CS 4001: Computing, Society & Professionalism

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Week 8: Midterm Review
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Ethics

Therac 25: What Happened

- Between June 1985 and January 1987, 6 known accidents involving massive overdoses, causing death & serious injury
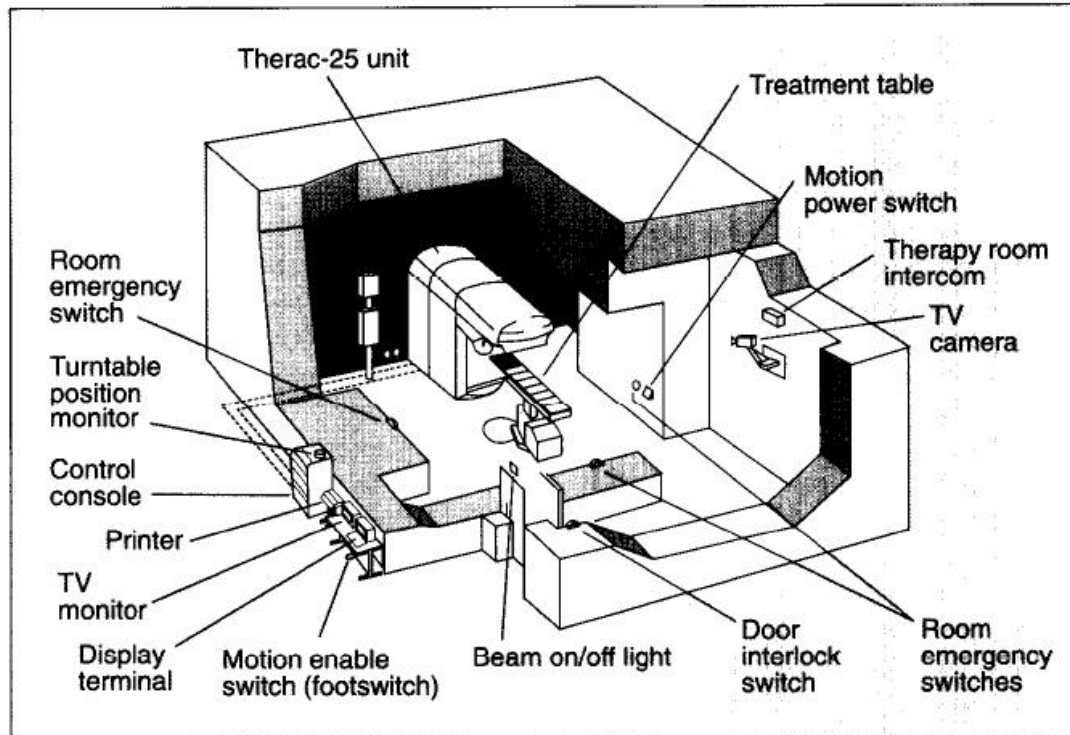

Figure 1. Typical Therac-25 facility.

Example Bugs

- Data Entry Bug
  - Setting the bending magnets takes 8 seconds
  - "Delay" subroutine uses shared memory with the data entry subroutine
  - So data changes within 8 seconds will be wiped out when Delay exits!
  - Causes bugs that only show up with proficient users who do data entry in <8 seconds

- Set-Up Test Bug
  - On every 256th pass through Set-Up (one-byte counter), the upper collimator is not checked
  - Problem if operator hits "set" exactly when counter rolls over to 0

- These kinds of bugs are notoriously difficult to track down

Lessons: General

- Focusing on particular software bugs is not the way to make a safe system
  - Assumption that fixing one error would prevent further accidents
  - **"There is always another software bug"**

- It is a bad idea to remove *independent hardware interlocks*, and to believe too much in software
  - Assume software will fail, and handle that properly, rather than trying to write "perfect" software

- Don't believe in numerical claims
  - "Risk assessment can be like the captured spy: if you torture it long enough, it will tell you anything you want to know"

- Record the reasons for design decisions (like duplicate data entry)

- Design for the worst case

- Don't enhance usability at the expense of safety

- Power of user groups to cause change when companies drag their feet

Lessons: Software Engineering

- Documentation should not be an afterthought

- Establish QA practices & standards

- Keep designs simple

- Design audit trails and logging from the beginning

- Perform extensive testing and formal analysis at the module and software level, rather than relying on system-level testing

- Software reuse?

Ethics

- Ethics is the philosophical study of morality, a rational examination into people's moral beliefs and behaviors.

  - It studies free human acts from the point of view of their moral value (their goodness or badness) in relations to a society's ultimate end

- Ethics is also termed as moral philosophy as it involves systematizing, defending, and recommending concepts of right and wrong behavior

Ethical Theories

- Formal study started with Socrates

- Ethical theories are frameworks for moral decision making

- We need ethical theories to examine moral problems behind an issue, reach conclusions, and defend those conclusions in front of a skeptical, yet open-minded audience

- Used to provide logical, persuasive justifications behind your reasoning in the case of an argument

Ethical Relativism

- It is the theory that there are no universal moral norms of right and wrong.

- That is, different individuals or groups of people can have completely opposite views of a moral problem, and both can be right

- Two kinds of ethical relativism: subjective relativism and cultural relativism

Act Utilitarianism
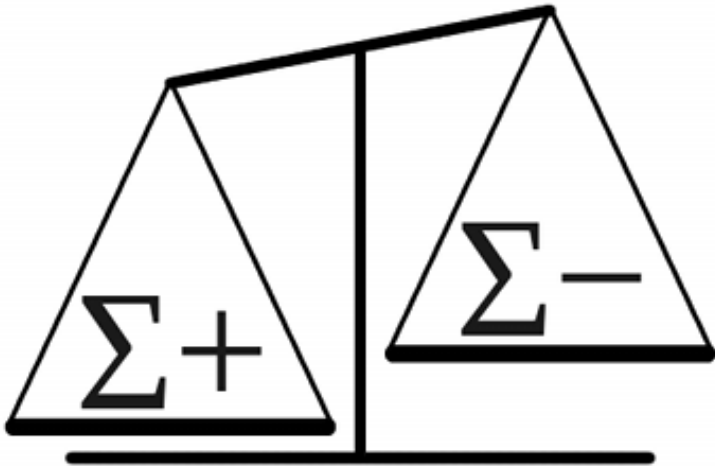
- An action is good if its benefits exceeds its harms

- An action is bad if its harms exceed its benefits

- This theory is called utilitarianism, based upon the principle of utility*, or the Greatest Happiness Principle

- * Utility is the tendency of an object to produce happiness or prevent unhappiness for an individual or a communtiy

Rule Utilitarianism

- It 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

- *Main difference with act utilitarianism:* the principle of utility is applies to mora utilities, whereas in act utilitarianism it is applied to the individual moral actions

Deontologists

- An act is right if, and only if, it conforms to the relevant moral obligation; and it is wrong if, and only if, it violates the relevant moral obligation

- They argue that the consequences of an action are irrelevant to moral evaluation

- They emphasize that the value of an action lies in motive, especially motives of obligation

Kant's Moral Theory

- Historical Background
  - Immanuel Kant (1724-1804)

- Kantianism is based on the writing of philospher Kant. He believed that people should be guided by universal moral laws. For these laws to apply to all rational humans, they must be based on reason.

- Kant said that the only thing that is good without qualification is a **good will**.

Categorical Imperative: Two Formulations

- **Act only in such a way in which the maxim of action can be rationally willed as a universal law**

- Main idea:
  - Do unto others as you would have them do unto you ("mentally reverse roles")

- It requires unconditional conformity by all rational beings, regardless of circumstances

- Is unconditional and applicable at all times

- Example of "breaking a promise" in pg. 68

Categorical Imperative: Two Formulations

- **Act so that you always treat both yourself and other people as ends in themselves and never only as a means to an end**

- Main idea:
  - Treat others as you would like to be treated
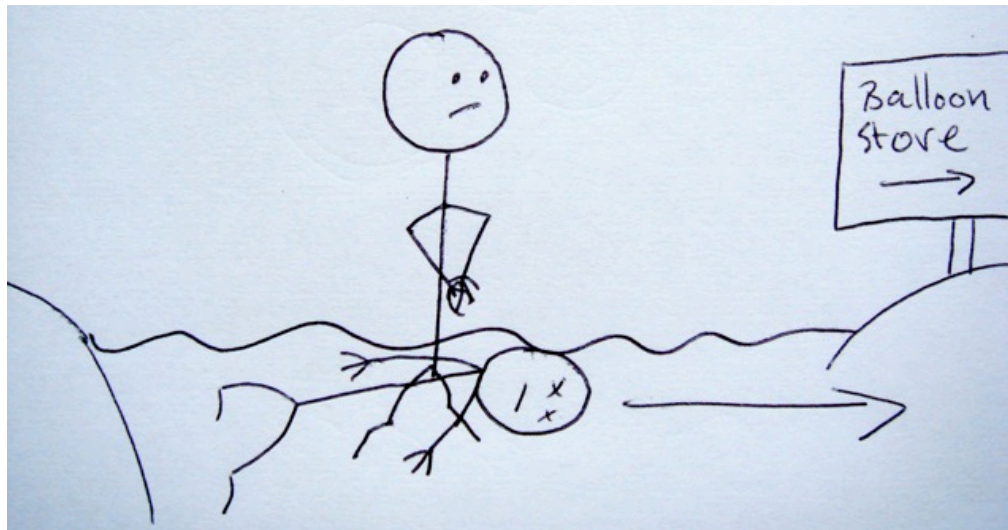
The Social Contract

Morality is the set of rules that rational people will agree to obey, for their mutual benefit, provided that other people will obey them as well.

Position of SCT

- "... parties do not know their conception of the good or their special psychological propensities ..."

- "The terms of the social contact are chosen behind a <u>veil of ignorance</u>. This ensures that no one is advantaged or disadvantaged in the choice of principles or rules by the outcome of natural chance or the contingency of social circumstances."

Virtue Ethics

- A virtue is an excellent trait of character

- The virtue ethicist argues that what matters morally is not what we do at a time, but what we become over time.

- To the virtue ethicist it is the acquisition of a good character that is – or should be – our moral aim

The Case For

- In many situations it makes more sense to focus on virtues than on obligations, rights or consequences

- Personal relationships can be morally relevant to decision making

- It recognizes that our moral decision making skills develop over time

- There are no irresolvable moral dilemmas

- It recognizes the important role that emotions play in living a moral life

The Case Against

- Different people may have quite different concepts of human flourishing

- It cannot be used to govern government policy

- It underlines attempts to hold people responsible for their bad actions

Do computer professional need to worry about ethics like lawyers or physicians?

Therac-25

Privacy and security

Financial decisions (e.g., tax software)

Software Engineering Code of Ethics: 8 Key Principles:

- Product

- Public

- Judgment

- Client and Employer

- Management

- Profession

- Colleagues

- Self

Whistle-Blowing

- A whistle blower is someone who breaks ranks with an organization in order to make an unauthorized disclosure of information about a harmful situation after attempts to report the concerns through authorized organizations channels have been ignored or rebuffed.

- Examples situations:
    - Actions/products of employer can potentially harm the public
    - Fraudulent use of tax dollars

Morality of Whistle-Blowing

- In most cases whistle-blowers are punished

- Are they heroes or traitors?
    - Analyze their motives (virtue ethics theory)

- Do whistle-blowers cause harm?
    - Disruption of an organization's social and professional fabric
    - Generate bad publicity
    - Cause emotional distress and financial hardship to family
    - Assess the net public good – utilitarian perspective

Censorship and Internet

- Unlike traditional one to many broadcast media, the Internet supports many to many communications

- The Internet is dynamic – new devices are being connected each year

- The Internet is huge – human censors not practical

- The Internet is global – national governments have limited authority to restrict activities happening outside their borders

- It is hard to distinguish between different types of people e.g., children and adults on the Internet

Children and Inappropriate Content

- Many parents and guardians believe that they ought to protect their children from exposure to pornographic and violent materials

- A few years ago the center of concern was the Internet – various kinds of blockers and filters are used

- But with smartphone use and their ubiquity, this problem has become a larger challenge

- How to tackle with inadvertent blocking of legit content? Sometimes blacklisting may be used by some organizations to curb expression of specific ideologies and ideas

Child Internet Protection Act

- In March 2003, the Supreme Court weighed testimony in the case of United States vs. American Library

- The CIPA requires that libraries receiving federal funds to provide internet access to its patrons must prevent children from getting access to visual depictions of obscenity and child pornography

- ACLU argued that web filtering is not perfect – legit content can be withheld; having adults request turning the filters off can be stigmatized

- Analysis with ethical theories (page 132-135)

Defining Privacy

- Privacy related to notion of access
  - Privacy is not "being alone", but defining who has access to what

- Access
  - Physical proximity to a person
  - Knowledge about a person

- Privacy is a "zone of inaccessibility"

- Privacy violations are an affront to human dignity
  - You violate privacy when you treat a person as a means to an end.
  - Some things ought not be known – you look away when your friend is typing their password

- Too much individual privacy can harm society

- Where to draw the line?

Information Technology Erodes Privacy

- Information collection, exchange, combination, and distribution easier than ever means less privacy

- Scott McNealy (Sun Microsystems): "You have zero privacy anyway. Get over it."

- This class: we will consider how we leave an "electronic trail" of information behind us and what others can do with this info

Data Gathering and Privacy Implications

- Facebook tags

- Enhanced 911 services

- Rewards or loyalty programs

- Body scanners

- Implanted chips

- OnStar

- Automobile "black boxes"

- Medical records

- Digital video recorders

- Cookies and flash cookies

Secondary Uses of Information
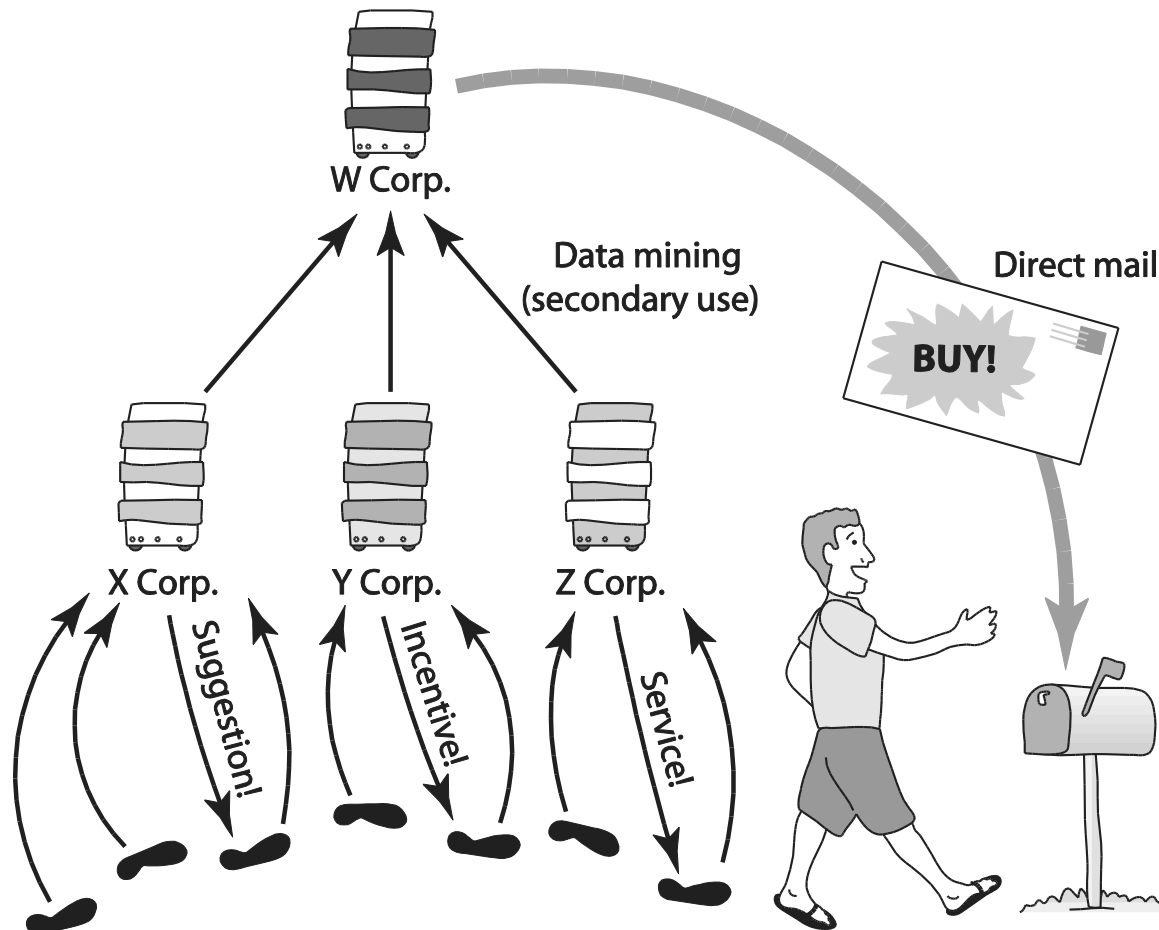
Information Sharing: Netflix Prize

- Netflix offered $1 million prize to any group that could come up with a significantly better algorithm for predicting user ratings

- Released more than 100 million movie ratings from a half million customers
  - Stripped ratings of private information

- Researchers demonstrated that ratings not truly anonymous if a little more information from individuals was available
  - Movie ratings predicted political leanings and sexual orientation

- U.S. Federal Trade Commission complaint and lawsuit

- Netflix canceled sequel to Netflix Prize

Information Sharing: AOL Search Dataset

- In 2006, AOL research team released three months worth of search queries from 650K AOL users
    - Support university research

- Anonymization using a random integer identifier for each user

- But aggregation of queries by a single identifier revealed a lot about the person, even without by PII

- Queries also contained personal info – address, SSN

- NYT identified several of the users

- Following public backlash, the dataset was taken down after 3 days

- Where did AOL go wrong?

Privacy & Government: A Balancing Act

- Federal, state, and local governments in United States have had significant impact on privacy of individuals

- Government must balance competing desires of citizens
  - desire to be left alone
  - desire for safety and security

- National security concerns increased significantly after 9/11 attacks

Solove's Taxonomy of Privacy

- **Information collection:** Activities that gather personal information

- **Information processing:** Activities that store, manipulate, and use personal information that has been collected

- **Information dissemination:** Activities that spread personal information

- **Invasion:** Activities that intrude upon a person's daily life, interrupt someone's solitude, or interfere with decision-making

Arguments

Defining Features of Arguments

- Argument requires justification of its claims
    - It is not sufficient to simply give reasons without justification
    - Example of an argument between a teenager and a parent

- Argument is both a process and product
    - It is a "living" entity that changes the participants

- Argument combines truth seeking and persuasion
    - This is a continuum that we the participants must balance
    - A student's argument on the topic "Is American Sign Language a foreign language for the purposes of meeting a university's foreign language requirement?"

The Continuum of Truth Seeking and Persuasion

Truth Seeking

- Exploratory essay examining all sides of an issue
- Argument as inquiry, asking audience to think out issue with writer
- Dialogic argument seeking common ground with a resistant audience
- Classical argument aimed at a neutral or possibly skeptical audience
- One-sided argument aimed at a friendly audience (often for fund-raising or calls to action)
- Aggressive one-sided arguments
- Outright propaganda

Outright Propaganda

Genres of Argument

- Genre types:
  - Personal correspondence; Letter to editor; Newspaper editorial or op-ed; Magazine article; Scholarly journal (peer-reviewed); Conference proceedings; Organization white paper; Proposal; Legal briefs and court decisions; Public affairs advocacy advertisements; Advocacy websites; Blogs; Visual arguments; Speeches; Powerpoint presentations; Books; Documentary films

- Understand status of work in relation to genre
  - Understand stylistic features of each genre

Dialectical Thinking

- Thinking dialectically – actively seek out alternate views

- Questions:
  - What would writer A say to writer B?
  - To what extent do writer A and writer B disagree about facts and interpretation of facts?
  - To what extent do they disagree about underlying beliefs and assumptions and values?
  - Can I find areas of agreement between them?
  - What new, significant questions does the text post for me?
  - After assimilating these information, what are my current views?
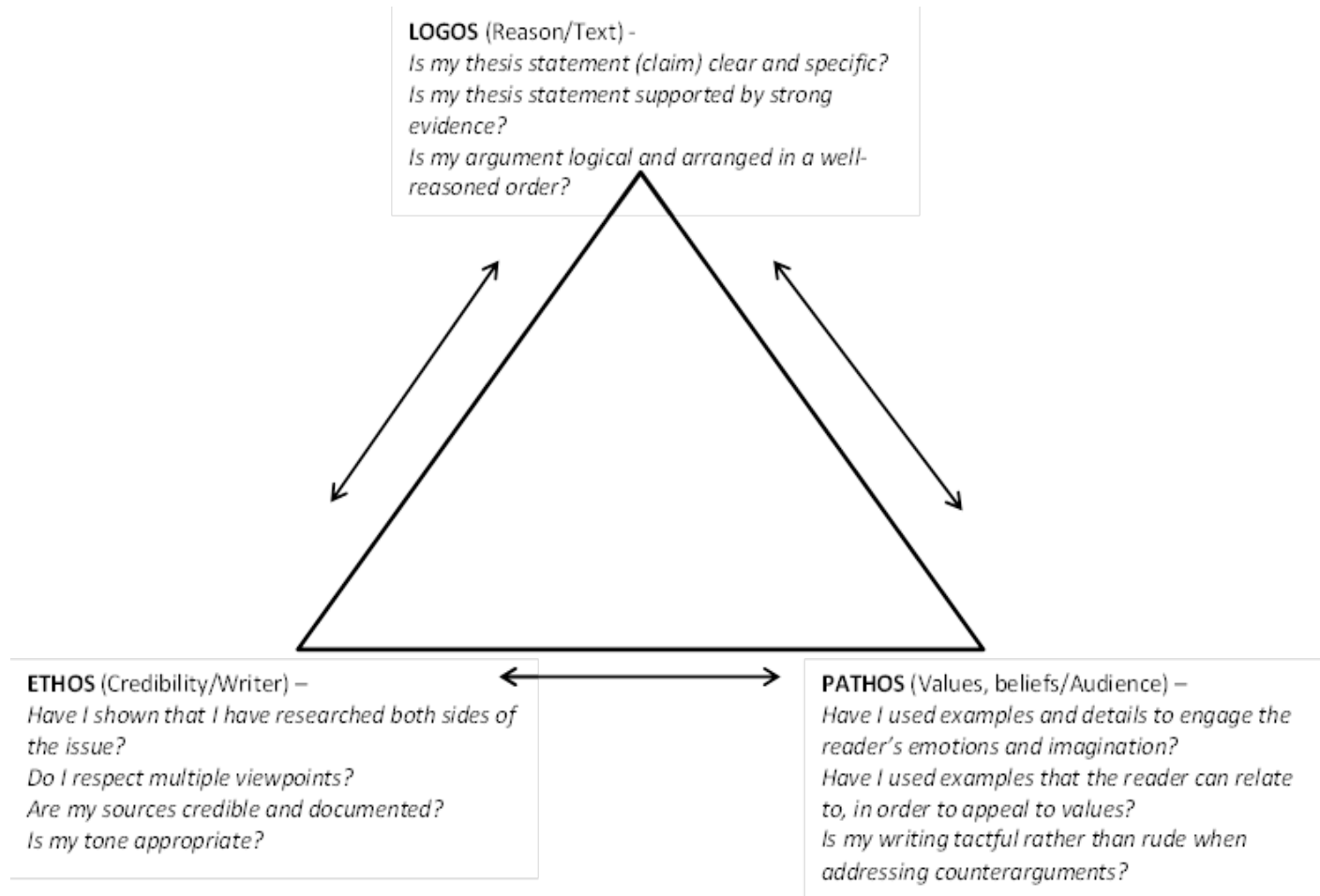
ARGUMENTATIVE ESSAY

The argumentative essay
is a genre of writing that requires you to:
1. investigate a topic;
2. collect, generate, and evaluate evidence; and
3. establish a position on the topic in a concise manner.

The Rhetorical Triangle

Don't forget to incorporate elements of ethos, pathos, and logos.

LOGOS (Reason/Text) -
Is my thesis statement (claim) clear and specific?
Is my thesis statement supported by strong evidence?
Is my argument logical and arranged in a well-reasoned order?

ETHOS (Credibility/Writer) –
Have I shown that I have researched both sides of the issue?
Do I respect multiple viewpoints?
Are my sources credible and documented?
Is my tone appropriate?

PATHOS (Values, beliefs/Audience) –
Have I used examples and details to engage the reader's emotions and imagination?
Have I used examples that the reader can relate to, in order to appeal to values?
Is my writing tactful rather than rude when addressing counterarguments?

IMPORTANT POINTS TO CONSIDER:
- Effective arguments consider all three points on this triangle. They are interrelated - they help each other.
- All three of the corners of the Rhetorical Triangle overlap. You can do one or all of them in a single paragraph.

Elements of an Argument

- **Claim**: statement to be justified/proven/upheld

- **Reason**: the reasons, support, and evidence to support your claim

- **Warrant**: a stated or unstated belief, rule, or principle that underlies an argument
    - Audience must accept the warrant

- To give body and weight to our arguments, we need:
    - **Grounds:** a statement, supporting evidence, facts, data that is established before an argument is begun
    - **Backing:** argument that supports the warrant

Organizing Your Argument

- Title
- Introduction
  - Thesis statement
- Body Paragraphs
  - Constructing Topic Sentences
  - Building Main Points
  - Countering the Opposition
- Conclusion
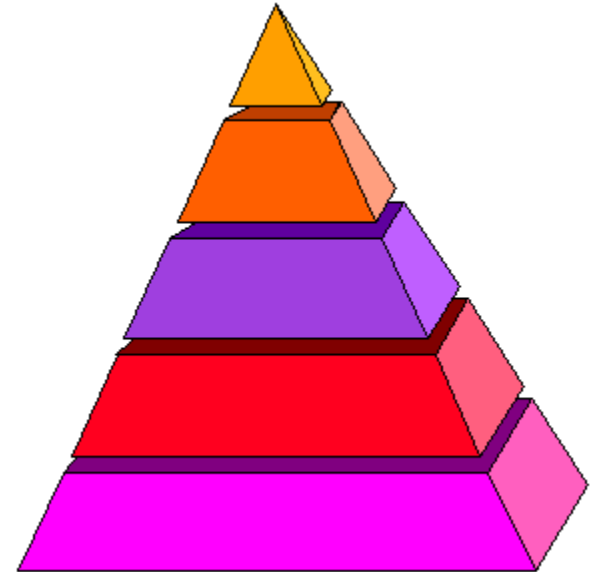
What is Evidence?

- "Evidence" I all the verifiable information a writer might use as a support for their argument, such as facts, observations, examples, cases, testimony, experimental findings, survey data, statistics, etc.

- Evidence is part of the "grounds" and "backing" of an argument in support of reasons and warrant respectively

Rhetorical Understanding of Evidence

- Kinds of evidence
  - Data from personal experience
  - Data from observations or field research
  - Data from interviews, questionnaires, surveys
  - Data from reading and research/library/internet
  - Testimony
  - Statistical data
  - Hypothetical examples, cases and scenarios
  - Reasoned sequence of ideas

Gathering Evidence

- Create a plan for gathering evidence.
  - What personal experiences have you had with this issue?
  - Relevant observational studies
  - What people could you interview?
  - What questions could be addressed through a survey or a questionnaire?
  - What useful information on this issue might be gathered from reference sources (e.g., journal)?
  - What useful information on this issue might be gathered from the library?
  - Can a search engine help?
  - Could any reliable statistical source provide you relevant information (e.g., Census Bureau, CDC)?

Gathering Evidence

- Gathering data from Interviews
  - Determine your purpose
  - Do background reading
  - Formulate well thought out questions but also be flexible
  - Come well prepared for the interview
  - Be prompt and courteous
  - Take brief but clear notes
  - Transcribe your notes soon after the interview

- Gathering data from Surveys
  - Include both closed-response questions and open-response questions
  - Make your survey or questionnaire clear and easy to complete
  - Explain the purpose of the questionnaire
  - Seek a random sample of respondents in your distribution of the questionnaire
  - Convert questionnaires into usable data by tallying and summarizing responses