Critical Thinking and Logical Arguments

• Tools for evaluating cyberethics issues

• Last step in applied ethics methodology is evaluation against rules of argumentation

• A claim is a statement.

• Critical thinking is the careful deliberate determination of whether to accept, reject or suspend judgment about a claim.

• Arguments
  – are a form of reasoning
  – are comprised of claims
  – aim at establishing a conclusion
Argument Structure

• Premises and conclusions are claims

• An argument must have at least one premise and one conclusion
  
  premise 1  
  premise 2

• Form : 
  
  premise n
  
  conclusion

• The horizontal line is implication: the conclusion is supposed to follow from the premises

• Premises and conclusions may need to be extracted from text
Valid Arguments

- Nolte’s system
- Arguments may be valid or invalid, but not true or false.
- Assume the premises are true.
- Does the conclusion follow from the premises?
- If it is logically possible for the conclusion to be false, then the argument is invalid.
- Validity is independent of the truth of the premises.
- Validity is determined by the form, not the content of the argument.
- Counterexamples can be used to establish invalidity.
Sound Arguments

• An argument is sound if
  – It is valid
  – All the premises are true
  – An unsound argument does not imply the conclusion is false.
Invalid Arguments

- Invalid Arguments are Inductive or Fallacious
- Inductive arguments provide a high degree of probability that the conclusion is true
- In fallacious arguments, the truth of the conclusion must be established outside the premises.
Evaluation Strategy

if valid
  then
    if all prem true then sound
    else if any prem false then unsound
    else inconclusive
  else // invalid
    if conclusion likely then inductive
    else fallacious
    eval truth of premises
Faulty Reasoning
Examples from
From http://www-rohan.sdsu.edu/faculty/rfreeman/reason.html

• Ad hominem
  Attack directed at a person

  BULLFINCH: I believe logic is an extremely important and useful subject.

  MARTHA: That is because you’re just an idiot, Bullfinch.
- Slippery Slope
  X could be abused, so don’t allow X
  Domino Theory

  MARTHA: If we let the communists take
  over El Salvador, the next thing you know
  they’ll be in Mexico. Once they take over
  Mexico, however, they’ll head for Texas and
  it is just a matter of time before we are all
  communists.

  Lack of sharp distinction $\Rightarrow$ no difference

  BULLFINCH: Brother, am I upset. That
  thief just stole my wallet.
  MARTHA: We’re all thieves, Bullwrench. We’ve
  all stolen something at sometime in our lives.
  What is the difference? One theft more, or
  less, can’t make a difference between a thief
  and someone who isn’t one.
• Appeal to authority
  X is an authority in field Y
  X said Z

  Z

MARTHA: I'm really worried about the ”Greenhouse Effect” Bullfinch. Merv Griffin says that the polar icecaps will be melting soon.
• **False-cause** (*post hoc ergo propter hoc*)
  
  X precedes Y \Rightarrow X caused Y

  BULLFINCH: How are you feeling today, Martha?

  MARTHA: Every time you come by to see me, I feel worse. I might start feeling better if you stayed away for a few weeks.
• Begging the Question
  Assume what you are trying to prove

  MARTHA: Of course I know that the operation was successful.

  BULLFINCH: How do know that?

  MARTHA: The doctor told me so, and he wouldn't have told me that, if it wasn't successful.
Fallacy of Composition
Assume characteristic of part of a group applied to whole group

BULLFINCH: What is that awful looking sandwich you are eating, Martha?

MARTHA: Peanut butter, strawberry jelly, and bananas.

BULLFINCH: I think I’m going to be sick.

MARTHA: Why? You like peanut butter don’t you? You like strawberry jelly don’t you? Moreover, I happen to know you like bananas too. What are you complaining about?
- Fallacy of Division
  Assume a characteristic of the whole applies to a subgroup

MARTHA: Why do you go to that club, instead of the one that is close?

BULLFINCH: It has been around since the turn of the century.

MARTHA: Really Bullfinch, you should spend more time with people who are your own age.
• Ambiguity
terms have more than one interpretation

BULLFINCH: Why are you drinking in the middle of the afternoon? I thought you said you were going to do some gardening.

MARTHA: My book on gardening says that these flowers are to be planted only after being potted.
• Appeal to the People
  *(Argumentum ad Populum)*
  flagwaving, snob appeal, bandwagoning

  BULLFINCH: Did you really need such an expensive computer, Martha?

  MARTHA: Of course. Everybody else in the neighborhood has one. [Bandwagoning] Besides, it’s the American thing to do. [Flag waving]
• Many/Any  
  many of A have property B  
  all of A have property B  

MARTHA: Never do I get in another balloon with you, Bullwench. That was the most harrowing experience I have ever had in my life.
- Virtuality
  
  X is in cyberspace

  cyberspace is virtual

  X (or its effects) is not real
Multiple Arguments

From http://www-rohan.sdsu.edu/faculty/rfreeman/reason.html

- I saw Bill looking at Sandy’s paper during the exam. He must have cheated, because they got the same questions wrong. We cannot tolerate cheating. So someone should discipline him.
Sandy would not have cheated on the test, because she already knew the material, as she amply proved by tutoring other students in it last week. Moreover, she didn’t need a good grade on it, since she already had a guarantee of an A in the course.
Either Jill went to the beach or she went to the movie. However, she never goes to the beach on Sundays. Moreover, the only movie she hasn’t seen is at the Strand Cinema. So she must be there.