence, loyalty, etc. ;
  - and dishonesty, disloyalty etc..
- Also tied up with personal character.
  - I do good things because I am a virtuous person, and seek to enhance these character traits in myself
- It may seem like this only deals with personal ethics, but of course you can't separate your personal morality from your business morality (or at any rate you shouldn't).
- This one is a little trickier to apply to the types of problems we wish to study, probably because it seems less concrete. However, we can use this by answering questions such as:
  - Is this action honest?
  - Will this action demonstrate loyalty to my employer, community, etc.?
  - Have I acted in a responsible fashion?
  - Have I been negligent?
- **Of course, these questions can also be applicable to a corporation.**

# Respect of Persons

- Respect for Persons (RP):
  - Those actions are good which respect the rights of the individual. (Good consequences for everyone are not the only moral consideration.)
- Two versions: Duty Ethics and Rights Ethics
  - Duty ethics says people have duties from which come the rights of others,
  - Rights Ethics says that people have fundamental rights which require certain duties.
- Problems with RP:
  - 1) Basic rights of one person (or group) may conflict with the basic rights of another group. How do we decide which rights take priority?
    - Example: Siting of a dam. Individuals have right not to have there homes taken away when the dam is flooded, but others nearby have a right to a steady and safe water supply. Sometimes need to think in terms of a hierarchy of rights, but this is hard to do sometimes.
  - 2) RP Doesn't always account for the good of society very well.
- How are these two theories to be applied? Analyze the problem from both perspectives and try to see which way makes the most sense.

# 1986 Challenger disaster

- http://www.onlineethics.org/CMS/profpractice/ppessays/thiokolshuttle.aspx
- http://en.wikipedia.org/wiki/Space_Shuttle_Challenger_disaster
- http://space.about.com/cs/challenger/a/challenger.htm

- **The commission's report cited the cause of the disaster as a the failure of an “O-ring” seal in the solid-fuel rocket on the Space Shuttle Challenger's right side. The faulty design of the seal coupled with the unusually cold weather, let hot gases to leak through the joint. Booster rocket flames were able to pass through the failed seal enlarging the small hole. These flames then burned through the Space Shuttle Challenger's external fuel tank and through one of the supports that attached the booster to the side of the tank. That booster broke loose and collided with the tank, piercing the tank's side. Liquid hydrogen and liquid oxygen fuels from the tank and booster mixed and ignited, causing the Space Shuttle Challenger to tear apart.**

# Principles of Global Ethics:

- **Global justice (as reflected in international laws)**
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# Discussion #2
# Cell Phone Safety

- Scenario: Let's say we work for a company producing cell phones which of course are known to produce microwave (or rf) fields. We've just started reading the about public concerns about cell phone safety, or we've just read this article in IEEE Spectrum. What should we do?

# Making the choices

- **Bottom line: here are your three choices**
  - **Do nothing.** Assume that everything will be ok.
  - Begin process to **redesign product** for better safety. Whether to actually go into production depends on the circumstances.
  - **Stop production** until the issue is resolved.

# Line drawing problems

- **Where along a spectrum can the problem we are considering be placed?**
  - Set up a continuum of situations; on one end is something clearly right, on the other something that is clearly wrong, the positive and negative paradigms respectively.
  - Find out where along this continuum your problem exists, and determine which end of the spectrum is most like your case.
  - Requires some use of judgment.
  - Caveat: if you're not careful, this technique can be misused, and used to prove that something is right that is actually wrong.

# Line drawing problems

- **Illustration: Pentium case.**
- **Positive paradigm: Products should perform as advertised.**
- **Negative paradigm: selling products which are defective and will affect customer's applications is unethical.**
  - Where does our situation fall on this line?
  - Some other cases:
    - 1) There is a flaw but it truly is undetectable.
    - 2) There are flaws but customer is informed.
    - 3) Warning label saying that this chip should not be used for certain applications.
    - 4) Fix chip when people notice problem.
    - 5) Order an immediate recall.
- **Where does what happened fit in here ? (Selling chip with no warning to customer.)**

# Illustration: Intel Pentium Chip

- In late 1994 reports were surfacing that the latest Intel Pentium microprocessor chip was flawed. At the time over 80% of the worlds personal computers used this chip.
- Apparently, flaws in complicated microprocessors are considered common. Many of these flaws are compensated or handled by software and are undetectable by the user. However the flaw discovered in the Pentium chip in 1994 was detectable by the users. A flaw in the floating point unit (FPU) resulted in incorrect answers when double precision arithmetic calculations were performed.
- Initially, Intel denied that there was any problem with the chip. When it was shown that their claim was inaccurate, Intel issued another press release stating that the detected flaw was insignificant and unnoticeable to the majority of users. Intel went on to state that they would replace the flawed chip if the user could demonstrate that they needed an unflawed version of the chip. Eventually there was enough negative publicity that Intel agreed to replace the chip for any customer that asked.
- Well before the flaw was brought to the attention of the public, Intel engineers were aware of the problem. The engineers corrected the flaw on all subsequent chips, but not before over 2 million of the flawed chips had been sold. Intel continued to sell the flawed chip (until inventory ran out). They reasoned that the flawed chip was not a significant problem to most users, so it was fine to sell the flawed chip.

# Conflict problems

- **A choice between two conflicting moral choices, each of which seems to be correct.**
  - 1) **Easy choices.** Sometimes there are conflicting moral choices, but one is obviously far more important than the other.
  - 2) **Creative middle way.** Sort of an attempt at some kind of compromise that will work for everyone.
  - 3) **Hard choice.** Sometimes you have to bite the bullet and do what is correct, even though it may cause problems in other areas.

- **Note: Sometimes the problem is presented to you in absolute terms. It is often helpful to work on reframing the problem so that it isn't quite so absolute.**

# Conflict problems

- **Back to the Challenger case.**
  - Conflict between need to protect the safety of the astronauts, and the need to be a faithful agent of your employer (or to ensure that the program goes on and jobs are saved.) How do we resolve these?
    - **Easy choice**: Clearly you shouldn't kill anyone so don't launch. (If you don't believe the jobs etc. are an important consideration.)
    - **Creative middle ground**: Delay until later in the afternoon when the temps. would be higher. Compromises some part of the mission, but some of it can still be done.
    - **Hard choice**: If you believe that jobs have equal standing with lives, bite the bullet and don't allow the launch and suffer the consequences of loss of jobs. Or bite the bullet, launch, save the jobs and say that 5000 jobs are more important than 7 lives.

# Flow charting

- Can also be applied to ethical problems.
- The idea here is to use a flow chart to visualize and evaluate the consequences of your actions.
- Sometimes this also helps you to see what new information you need.
- Frequently seeing all of the consequences spelled out will make it obvious which way to go.
- Do example with electromagnetic fields from cellphones, seeing what happens if we go ahead into production, and face lawsuits.

# Lecture 3 after this slide

# Accidents

- **Accidents can be grouped into three broad categories:**
  - Procedural: Caused by someone failing to follow an accepted procedure. Sometimes called “pilot error.” Can include improper maintenance.
    - What can engineers do about this? Design things to be easier to use and maintain.
  - Engineered: Caused by a flaw in the design. Or a device that didn’t work properly when subjected to unanticipated conditions.
    - Prevented by doing more thorough testing, gaining experience with the device.
  - Systemic: Characteristic of very complex technologies that require complicated systems to run and maintain. Space shuttle and airline industry are examples. These accidents are generally not caused by any one thing, but rather by a chain of small, seemingly insignificant events.
    - These are difficult to prevent. Best approach is to be creative and attempt to foresee potential problems and design around them.

# Safety

- **What then are the duties of a design engineer? Safety is an essential criterion for any design.**
  - 1) Must meet legal requirements. (minimum)
  - 2) Must meet standard of "accepted engineering practice." I.e., can't make a design that is less safe than what everyone in the profession understands to be acceptable.
  - 3) Alternative designs that are potentially safer must be explored. (Requires a fair amount of creativity.)
  - 4) Must attempt to foresee potential misuse by consumer and design to avoid these problems. (Again requires some creativity and research.)

- **Even if you have done all of this, you can still lose a law suit depending on the judge/jury.**

# Discussion #5
# Valujet Flight 592

- **Basic facts:**
  - May 11, 1996 Valujet flight 592 takes off from Miami. Shortly into the flight smoke starts to fill the cabin. Pilots try to return to airport, but plane crashes in Everglades before it can make it back.
- **Crash attributed to oxygen canisters that were being carried back to headquarters in Atlanta. These accidentally went off, causing a tire to burn.**
- **No single mistake led to this accident, yet a series of mistakes led to the problem.**

# Discussion #5

- What type of accident is this? Procedural, engineered, systemic?
- What role might engineers have had in causing this accident? In preventing this accident?
- How might the oxygen canisters have been better designed to prevent this problem?
- Smoke and heat detectors are now required in cargo holds of commercial airplanes. Should the engineers have thought of this before?
- Did the engineering of this airplane meet legal requirements?
- Did it meet accepted engineering practice? Hard to know this one.
- What alternative designs might have been explored to help prevent this accident?
- Did the engineers anticipate problems associated with not following procedures, or people doing stupid things?

# BP Oil spill

**Never downplay safety to save cost or meet deadlines.**

- http://www.slideshare.net/mengkiat/deepwater-horizon-oil-spill-5539058

- The BP oil spill has been considered the largest accidental marine oil spill in the history of the petroleum industry. It resulted from the Deepwater Horizon drilling explosion in 2010 killing 11 workers and leading to 206 million gallons of oil being released from BP's well a mile beneath the Gulf of Mexico. The well gushed for three months before being capped and then permanently sealed in September.
- BP focused mainly on profits and failed to acknowledge the risks and safety aspects during the operation.

# Events:

- http://www.citizenvox.org/2010/06/07/bp-disaster-what-went-wrong-step-by-step/

- According to an AP report, in an email four days before the well exploded a BP official wrote of an engineer's recommendation to use 21 "centralizers": "It will take 10 hours to install them. I do not like this." Later that day, another official recognized the risks of proceeding with only six centralizers but commented: "Who cares, it's done, end of story, will probably be fine."
- Isn't it very much like the attitude behind the sub-prime mortgage crisis? "Who cares if these people don't have the money to pay for this property and never will, so long as business is booming and our stocks are riding high?"

- Building on a professional tradition dating from the Hippocratic Oath, they came up with the MBA Oath, a voluntary pledge to strive for a high standard of ethical and professional behavior. One of its eight points is this: "I will take responsibility for my actions, and I will represent the performance and risks of my enterprise accurately and honestly."

  So far there are over 3000 signatories to this excellent code from more than 300 universities and the idea is spreading rapidly. One Harvard graduate told Business Week last month: "For me, it was a stake in the ground, to say here are my values, here's what I believe in. … When I have a tough decision, I want to be in a position where I have my own personal oath."

# Deepwater Horizon Oil spill

- **Casualties: 11 dead, 17 injured**

# Lecture 4 after this slide

# Whistleblowing

- **Whistleblowing:** **the act by an employee of informing the public or higher management of immoral or illegal behavior by an employer or supervisor.**
  - Is a whistleblower a public hero, or a disloyal stool pigeon?
  - Does an employee have an overriding obligation to the public, or is the obligation to one's employer more important?
  - Where is the proper balance here?
  - Internal vs. external whistleblowing
  - Anonymous vs. acknowledged whistleblowing ?

# Examples of problems that might warrant whistle-blowing

- **Incompetence**
- **Criminal Behavior**
- **Unethical Policies**
- **Threat to Public Safety**
- **Injustices to Workers**

# Whistle-Blowing

**Always the LAST RESORT, it indicates serious corporate culture problems**

**Can be internal as well as external**

**Definition depends on one's point of view: (Martin and Schinzinger, pg 214)**

**"Whistle-blowing" - the act of a man or woman who, believing that the public interest overrides the interest of the organization he[sic] serves, publicly "blows the whistle" if the organization is involved in corrupt, illegal, fraudulent, or harmful activity (Nader, Petkas, and Blackwell, 1972)**

**Some of the enemies of business now encourage an employee to be disloyal to the enterprise. They want to create suspicion and disharmony and pry into the proprietary interests of the business. However this is labeled -industrial espionage, whistle-blowing or professional responsibility - it is another tactic for spreading disunity and creating conflict (Roche-GM chairman, 1971)**

# Whistleblowing

- **Is whistleblowing a moral obligation?**
  - Yes, if it is to protect others or to prevent morally unacceptable activities.
- **Four conditions before whistleblowing should be attempted:**
  - **1) Need:** There must be a clear and important harm that can be avoided by whistleblowing. Sense of proportion, so we don't blow whistle about everything.
  - **2) Proximity:** whistleblower must be in very clear position to report on problem. Hearsay is not adequate. Also implies that the whistleblower has enough expertise to be making a realistic assessment of situation.
  - **3) Capability:** must have reasonable chance of success. (Access to press, government authorities, etc.) Don't risk things if you can't see it through. This includes being believable. No moral obligation to jeopardize yourself through useless gestures.
  - **4) Last resort:** Should only blow whistle if there is no one else more capable, more proximate, and if you feel that all other lines of action within the context of the organization have been shut off.

# Whistleblowing

- **Whistleblowing can be very bad from a corporation's point of view.**
- **It leads to:**
  - Distrust
  - Disharmony
  - Inability to work together
  - etc
- **Sports analogy: in whistleblowing it's not the referees who are stopping play, its one of your own teammates who stops the game.**

# Moral Guidelines to Whistle-Blowing (ref. Richard T. DeGeorge)

**It is morally permissible for engineers to engage in external whistle-blowing concerning safety:**

1. **If the harm that will be done by the product to the public is serious and considerable**
2. **If they make their concerns known to their superiors**
1. **If getting no satisfaction from their immediate superiors, they exhaust the channels available within the corporation, including going to the board of directors.**

# Whistle-Blowing (cont)

**In order for whistle-blowing to be morally obligatory requires two further conditions:**

4. **He [or she] must have documented evidence that would convince a reasonable, impartial observer that his [or her] view of the situation is correct and the company policy wrong.**
5. **There must be strong evidence that making the information public will in fact prevent the threatened serious harm.**

**(ref. Martin and Schinzinger, pg 217)**

# DC10 Cargo Door

- On June 12, 1972 A DC-10 left Detroit with 67 passengers, after reaching 12,000 ft, the cargo door blew off, collapsing floor and disrupting all hydraulic controls to tail section. Only the pilot's skill and the light load prevented a disaster.
- June 27, 1972 Daniel Applegate, Director of Product Engineering for Convair, the fuselage contractor, wrote a memo to his supervisors detailing potential problems of cargo door. *The problem was first recognized in August 1969. The same thing had also happened in a ground test in 1970.*
- Recognized design flaws - floor, latch

# DC10 Cargo Door (cont.)

- After the Detroit near-disaster, NTSB (National Transportation Safety Board) investigation revealed several problems and recommended immediate design changes.
- FAA did not follow NTSB recommendations. FAA director John Shaffer and Douglas President Jackson McGowan reached a gentleman's agreement to voluntarily fix problem, but no further official action was taken.
- In July 1972, Three inspectors at Long Beach plant certified that Ship 29 had been modified (but it was not).
- Two years later, after leaving Paris, its cargo door blew off at 13,000 feet, killing 346 people.

# Why Did This Accident Happen?

- McDonnel Douglas was in precarious financial condition - trying to beat Lockheed L1011 to market
- Convair did not push too hard, since by contract, they may have been held liable for the costs of all design changes
- Engineers pressed the matter through normal channels to the highest levels within both companies, but did not take it any further. Standard operating procedure at McDonnell Douglas and Convair was for engineers to defer to upper management, even though they were aware of serious design flaws

**Were the engineers negligent?**

# A Reasonable Care Model of Professional Responsibility

**A person, S, is responsible for the harm he or she causes when his or her conduct fits the following pattern:**

**(1) As a member of a profession, S has a duty to conform to the standard operating procedures of his or her profession, unless those standards are lower than those that a nonprofessional would adopt in a given situation, in which case S has a duty to conform to the higher standard;**

**(2) At time t, action X conforms to the standard of reasonable care defined in (1);**

**(3) S omits to perform X at time t,**

**(4) Harm is caused to some person, P, as a result of S's failure to do X.**

# Conflict of Interest

- A **conflict of interest** (**COI**) is a situation in which a person or organization is involved in multiple interests, financial or otherwise, one of which could possibly corrupt the motivation or decision-making of that individual or organization.
- The presence of a conflict of interest is independent of the occurrence of impropriety. Therefore, a conflict of interest can be discovered and voluntarily defused before any corruption occurs.
- A conflict of interest exists if the circumstances are reasonably believed (on the basis of past experience and objective evidence) to create a risk that a decision *may* be unduly influenced by other, secondary interests, and not on whether a particular individual *is actually* influenced by a secondary interest.

# Conflict of Interest

- A widely used definition is: "A conflict of interest is a set of circumstances that creates a risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest."
- *Primary interest* refers to the principal goals of the profession or activity, such as the protection of clients, the health of patients, the integrity of research, and the duties of public office.
- *Secondary interest* includes personal benefit and is not limited to only financial gain but also such motives as the desire for professional advancement, or the wish to do favors for family and friends. These secondary interests are not treated as wrong in and of themselves, but become objectionable when they are believed to have greater weight than the primary interests.

# Other ethical decisions:

**Ethical dilemmas arise for a variety of reasons in this business world. Four of the most common reasons are as follows:**

***1. Selfishness and personal gain***
***2. Profit pressures***
***3. Business standards conflicting with personal values***
***4. Cultural differences in global settings***

# Bribes:

- **Bribe- Something, such as money or a favor, offered or given to someone in a position of trust to induce him/her to act dishonestly. Something offered or serving to influence or persuade.**

- ***Bribery is definitely illegal in the US, as well as most places in the world (although the practice is allegedly socially accepted in some places).***

- **Let's look at some reasons why we shouldn't tolerate bribery:**
  - 1) It corrupts a "free-market" economic system, i.e. it is anti-competitive. Unlike buying the best product at the best price, bribery does not reward the most efficient producer.
  - 2) Bribery is a sellout to the rich. "Them that have the gold, make the rules." This would corrupt justice, public policy, etc. by allowing rich people to make all the rules.
  - 3) Bribery treats people as commodities which can be bought and sold; degrading to us as human beings.

# Questions:

- **Example #1: You are an employee for the Employees' Retirement System . A vendor of invites you and your co-workers to a pre-game tailgate party hosted by the vendor. May you and your co-workers attend?**
  - Answer: Yes, as long as a representative of the vendor is present at the pre-game party. In contrast, you could not accept a gift certificate to a restaurant for dinner.

- **Example #2: At the pre-game party, the vendor offers you tickets to a game/event you really wanted to see. May you accept the tickets?**
  - Answer: No. The vendor has a business relationship with your agency, therefore you may not solicit or accept any thing of economic value from them.

# Impartial list of gifts:

- **A partial list of gifts which a large electronics firm considers it improper for engineers to accept:**
  - door prizes at a conference
  - raffle prize by a supplier or distributor
  - any gift of excessive value (supervisor must be notified)
  - fare lower than commercially available
  - cash rebates
  - tickets to sporting events or other entertainment given as an outright gift where the
    - supplier does not intend to accompany the employee, or
    - the sports team is sponsored by supplier
  - extravagant dinner or entertainment
  - any gift, favor, hospitality or entertainment that could in any way create a feeling of obligation or could compromise professional judgement.

# Computer Ethics

- **This is a relatively new issue in engineering ethics.**
- **Our question: What responsibility do engineers have in the area of computer ethics?**

- **Roles of engineers regarding computers:**
  - Designers
  - Users
  - Managers of computers

- **Three broad areas of ethical concerns in computer use:**

# Computers as objects of unethical acts.

- **For example hacking, or creating computer viruses.**
- **Can come in many forms: unauthorized access to information, altering databases, etc.**
- **What are the ethical issues here?**
  - Privacy
  - Health and safety (if a health database becomes corrupted)
  - Destroying other people's data
  - National security

- **Costs to industry and government in prevention and recovery**
- **Again, the issue with this type of activity is that the computer allows this to become somewhat depersonalized and safe.**
  - But is it ok?

# Privacy

- **Fundamental: Do employees have a right to electronic privacy?**
  - **Public versus private availability (eg, computer files)**
    - **Aggressive: what ever I can get to, even without permission**
    - **Typical among many students and hackers**
    - **Conservative: only what is explicitly public is allowed**
    - **Metaphor:What is on the bookshelf, on the desk is accessible**
    - **What is behind doors, in drawers in the desk is not, even if not locked**
- **Email: Company resources/assets, hence company rights to look at employees email**
  - How private is your email anyway from snoopers, ISP providers, company email systems, etc ?
- **Project state (your part of a project)**
- **Anytime access vs explicit reporting**
- **What are the pros and cons?**

# Autonomous computers-

- **Systems which are able to make decisions without human intervention.**

  - This can be good! For example, in manufacturing where decisions can be made more quickly and efficiently than if humans were involved.
  - Case of a bad system: Faulty decisions

  - Military computers: autonomous computers can lead to instability.
  - A bad sensor tells computer that something is going on. Increased preparations are ordered, so enemy computer senses a problem and orders more alertness on their part. Before long, everyone is on alert and a real problem has started.

# Plagiarism

- **Plagiarism vs Reuse –one is bad, the other good**
- **Textbook algorithms and data structures**
  - Eg, Knuth's series, standard algorithms and data structures
- **Useful source for reuse**
- **Good manners to provide citation**

- **Libraries and frameworks.**
  - Often need licenses or purchase agreements
  - Use them typically, not copy them
  - Suppose you bring software source from another company? Your own – is that plagiarism?
  - Someone else's software – plagiarism?

- **Downloading from the web?**

# Reverse Engineering

- **Reverse Engineering (RE): discovering the design of a system by a variety of means on the basis of its function and operation –usually with the intent of recreating the product**
  - **Independent design vs. using someone else's design.**
    - **Fundamental questions: how many different ways are there to design a system?**
    - **Does the process matter how you design at the system?**
    - **Are there good uses of reverse engineering?**
  - **Example:**
  - **Product licensed to company X –created via hard work by Y.**
    - **RE prohibited in the license**
    - Licensed to be used solely in a production context
  - **Using the licensed system, created their own via RE.**
  - **Used licensed system as the perfect testing platform**
  - **Result: theft of IP and the effort to produce it**
  - **How could this have been done properly?**

# Summary

- **Where you draw the line is your choice**
- **Corporate ethics begins with each person**
- **You can be held personally and legally responsible for your professional actions**
- **It is important to understand your company's attitude toward ethics - it should be a factor in your choice of employer**