

# CS 3001 Notes

*CS Ethics Notes Based On Lectures/Lecture Slides*

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## 1. Therac-25

Definition 1.1

The **therac-25** was a linear accelerator created to treat cancer with radiation therapy

The therac-25 was an all new version of earlier therac-6 and therac-20 machines, but unlike them did not have manual overrides.

The therac-25 had malfunctions and would give too much, or too little (which could also be dangerous) radiation causing lots of harm.

### 1.1. Software Errors

Two of the therac-25's main software errors were **race conditions**.

#### Definition 1.1.1

**Race Conditions** is when a system tries to perform two operations at very similar times but because of the nature of the system, the operations have to be done in specific manner for it to work correctly.

One race condition was with the system acting on old information that had been changed to new information while the computer wasn't checking the values.

### 1.2. Design Flaws

Design process flaws by reusing older code designed to work with a system that had manual overrides and locks.

- So the flows were system flaws, not only software errors

The system was not designed with being fail safe in mind

### 1.3. Moral Responsibility

In order for a moral agent to be responsible for a harmful event, two conditions must hold:

- **Causal Condition:** The actions (or inactions) of agents must have caused the harm
- **Mental Condition:** The actions (or inactions) of agents must have been intended or willed by the agent\*

\*This also includes unintended harm if it came from carelessness or negligence

## 2. Utilitarianism

#### Theorem 2.1

In utilitarianism, an action is good if the benefits exceed its harms, and an action is bad if its harms exceed its benefits

#### Definition 2.1

**Act Utilitarianism** is the ethical theory that an action is good if the net effect (over anyone and everyone who is affected) is to produce more happiness than unhappiness

**Case For:**

- It focuses on happiness
- It is practical
- It is generally comprehensive

**Case Against:**

- Where to draw line in calculations? How bad is too bad if the end justifies the means?
- Takes a lot of time for each moral calculation
- Ignores innate sense of

### Definition 2.2

**Rule Utilitarianism** is the ethical theory that holds that we ought to adopt those moral rules that, if followed by everyone, lead to the greatest increase in total happiness over all affected parties

A *rule utilitarian* chooses to follow a moral rule because its universal adoption would result in the greatest net increase in happiness. *This differs from kantianism because a rule utilitarian is still concerned with the consequences and not the motive.*

#### Case For:

- Not every moral decision requires performing utilitarian calculus
- Exceptional situations don't overthrow moral rules
- Reduces problem of **bias**(?)
  - idk what this means

#### Case Against:

- It forces us to use a single scale or measure to evaluate completely different kinds of consequences
- It ignores the problem of an unjust distribution of good consequences

## 3. Kantianism / Deontology

Unlike utilitarianism, Kantianism is not concerned with outcomes. Instead, the motive for why you did certain actions is more important.

### 3.1. Duties

#### Definition 3.1.1

**Perfect duties** are duties we are obligated to fulfill in every instance. **Imperfect duties** we are obligated to fulfill in general but not in every instance.

### 3.2. Imperatives

An **imperative** is a way in which reason commands will.

#### Definition 3.2.1

A **hypothetical imperative** is a conditional rule of the form "If you want X then do Y" A **categorical imperative** is an unconditional rule: a rule that always applies, regardless of circumstance. For Kant, only a categorical imperative can be a moral imperative.

Both of the *main two categorical imperatives* should be held for an act to be considered morally right.

1. Act only from moral rules that you can at the same time will to be universal laws
2. Act so that you always treat both yourself and other people as ends in themselves, and never only as a means to an end

#### The Case For:

- It treats all persons as moral equals
- It gives all persons moral worth by considering them rational, autonomous beings
- Everyone is held to the same standard
- Kantianism produces universal moral guidelines

#### The Case Against:

- Sometimes no single rule can fully characterize an action
- Sometimes there is no way to resolve a conflict between rules
- Kantianism allows no exceptions to perfect duties

## 4. Social Contract

### 4.1. Hobbes' Beliefs

Man is inherently *evil*. In order to avoid man's evil state of nature, rational people understand that some sort of social cooperation is only possible when people mutually agree to follow certain guidelines.

He basically said without rules and reinforcement, people would not create anything of value and instead attack and defend from others until they die.

#### Theorem 4.1.1

This leads to a **social contract** - the view that persons' moral and/or political obligations are dependent upon a contract or agreement among them to form the society in which they live.

### 4.2. Social Contract Theory

#### Theorem 4.2.1

Hobbes argues that everyone in society has implicitly agreed to two things:

1. The establishment of a set of moral rules to govern relations among citizens
2. A government capable of enforcing these rules

Hobbes believes that the morals derived from natural law do not permit individuals to challenge the laws of the sovereign, meaning that you cannot disobey the laws of the government.

All morally significant beings have certain rights such as the right to life, liberty, and property.

Living in a civil society gives a person moral quality they would not have otherwise

### 4.3. Rights

*Rights* can be classified according to the duties they put on others

#### Definition 4.3.1

**Negative Rights** are rights that another can guarantee by leaving you alone to exercise your right.

- Right of free speech
- Right to be safe
- Right to move around

**Positive Right** - a right that obligates others to do something on your behalf (guarantee of an action)

- Right to free education
- Community and national security

**Absolute Right** - guaranteed without exception **Limited Right** - may/can be restricted

### 4.4. Rawls's Theory of Justice

Rawls notes that both cooperative and competitive behavior can be found in every society. The former because social cooperation produces more benefits than a situation in which individuals are completely on their own. The former because it is important how the benefits are divided among society.

To be well ordered, a society must establish the rights of its members and also determine a just way of distributing both the benefits and burdens of social cooperation

Theorem 4.4.1

**Rawl's Principles of Justice**

1. Each person may claim a "fully adequate" number of basic rights and liberties, such as freedom of thought and speech, the right to be safe from harm, etc so long as these claims are consistent with everyone else having a claim to the same right and liberties
2. Any social and economic inequalities must satisfy two conditions: first, they are associated with positions in society that everyone has a fair and equal opportunity to assume, and second they are "to be to the greatest benefit of the least-advantaged members of society"

Definition 4.4.1

**Difference principle:** societal and economic inequalities must be justified, which can only be done by showing that its overall effect is to benefit least advantaged members of society

**The Case For:**

- It is framed in the language of rights
  - The cultures of many modern countries **FINISH REST OF SOCIAL CONTRACT**
- It is based on a solid understanding of human nature, recognizing that rational people act out of self-interest in the absence of a common agreement
- It explains why under certain circumstances civil disobedience can be the morally right decision

**The Case Against:**

- None of us signed the social contract
- Some actions can be characterized in multiple ways

**How do the philosophies compare? Reason for making a rule:**

- **Utilitarianism:** it causes the greatest happiness for the most people
- **Kantianism:** it could be universalized for all people
- **Social contract theory:** rational people would collectively accept it as binding because of its benefits to the community

## 5. Stakeholder Analysis

Definition 5.1

**Stakeholders** are interested parties: people or entities that will be affected in a given situation

Make a list of all the stakeholders involved, and try to balance the positive and negative impact on people.

This is not an ethical theory, but it is a *useful way of looking at things*.

## 6. Kohlberg's Stages of Moral Development

### 6.1. Stages 1 & 2

Egocentric understanding of fairness based on individual need (kids)

1. Obedience and punishment orientation
2. Self interest orientation

### 6.2. Stages 3 & 4

Shared concept of fairness based in societal agreement

1. Interpersonal accord and conformity (good boy/girl attitude)
2. Authority and social-order maintaining (law and order morality)

### 6.3. Stage 5 & 6

Free standing logic of equality and reciprocity

1. Social Contract Orientation
2. Universal Ethical Principles (Kant)

## 7. Virtue Ethics

**Virtue ethics** can address the questions of how one should live, what kind of person one should become, and even what one should do in certain scenarios. Would a good person perform this action under this virtue? According to Aristotle, happiness derives from living a life of virtue.

In general, the other perspectives tend to not account for emotion and social relationships.

#### Definition 7.1

**Virtues:** behaviors showing high standards. The qualities or states of character that find expression in morally good actions and morally good purposes.

**Intellectual Virtues** - virtues associated with reasoning and truth

**Moral Virtues** - habits or dispositions formed through the repetition of relevant virtuous actions. *A deep seated character trait.* Not simple just a disposition to act a certain way but also to *feel* that way.

#### Definition 7.2

**Vices:** the opposite from virtues. A vice is a character trait that prevents a human being from flourishing or being truly happy

Usually, there are two vices for every virtue, because one corresponds to excess and the other corresponds to a deficiency.

Ex: Rashness ← Courage → Cowardice

#### Note 7.1

Virtue ethics pays particular attention to the agent as well as the action and the consequences of the action. This touches on social contract theory, utilitarianism, and Kantianism. *A good person does the right thing at the right time for the right reason.*

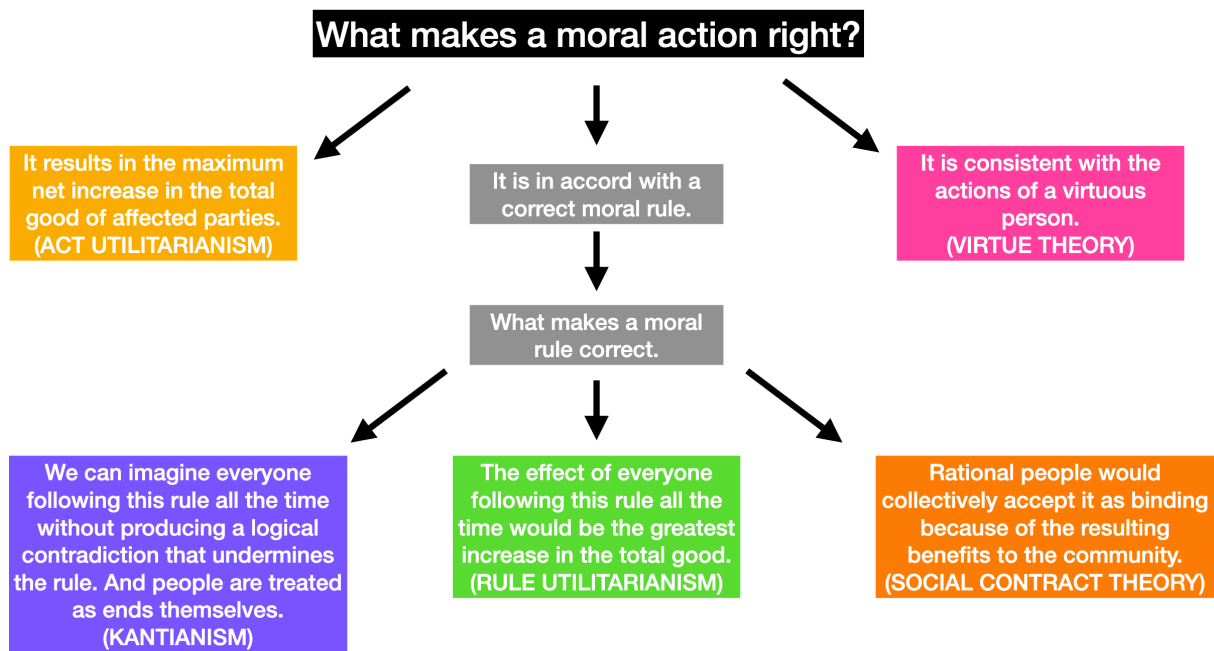
Also, according to virtue ethics, moral decision making cannot be reduced to the routine application of a set of rules. Basically, moral wisdom or discernment takes precedence over any rule.

#### Pros

- In many situations it makes more sense to focus on virtues than on obligations or rights
- Personal relationships can be morally relevant to decision making
- There are no irresolvable moral dilemmas
- Recognizes the importance of having a say in living a moral life

#### Cons

- Different people may have quite different conceptions of what human flourishing is
- Virtue ethics cannot be used to guide government policy
- Undermines attempts to hold people responsible for their bad actions



## 7.1. Censorship

Censorship is the attempt to suppress or regulate public access to material considered offensive or harmful.

### Direct Censorship

- **Government monopolization** - government owns TV stations, radio, and newspapers. This has become harder due to the internet.
- **Prepublication review** - most governments have laws restricting the publication of information that harm national security
- **Licensing and Registration** - begins as a means to control media with limited network bandwidth (radio station)
  - However, controlling bodies such as FCC also censor or ban content on platforms wishing to obtain licenses

### Self Censorship

- A group deciding for itself not to publish content for whatever reason.

### Challenges posted by the internet

1. Unlike traditional 1-many media, the internet supports many to many communications
2. The internet is dynamic
3. The internet is huge
4. The internet is global
5. It is hard to distinguish between children and adults on the internet

## 7.2. Mill's Principle of Harm

However, a lack of government censorship can also lead to harm.

Definition 7.2.1

**Principle of Harm:** the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others.

Basically, the government should not get involved in the private activities of individuals, even if the individuals are doing something that harm themselves (only if it harms others)

### 7.3. Freedom of Expression

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for redress of grievances

Note 7.3.1

Freedom of expression is not an absolute right.

Protection is not given to “libel, reckless or calculated lies, slander, misrepresentation, perjury, false advertising, obscenity and profanity, solicitation of crime, and personal abuse or fighting words”

A **web filter** is a piece of software that prevents certain Web pages from being displayed in your browser.

**CIPA** - Child Internet Protection Act

- Ruled that autopornography filters do not violate the First Amendment

## 8. How to Argue?

### Classical Structure

Introduction → Presentation of writer’s position → Summary of Opposing views → response to opposing views → conclusion

### 8.1. Classical Appeals

Definition 8.1.1

**Logos:** appear to logic, focuses attention on the quality of the message, the clarity of the argument itself and the logic of its reasons and supports

Definition 8.1.2

**Ethos:** focuses on the writer’s character of credibility. This can come through the professionalism of the paper, the expert reputation of the author, the *appeal from credibility*

Definition 8.1.3

**Pathos:** focuses on the values of the intended audience, *appeal to their emotions*

### 8.2. When to use which?

#### Logos

- Articles in scholarly journals
- Legal briefs and court descriptions
- Visual arguments (unbiased graphs/charts, etc)

#### Ethos



- Using speeches from well respected experts
- Newspaper editorials from experts
- First hand account from expert

### Pathos

- Blogs/Message Boards
- Personal stories
- Visual Arguments (political cartoons, photographs)
- Public affairs advocacy advertisements

## 9. Professional Ethics

### Definition 9.1

**Professional ethics** refers to the moral principles that govern the behavior of individuals in a professional context.

### How are Professional Ethics Different?

- Customers don't know the domain, so they rely on the honesty, knowledge, and expertise of the professional
- Professionals' products affect lots of people
  - People affected may be connected indirectly
  - Didn't have a chance to choose the professional
- Special responsibility not just to the customer, but to the public

### 9.1. ACM Code of Ethics

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
3. **Product** - Software Engineers shall ensure that their products meet the highest possible standards possible
4. **Judgement** - Software Engineers shall maintain integrity and independence in a professional Judgement
5. **Management** - leaders shall subscribe to and promote an ethical approach to software development and maintenance
6. **Profession** - Software Engineers shall advance the integrity and reputation of the profession consistent with 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 profession

### Definition 9.1.1

**Exclusive Responsibility:** "I am responsible for paying this bill" **Not exclusive:** "My boss is responsible for this, and so am I" Moral responsibility is typically not exclusive

When the public can trust the competence and integrity of the members of a profession, every one of its members benefit. Thus, professionals have a stake in ensuring that fellow members of profession are capable and act properly.

Especially because software engineers don't have formal certification and licensing, it is important that they act professional and take professional responsibility to develop their ethical decision making skills.

## 10. Privacy

### What is Privacy?

- Freedom from intrusion
- Control of information about oneself
- Freedom from surveillance

### 10.1. Free Market View

#### Theorem 10.1.1

From the free market view, you can choose how much information you want to exchange and if you don't like a company's privacy practices, don't do business with them.

### 10.2. Consumer Protection View

#### Theorem 10.2.1

Privacy is a positive right, and you can't negotiate terms with a business even if you wanted. Often, customers have few to no alternatives.

Furthermore, people couldn't read privacy policies even if they tried because the reading level is too high and it would take too much time.

#### Benefits of Privacy

- Lets people be themselves (you act differently if someone is watching you)
- Lets us remove our "public persona"
- Important for one's individuality and freedom

#### Harms of Privacy

- Difficulty to stop family violence
- Allows for easier coverup of illegal or immoral actions

Privacy is a **prudential right** (a right stemming from sound judgement/practical wisdom)

- Rational agents recognize some privacy rights because granting these is of overall benefit to society

#### How do computers change privacy?

- Computers add to the ease of collecting, searching, cross referencing personal info
- Makes it easier to use information for secondary purposes
  - Basically reasons other than why we collected it
  - Can be combined with other info
- Laws written don't adapt well to new technologies

## 11. Intellectual Property

#### Definition 11.1

**Intellectual property** refers to creations of the mind: inventions, literary works, names and images used in commerce, etc.

A **trade secret** is a confidential piece of intellectual property that protects a company with a competitive advantage, such as formulas, processes, and other information. In order to maintain its rights to a trade secret, a company must take active measures to keep it from being discovered.

Trade secrets don't make sense for example for movies, since you wouldn't want a movie to be confidential.

A **trademark** is a word, symbol, picture, sound, or color used by a business to identify goods. A **service mark** is a mark identifying a service.

A **patent** is how the US government provides IP for a limited period of time to creators of machines, systems and other inventions. A patent is quite different from a trade secret because a patent is a public document that provides a detailed description of the invention.

After 20 years, anyone can make use of its ideas.

A **copyright** is how the US government provides authors with certain rights to original works they have written.

*Rights*

1. The right to reproduce the copyright work
2. The right to distribute copies of the work to the public
3. The right to display copies of the work in public
4. The right to perform in public
5. The right to produce new works derived from the copyrighted work

Copyright owners have the right to authorize others to exercise these rights with respect to their works

## 12. Networked Communications

### 12.1. Spam

The rise of spam corresponded with the transformation of the Internet from a noncommercial academic and research enterprise into a commercial global network.

The volume of spam grew because spam is effective. The principal advantage of spam is its low cost compared to other forms of advertising.

#### Definition 12.1.1

**Botnets:** huge networks of compromised computers controlled by “bot herders”. Bot herders create botnets by launching programs that search the internet for computer w/bad security and install software bots that send emails.

### 12.2. Political Impact of Social Media and Online Advertising

## 13. Internal Realism

- How do we know there is a desk here?
  - We are all trapped in our subjective perceptions of the world around us, but our subjective perceptions oddly agree

## 14. Evidentialism

#### Definition 14.1

**Evidentialism:** all beliefs must be supported by evidence

- Some beliefs are basic and justified, such as things you learn through a reliable sense

## 15. Reliabilism

#### Definition 15.1

**Reliabilism:** a belief is reliable if it is the result of a reliable cognitive process.

- A *reliable* process is one that generally leads to the correct outcomes