Software Engineering Ethics

Jin L.C. Guo

Ethics

- Definition: Moral principles that govern a person's behaviour or the conducting of an activity.

"The most important thing is life, but the good life."

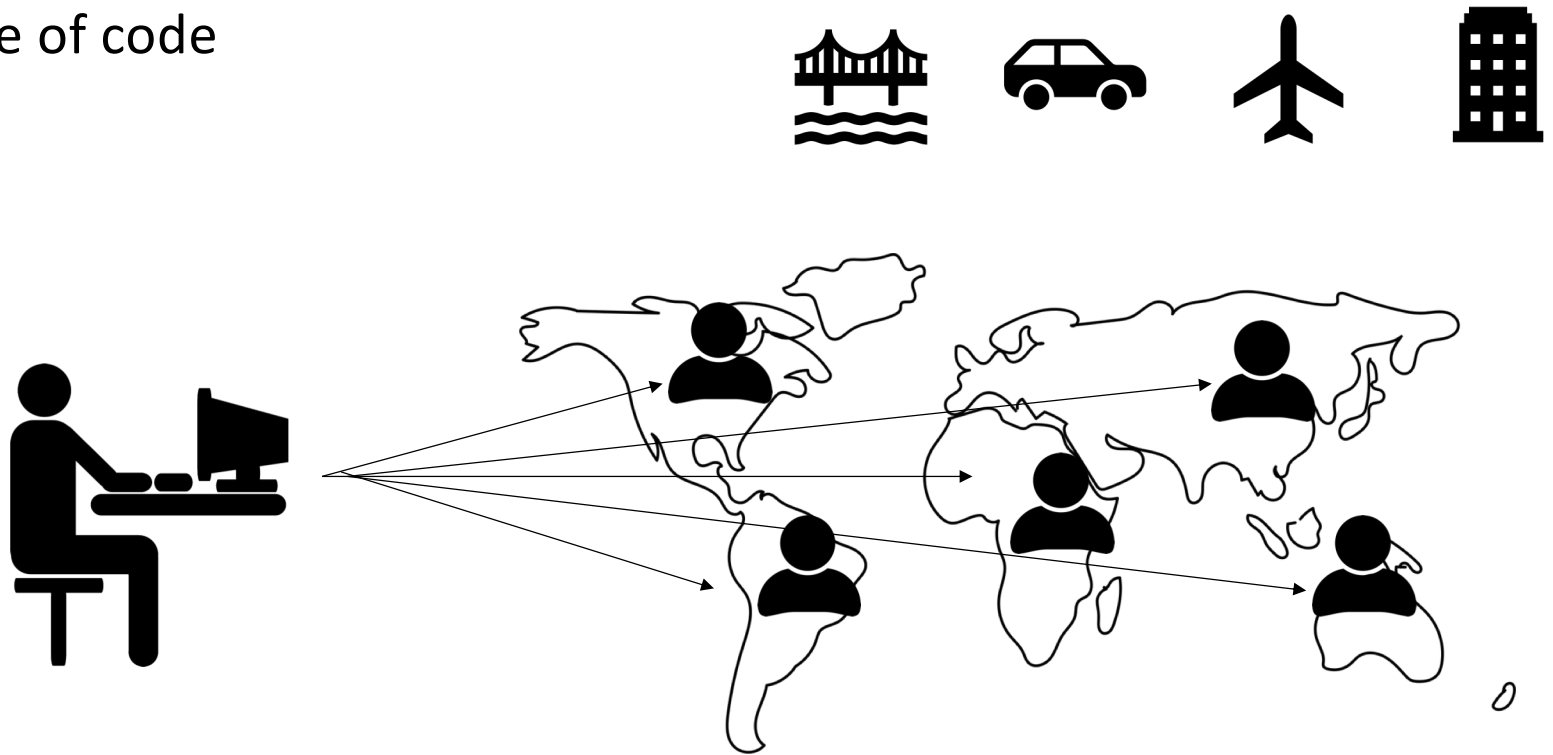— **Socrates**

Engineering Ethics

Quebec Bridge

In August 1907, the bridge collapsed suddenly. Seventy five workers were killed in the accident, and there were only 11 survivors from the workers on the span.
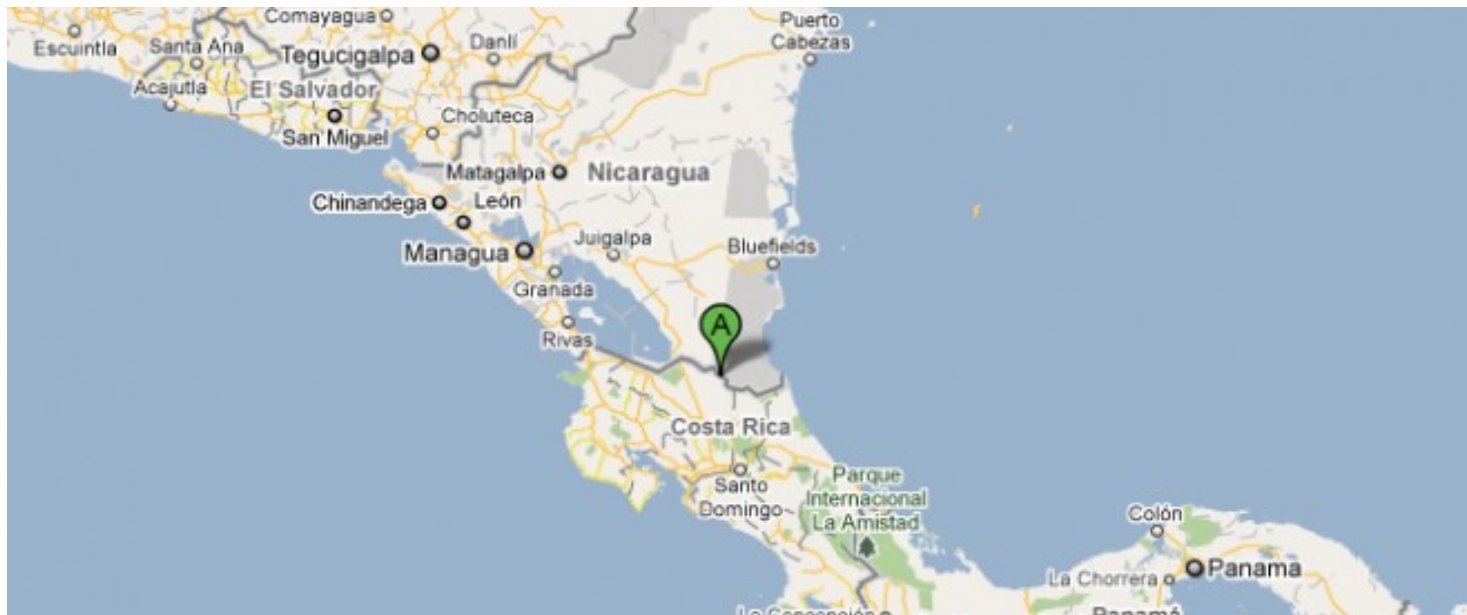
Software Engineer Ethics

- Build line of code

Nicaragua to keep troops in disputed territory after Google Maps error

Ethical Obligations of Software Engineers

- Personal level

    Take full responsibility for our moral choices and their consequences

- Professional level

    What does integrity look like in a software engineer?
    What sort of specific coding practices demonstrate integrity, or a lack of it?

Case Study 1:

- Karen

- Lives with an incredibly hectic and stressful schedule

- Using an App Errand Whiz

App Errand Whiz

- Merges information from to-do list, retail stores, and GPS software

- Produce the most efficient map and directions for running errands on a given day

- To accomplish this, the app aggregates information about
  - where Karen lives and shops,
  - what she typically buys in each store,
  - how much she buys,
  - what she typically pays for each item.

- This collected data is stored on a separate server that the app links to when it needs to create a shopping map.

- The app encourages users to log in via Facebook, as the developers have made a deal with Facebook to sell this data to third-party advertisers, for the purpose of targeting Facebook ads to Karen and her friends.

Questions

1. In what ways could Karen potentially be harmed by this app, depending on how it is designed and how her shopping data is handled and used

2. Which if any of these harms could result from ethical failings on the part of the people who developed Errand Whiz? How, specifically?

3. What actions could the people behind Errand Whiz take to prevent these harms? Are they ethically obligated to prevent them? Why or why not?

Doing good

- What things can excellent Software Engineers contribute to the good life?

- What kinds of character traits, qualities, behaviors and/or habits do you think mark the kinds of people who tend to contribute most in these ways?

Dilemmas

"Mission impossible"
being asked to create or accept a product schedule that is clearly impossible to meet

"Mea Culpa"
delivering products without key functionality or with known defects

"Rush Jobs"
delivering products of subpar quality to meet schedule pressures

"Red Lies"
telling clients or management known falsehoods about product schedule or performance

"Fictionware"
promising features that are infeasible

"Nondiligence"
inadequate review of requests for proposals, contracts or specifications

Brian Berenbach and Manfred Broy (2009), "Professional and Ethical Dilemmas in Software Engineering," Computer, 42:1, 74-80.

Case Study 2

- Case and Question 1 on Google Form

Question 2

- Who were the various **stakeholders** whose interests were ethically significant here? What were the interests of each stakeholder? Whose interests should have taken precedence in the minds of the relevant actors, and why?

Question 3

- Who at LifeDesign had the power to prevent this outcome? The sales manager? The design team manager? The manager of the software group? The individual members of that group? The quality-assurance team? The CEO?

Question 4

- Put yourselves in the shoes of the software engineers employed on this project. How the outcome of this case would affect you, personally and professionally.

- How would you feel about your friends, family, neighbors and mentors learning that you were involved in the scandal, and that your work was implicated in the suffering and deaths of many innocent people?

- What would you say to them to explain yourself? Would any explanation be adequate?

ACM/IEEE-CS Software Engineering Code

- For anyone that is a member of the software engineering profession

Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession. In accordance with their commitment to the health, safety and welfare of the public, software engineers shall adhere to the Eight Principles.

https://ethics.acm.org/code-of-ethics/software-engineering-code/

PUBLIC

Software engineers shall act consistently with the public interest.

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.

PRODUCT

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

JUDGMENT

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

MANAGEMENT

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

PROFESSION

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

COLLEAGUES

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

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.

Acknowledgement

- This module is adapted from "An Introduction to Software Engineering Ethics" by the Markkula Center for Applied Ethics at Santa Clara University with permission.