



# **CHAPTER 2: MORAL REASONING AND CODES OF ETHICS**

## Resolving Moral Dilemmas



### 1. Moral clarity

- Need to know something is wrong! *Do not ignore problems!*
- Loyalty to employer, responsibilities to public and environment (and complex relations between these)

### 2. Know the facts

- Get hard, documented facts, discuss with others
- Competence matters in gathering technical facts

### 3. Consider options

- Diversity of actions to take? Evaluate/discuss.
- Long-term, short-term perspectives, repercussions?
- “Creative middle solution”?

### 4. Make a reasonable decision

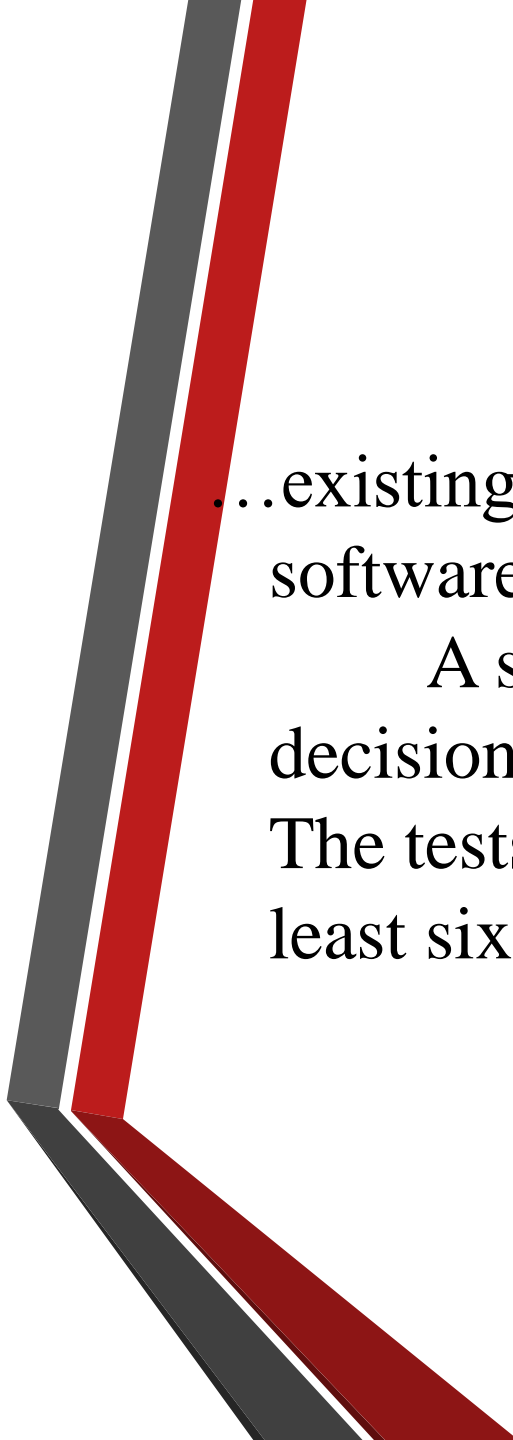
- Weigh all factors, recognize “gray areas”/compromises
- An engineering design problem?

## Discussion Question

- Engineer A is employed by a software company and is involved in the design of specialized software in connection with the operations of facilities affecting the public health and safety (i.e., nuclear, air quality control, water quality control). As the part of the design of a particular software system, Engineer A conducts extensive testing and although the tests demonstrate...

## Discussion Question

that the software is safe to use under existing standards, Engineer A is aware of new draft standards that are about to be released by a standard setting organization-standards which the newly designed software may not meet. Testing is extremely costly and the company's clients are eager to begin to move forward. The software company is eager to satisfy its clients, protect the software company's finances, and protect...



...existing jobs; but at the same time, the management of the software company wants to be sure that the software is safe to use.

A series of tests proposed by Engineer A will likely result in a decision whether to move forward with the use of the software. The tests are costly and will delay the use of the software by at least six months, which will put the company at a competitive...

.....disadvantage and cost the company a significant amount of money.

Also, delaying implementation will mean the state public service commission utility rates will rise significantly during this time.

The company requests Engineer A's recommendation concerning the need for additional software testing.

**Question: Should Engineer A design the software to meet the new standards?**

# Analyzing the case...

- Moral clarity:
  - What is wrong? What is the core issue/question?
  - Will the software meet the new standards?
  - Why are there new standards?
    - Experience shows new failure modes
    - New tests designed to test new failure modes
  - Engineer's role in new standards?
    - Development of new standards
    - Following new standards

# Analyzing the case, continued...

- Know the facts
  - It is critical software (health/safety of public)
  - New standards to test new failure modes (that you need to understand)
  - Testing is costly, company finances at stake
  - Need to protect existing jobs
  - Testing will delay release by > 6 months
  - Testing will hurt competitive advantage?
  - Utility rates will rise



# Analyzing the case, continued...

- Consider options
  - **Option 1:** Ignore the new tests, take risk to public safety/welfare, save time/money
  - **Option 2:** Conduct the tests, risk jobs, hurt finances, become certain software will work, protect safety/welfare of the public
  - **Option 3:** Creative middle of the road solution: Is there are limited version of full tests that could be conducted that would partially test, but save some money/time?

# Analyzing the case, continued

- Make a reasonable decision
  - Pick Option 2 since safety/health/welfare of the public is paramount/**supreme**
  - If company says no, pick Option 3 and try to do a limited test for the failure mode (your competence in coming up with an economical test is critical here). In this option, all constraints considered, you *try* to protect the safety, health, and welfare of the public

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# Codes of Ethics

- Why are codes important?
  - Serve and protect the public
  - Guidance/support for engineers
  - Inspiration, deterrence, discipline
  - Shared standards, education, mutual understanding
  - Profession's image
- Limitations of codes
  - Too vague to be useful in every day ethical decision-making?
  - Impossible to cover all eventualities

# Attendance Question

**The following phrase is from the IEEE Code of Ethics:**

**“To improve the understanding of technology, its appropriate application, and potential consequences.”**

**Please identify as many strategies as you can for satisfying this statement.**

**Please:** Put your name on the sheet of paper and turn it in...