Ethics

18-849b Dependable Embedded Systems

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Required Reading:

Best Tutorial: Software Engineering Code of Ethics

Authoritative Books: Socrates and on, take a philosophy class

Carnegie Mellon

Overview: Ethics

- **Introduction**
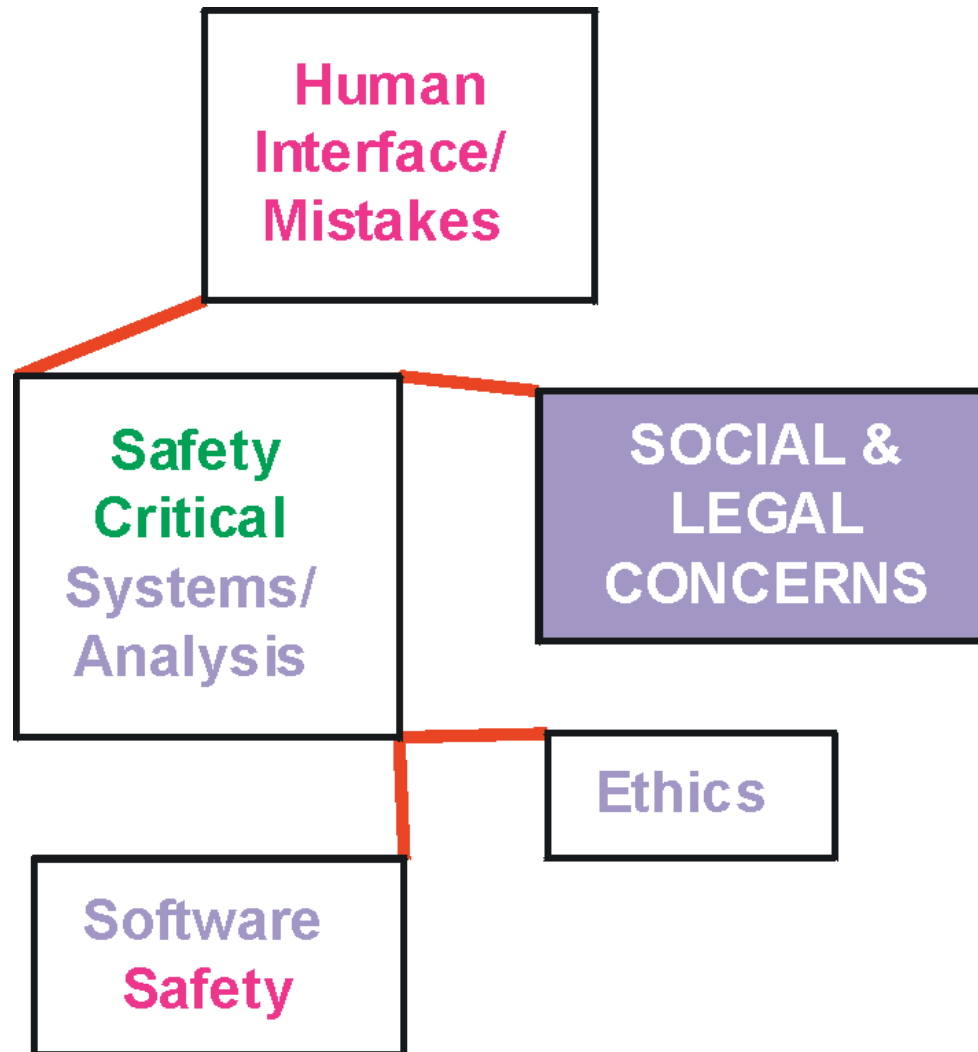 - Clusters it belongs to
- **Key concepts**
  - No right or wrong answers --- "The Right Thing"
  - ethics is NOT process
  - socially and culture based
- **Relationship to other topics**
  - List "surrounding" topics
- **Conclusions & future work**

YOU ARE HERE MAP

Description of Ethics

◆ **Ethics is all about doing the right thing**

◆ **What is the "right" thing?**

◆ **Ethics is always interesting in the gray arrays, usually not simple answers**

  • there are always the obvious rights and wrongs

◆ **Definition: Ethics are a personal code of behavior. They represent an ideal we strive toward because we presume that to achieve ethical behavior is appropriate, honorable, and desirable --- both on a personal level and within the groups we belong to. (Dakin)**

Ethics Description

- Ethics requires accountability. For the religiously inclined, accountability to God. For the irreligious, accountability to society.

- To every man is given the key to the gates of heaven, the same key opens the gates of hell (Buddhist religious saying)

- Professional societies encourage the view of ethics as responsibility of their members to better society

- People must be ethical and companies must be ethical it make the right choices

The Right Thing

◆ **Example:**

- You're in charge of the software for a satellite delivery system (something like the Arian-5) The software checks out fine, but it's raining out and it looks like it might have lightning. The person in charge of weather OK's the flight. Should you make something up to stop it?

- (You go for launch and the satellite gets struck by lightning!)

Ethics is NOT process

◆ **How to destroy a Space Shuttle (and lose 7 astronauts)**

◆ **Complex process and mechanisms in place to launch shuttle**

- engineers have to prove to management shuttle is safe to launch
- How did Challenger happen then?
- Role reversal --- engineers trying to prove to managers that shuttle shouldn't launch!

◆ **Ethics is personal responsibility**
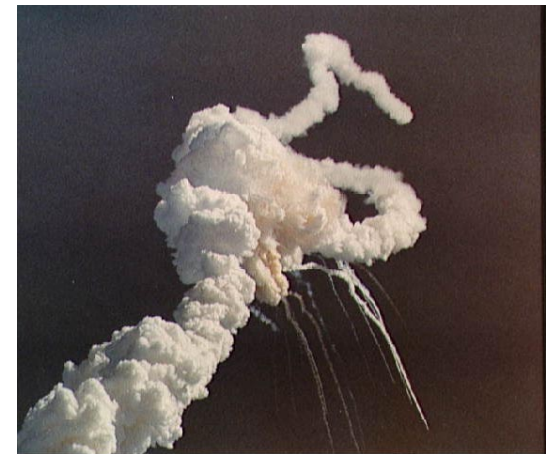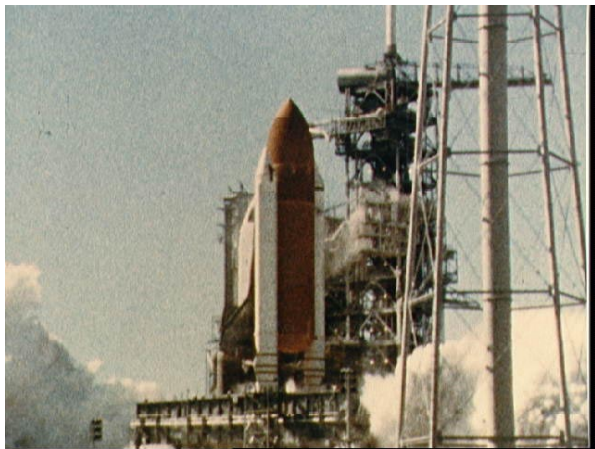
Comparison of professional codes

- **IEEE code of ethics short to the point**
  - mostly broad points
  - no in-depth discussion
- **ACM code of ethics is long**
  - also very contradictory
  - obey the law, unless you don't feel the need?
- **Software Engineering code of ethics most reasonable**
  - has real recommendations
  - very practical
  - not contradictory
- **most codes have rules/recommendations that are "common sense"**
- **emphasize responsibility to public good**

Tools / Techniques

- **Codes of Ethics**
  - IEEE Code of Ethics
  - ACM Code of Conduct
  - Most other professional societies

- **Professional licensing bodies have ethics rules**

- **IEEE has an ethics board you can ask, (and in theory get to defend you against your employer)**

- **Your company may have an ethics line you can call**

Metrics

- **Engineers not so bad after all:**
  - Immediate deaths proven related to the Love Canal 1978 - 0
  - Immediate deaths proven related to Three Mile Island 1979 - 0
  - Immediate deaths proven related to Bhopal 1984 - 2,000
  - Immediate deaths proven related to Chernobyl 1986 - 31

- **Mother Nature is what will get you:**
  - Immediate deaths related to cyclone over Bangladesh May 1985 - 10,000
  - Immediate deaths related to Mexico City Earthquake September 1985 - 10,000
  - Immediate deaths related to Armero Columbia volcanic eruption November 1985 - 20,000

- **("Engineering in Search of Ethics" M. N. Maxey 1993)**

Relationship To Other Topic Areas

- **Safety Critical Systems**
  - Any system that has lives depending on it should be made by ethical people
  - also needs ethical organizations
  - engineers making SC systems need to be sensitized to these issues

- **Business Processes**
  - businesses can either support or deter ethical conduct
  - business processes cannot replace ethical conduct

- **Social and Legal**
  - hopefully, acting ethically will prevent acting illegally
  - ethics are socially determined
  - ethics are demanded by society
  - culture is an issue in ethical behavior, what about hacker culture?

Conclusions & Future Work

- ◆ **Ethics is your personal responsibility**
- ◆ **Companies must be responsible and therefore ethical too**
- ◆ **Process does not absolve you of your responsibility**
- ◆ **If you're going to fight your employer over ethics, hope for the whistle-blower law for protection**
- ◆ **Mostly honesty and responsible actions**
- ◆ **More than just public good, I think**
- ◆ **IEEE will not defend you**

Papers

- **Do you want an airbag in your car?**

- **Software developers are just morally depraved**
  - they steal stuff

- **Would you have launched**
  - very expensive satellite loss, oh well…