

Calendar and Readings (week of April 4)

If you did not fill out a section questionnaire on Monday (we got only 165 in comparison to 202 registered students), please fill one out and turn it in by the end of today's class. Anyone who has not turned in a form will be placed in a section only if there is space available. Section assignments will be mailed out by midnight tonight. Your response paper (see Handout #3) is due to your section leader by noon tomorrow.

Monday, April 4

On Monday, I will introduce the topic of the risks of failure in complex systems, which is the topic area for the first paper (the paper assignment goes out that day). I will begin with an overview of Charles Perrow's idea of *normal accidents* (see the excerpts in the reader beginning on page 53) and then particularize the discussion to consider how those ideas are manifest in the process of software development, concentrating on the example of the Therac-25 case presented in the analysis by Leveson and Turner (page 84).

Reading: The articles in Part 3 of the reader.

Study questions:

- The fundamental message in Perrow's *Normal Accidents* is that the chance of massive, unpredictable failure increases with complexity and interconnectedness. What aspects of software development make it particularly susceptible to this type of failure?
- What does Fred Brooks mean by his identification of *essential* and *accidental* difficulties? When you consider your experience in writing programs, to what extent do you feel the difficulties of the programming process arises from each of these categories?
- The technical details of the software failures implicated in the Therac-25 accidents are often difficult to understand, even for people with a passing knowledge of computer science and programming. What parts of the discussion generated the most confusion in your own reading? What questions do you still have? How might you present the central software-related findings to a lay audience with no understanding of programming so that they would gain at least some understanding of the basic ideas? When you compare the two accounts, do you think Jacky succeeds in reaching that audience?

Wednesday, April 6

On Wednesday, I will present an overview of classical ethics focusing on two major philosophical perspectives:

1. *Consequentialist theories.* Consequentialist theories, which are typified by the doctrine of utilitarianism defined by Jeremy Bentham and John Stuart Mill, judge the ethics of an action primarily by evaluating the overall effect of that action.

2. *Deontological theories.* Deontological theories, such as those described in Kant’s *Metaphysics of Morals*, assess the ethics of an action based on its intrinsic character of the action itself, independent of its consequences.

Reading: Part 4 of the reader.

Thought questions:

- Scientists and engineers are often skeptical of philosophical arguments of the sort we will discuss in class. In most cases, it is easy to find counterexamples to philosophical principles, which is certainly the case for the deontological and consequentialist theories of ethics. In the hard sciences, counterexamples invalidate a theory. Why might the situation be different in philosophy?
- Which of the two broad categories of ethics—consequentialism and deontological theories—do you think comes closest to explaining your own ethical decision-making process?
- In its local manifestation as the split between “techies” and “fuzzies,” the two-cultures problem described by C. P. Snow seems to be more pronounced at Stanford than it is at most universities. What specific factors might contribute to the intensity of this cultural split here at Stanford?
- How does Ursula Le Guin’s short story relate to these ethical theories?

Reaction paper assignment

On the first day of class, I asked whether any of you wanted to share ethical decisions you have faced in your own life. I got a few responses, and then observed that almost all of you have certainly faced (or simply not thought about) the question of downloading music, films, software, and other proprietary works. For this week’s reaction paper, I want you to send your TA a one-to-two page message (length guidelines are at best approximate for something that isn’t printed and double-spaced) in which you

1. Describe briefly the position you take (or would want to take) with respect to this activity. We won’t care at all what position you choose. You can argue that you’re hoping to be the next J. K. Rowling and would be incensed if your novels were freely available. At the other end of the spectrum, you could argue that all content should be free and that everyone has a civic duty to promote that idea by downloading even protected content, essentially as an act of civil disobedience.
2. Given the personal ethic that you have staked out in part 1, write a couple of paragraphs that outline how that ethical position fits into the frameworks proposed by Kant and Mill. It’s great if you can include in your paragraphs some quotations from the readings, but that isn’t strictly necessary. What you do need to do is convince your TA that you’ve read the material.