Engineering Ethics

CSCI-370

Ethical Principles - Daniels Fund

Integrity

Act with honesty in all situations

Trust

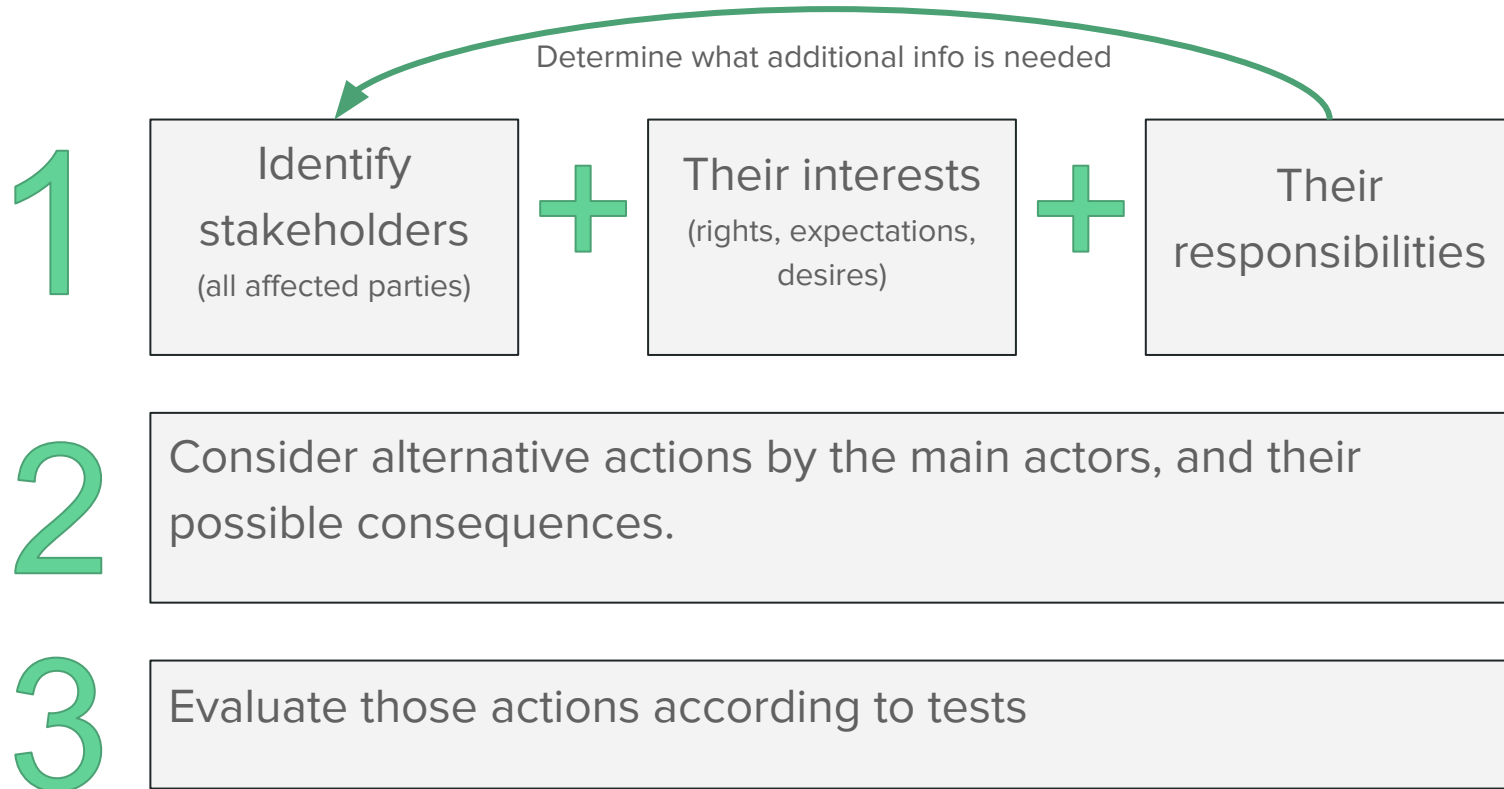Build trust in all stakeholder relationships

Accountability

Accept responsibility for all decisions

Transparency

Maintain open and truthful communications

General Approach to Engineering Ethics - M.C. Loui

Determine what additional info is needed

1

| Identify stakeholders (all affected parties) | **+** | Their interests (rights, expectations, desires) | **+** | Their responsibilities |

2 Consider alternative actions by the main actors, and their possible consequences.

3 Evaluate those actions according to tests

Ethical Tests - M.C. Loui

Harm test: Does this option do less harm than any alternative? Do the benefits outweigh the harms?

Reversibility test: Would this choice still look good if I traded places? (i.e., if I were one of those adversely affected by it?)

Professional test: What does the Software Engineering code of ethics say about this problem?
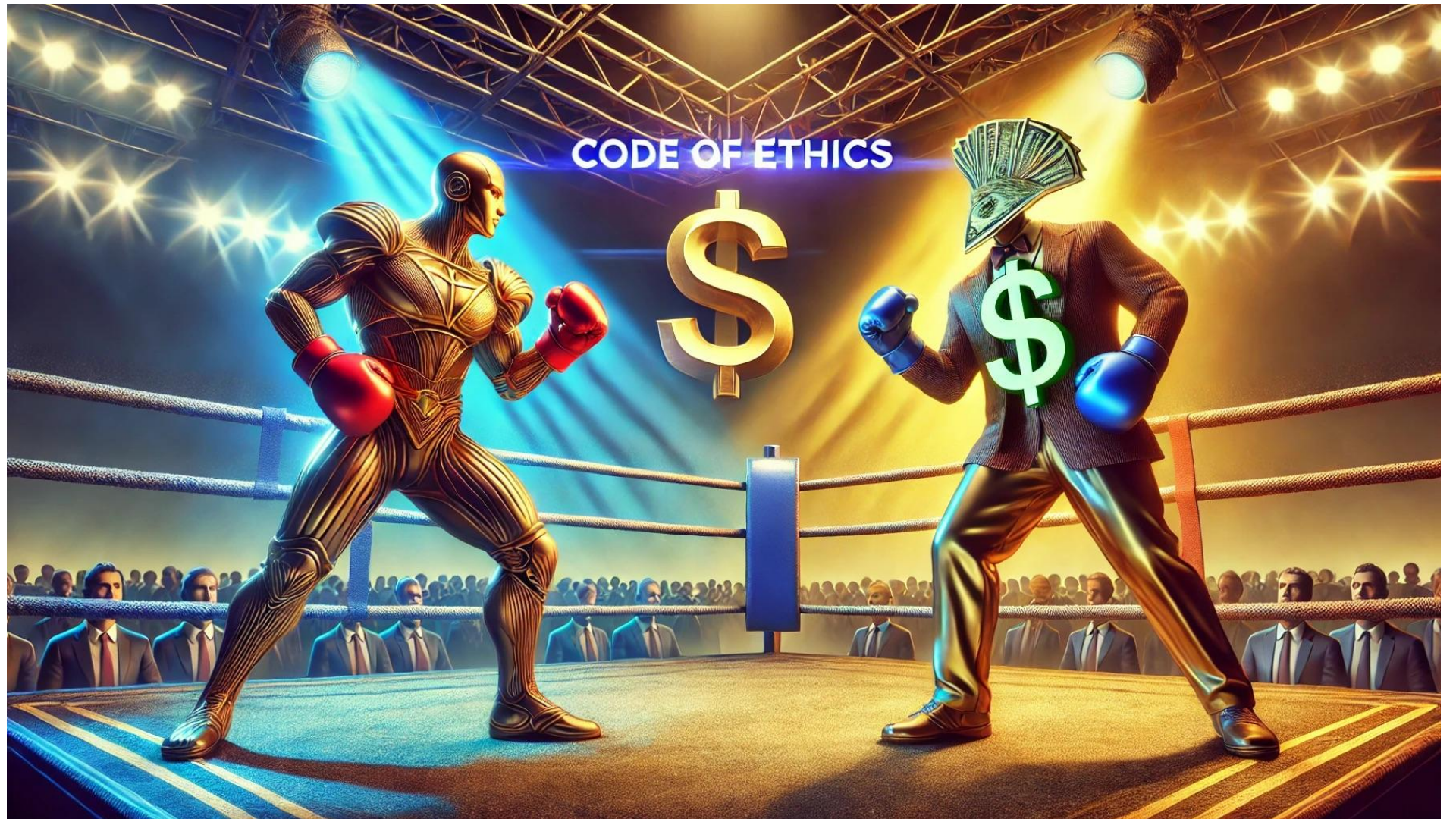
Common practice test: What if everyone behaved this way?

Legality test: Would this choice violate a law or a policy of my employer?

Publicity test: How would this choice look on the front page of a newspaper?

Mirror test: Would I feel proud of myself when I look into the mirror?

CODE OF ETHICS

Time & Money

"Software is eating the world." - Marc Andreessen (2011)

"When an online service is free, you're not the customer. You're the product."

"We cannot have a society in which, if two people wish to communicate, the only way that can happen is if it's financed by a third person who wishes to manipulate them." - Jaron Lanier

The Challenger Disaster

January 28, 1986

Codes of Ethics

ACM: https://www.acm.org/code-of-ethics

Computing professionals' actions change the world

IEEE: https://www.computer.org/education/code-of-ethics

Because of their roles in developing software systems, software engineers have significant opportunities to do good or cause harm

ACM

1. GENERAL ETHICAL PRINCIPLES - fundamental ethical principles that form the basis for the remainder of the Code

2. PROFESSIONAL RESPONSIBILITIES - addresses additional, more specific considerations of professional responsibility

3. PROFESSIONAL LEADERSHIP PRINCIPLES - guides individuals who have a leadership role, whether in the workplace or in a volunteer professional capacity

4. COMPLIANCE WITH THE CODE.

ACM Section 1

1.1 Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing

1.2 Avoid harm

1.3 Be honest and trustworthy.

1.4 Be fair and take action not to discriminate.

1.5 Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.

1.6 Respect privacy.

1.7 Honor confidentiality.

ACM Section 2

2.1 Strive to achieve high quality in both the processes and products of professional work.

2.2 Maintain high standards of professional competence, conduct, and ethical practice.

2.3 Know and respect existing rules pertaining to professional work.

2.4 Accept and provide appropriate professional review.

2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.

2.6 Perform work only in areas of competence.

2.7 Foster public awareness and understanding of computing, related technologies, and their consequences.

2.8 Access computing and communication resources only when authorized or when compelled by the public good.

2.9 Design and implement systems that are robustly and usably secure.

IEEE

1. PUBLIC – Software engineers shall act consistently with the public interest.

2. CLIENT AND EMPLOYER – Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.

3. PRODUCT – Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.

4. JUDGMENT – Software engineers shall maintain integrity and independence in their professional judgment.

5. MANAGEMENT – Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.

6. PROFESSION – Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.

7. COLLEAGUES – Software engineers shall be fair to and supportive of their colleagues.

8. SELF – Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

Bug Free Code

The gap between practice and theory is greater in practice than in theory

- 10-12 errors per 1k LOC in critical systems -> 0.11 (~100x decrease)
- 20x cost increase (~$3800 per LOC)
- Modern ease of updates

You will write code containing a critical security vulnerability

https://www.nasa.gov/history/sts1/pages/computer.html

Vulnerability Disclosure

- Bug Bounty: private, pubic, mediated
- Disclosure best practices
- Receiving a disclosure
- "Patch Tuesday" -> "Exploit Wednesday"

Ethical implications of your project