# Week 4

# Remainder of the quarter

- Week 5: Final Hardin Papers Due.
- Week 6: 0th Draft of Team Paper Due.
- Week 7: First Draft of ECS Paper Due => Conferences.
- Week 8: Nothing (Conferences continued).
- Week 9: Final Draft of ECS Paper Due.
- Week 10: Team Project Presentation.
- Finals Week - Monday: Team Project Final Paper Due.

# Simplicity

- Read the paper by William Zinsser.

# Reason for Brevity

- More effective.
- More understandable.
- Allows more time to convey more information.

# Common Places of Extraneous Fluff

- Unnecessary details.
  - Constant repetition / redundancy.
  - Irrelevent statistics / examples / information.
- Source dumping.
  - When not processing your topic, this becomes common.
- Others:
  - Trying to use large vocabulary.
  - Using passive voice.

# Goal

- Every sentence should feel relevant and have a purpose toward your point.

# Examples

1. Vigorous writing is concise.
2. The Ford Pinto was a vehicle that was built in the 1970s and into part of the 80s, that was designed to be competitive in the marketplace.
3. I never make predictions, especially about the future.
4. The Pinto, its poor engineering, and a severe lack of rights ethics on the part of Ford were the underlying causes behind numerous deaths, injuries, and brutal burns, not to mention the destruction of the cars themselves.
5. In developing from embryo to adult, animals go through stages resembling or representing successive stages in the evolution of their remote ancestors.

# Examples (cont.)

6. The water pollution problem is getting more serious each year, and unless society is educated about the problems, they are given ways to help reverse the damage, and they act upon these ideas, we are all in a lot of trouble.
7. Joe was an honest and hard-working man. Basically, he never gave much consideration to sitting idly about, doing nothing constructive.
8. Individuals, through Hardin’s perspective, thrive on their ability to deny that what they are doing is harmful to them, even though the consequences to society as a whole are negative.

# Hardin Paper Reminders

- Problem Statement:
  - Keep in mind that your solution section of the problem statement should feel specific to your topic and solution.
- Hardin Integration:
  - Include why there is a conflict between individual and collective interest.
  - Include why a technical solution is not sufficient to solving the problem.
  - Include why mutual coercion is the preferred solution.
- Integrate your quotes/research
  - Give context to your quotes. Explain why your quotes are relevant.
  - Make sure that your research points toward your solution.
  - Without proper integration, your paragraph will feel choppy and confusing.
- First person:
  - While alright, often increases wordiness without adding meaning.

# Solutions

- Can be anything as long as it is somewhat plausible.
- Do not need solution to be in consideration or have direct examples in actuality.
    - As such, quotes are not as necessary, but should simply be to support the validity and the efficacy of your solution.
- Be specific!
    - More interest.
    - More research.
    - More understanding of topic.
    - More interesting and cool.

# Solutions (cont.)

- I mentioned this to many of you but here are just a list of things to consider:
  - Are laws / legislation the way to go? Is education the way to go? Is there a way to merge them (e.g. permits)? Is there evidence to suggest that other solutions (than legislation) work?
  - Is there a way to enforce / monitor people not to exploit the commons? This can be done through technical changes (devices) or non-technical changes (removing commons-like things about the resource).
  - Is there a way to maintain economic viability? What's the flow of money when solving this problem like? Where does money come from (taxes, punishment, donations, etc.) and where does it go (subsidies, research, hiring people, etc.)?

# ECS Paper Prompt - “Post-mortem”

- Examine, in detail, an engineering ethics case study.
- Describe the actions, as an engineer, that should be taken (should have been taken) to come to grips with the failure, utilizing one of the ethical frameworks you have learned about as a guide in influencing or determining your course of action. Describe the advantages and disadvantages of the actions you propose and provide justification using one of the ethical frameworks as a guideline in the analysis process.
- Identify an audience for your post-mortem write-up - this can be either a government regulatory agency, the company’s board of directors, etc.

# ECS Paper Topics

- Hurricane Katrina.
- BART. (whistleblowers, design failures, and minor accident)
- Kansas City Hyatt Regency. (walkways collapsing)
- Atanasoff-Berry Computer. (I heard this one is hard)
- Bjork-Shiley heart valve. (design failures)
- British Petroleum Texas City Explosion.

# Break!

Questions?

# Normative Ethics: Consequentialism

- An action is judged purely by its consequences.
- The branch we will focus on is utilitarianism.
  - An action is morally right if it results in pleasure and wrong if it results in pain.

# Jeremy Bentham

- Founder of utilitarianism.
  - Hedonism: pleasure is the only good in itself. All other “goods” are derived from pleasure.
  - Utility Principle: greatest happiness for the greatest number.
  - Moral Balance Sheets: quantifying happiness for every action.

# Criticisms

- Happiness is subjective.
- Exploitation of Minorities (Bentham’s definition)
- As a judgment technique, pushes everyone to be the same, because that maximizes pleasure.
- Ignores personal relationships.
- Even when no choice creates pleasure, there is an answer by utilitarianism.
- Difficult to apply proactively, as it works retroactively.
- Commonly abused or misused.

# John Stuart Mill

- Forms of pleasure should be qualitatively compared.
  - “Higher” desires may be more valuable than “lower” desires.
- Freedom Principle: Strive for own pleasure, up to denying others’ pleasure
  - Protecting the minority.
  - A.k.a. No harm principle

*“One is free to do what one wishes, but only to the extent that no harm is done to others.”*

# Normative Ethics: Deontology

- An *action* is morally right if it is in agreement with a *maxim*, or a moral rule (law, norm, or principle), *independent of the consequences of that action*
- Immanuel Kant
  - Duty > Happiness
  - Moral autonomy + good will (one can reason morality)
  - Formulated the Categorical Imperative
- In math words, this translates to: An action is morally right if and only if it is in accordance with a maxim that follows the categorical imperative, which means both of the following must hold:
  - Universality principle
  - Reciprocity principle

# Universality Principle

- A practical principle or proposition that prescribes some action
- Unconditionally good, serves as a general law for everyone without contradiction

*“Act only on that maxim which you can at the same time will that it should become universal law”*

# Reciprocity Principle

- A postulate of equal and universal human worth
- Respect the rational nature of humans as free, intelligent, self-directing beings

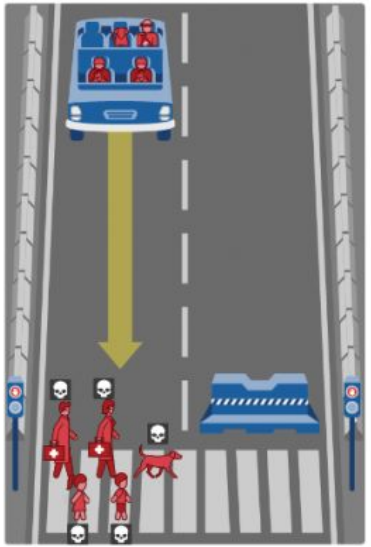
*“Act as to treat humanity, whether in your own person or in that of any other, in every case as an end, never as a means only”*

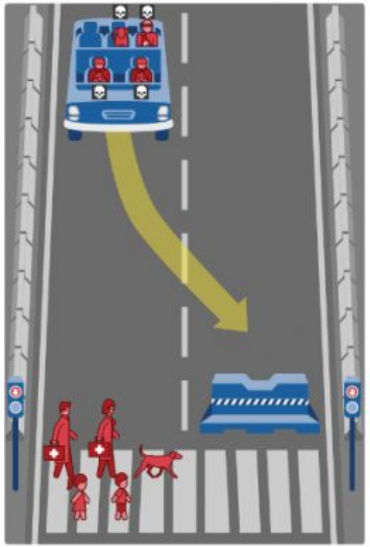
# Criticism

- Too rigid.
  - ignores extreme cases.
  - strange reciprocity cases.
- As a result, too restricted.
  - If any maxim exists that violates, then it is technically morally incorrect.
  - William David Ross: pluralistic theory of moral obligations
    - “Self-evident norm” vs. “Prima Facie Norms”

# Trolley Problem

- Is it possible to justify any course of action in this situation according to deontology?
- What does Bentham’s utilitarianism and the utility principle say about the trolley problem?
- What about John Stuart Mill’s?





# Case Study #1

Guidant, a medical device company, produced an embedded defibrillator called the VENTAK PRIZM 2 DR. The management of Guidant was aware that the defibrillator could short-circuit, causing it to either repeatedly attempt defibrillation or simply do nothing at all. Guidant did not disclose this information to its patients, and it took the death of a college student with the device for the general populace to become aware of the defect.

# Case Study #2

In the 1980s, Atomic Energy of Canada Limited manufactured the Therac-25, a radiation therapy machine. The product used software to set the dosage amount and other settings, but there were many latent programming errors that remained unfixed upon production. This led to six cases of overexposure to radiation, causing either death or severe injury to patients. The company had previously generated probabilities for errors to occur in the software, but it was later found that there were no justifications provided for the numbers.

# Case Study #3

On January 28th, 1986, the Space Shuttle Challenger took flight, but it exploded shortly after beginning its ascent. Upon further inspection, it was determined that the rubber seal of a solid rocket booster had failed, allowing for pressurized gas to leak from the joint. Notably, there was cold weather during the launch, and the seals had never been tested in temperatures below 50 degrees Fahrenheit. While the spacecraft's engineers had pointed out this risk beforehand, NASA continued with the launch anyway.

# Case Study #4

The Bay Area Rapid Transit (BART) is a transportation system in Northern California. During its original construction, the BART was running behind schedule and over budget. At one point, three engineers working on the project alerted their supervisors of shoddy installation and testing practices. The board of directors received the complaints, but they opted to not act on them whatsoever. Instead, the members of the board sought out the employees and fired them. A month after the official opening of the BART, a train on the Fremont route experienced a technological malfunction, causing it to derail. Several individuals were injured in the resulting crash.

# Team Time!