COSC1147: PCP

Advanced Professional Development

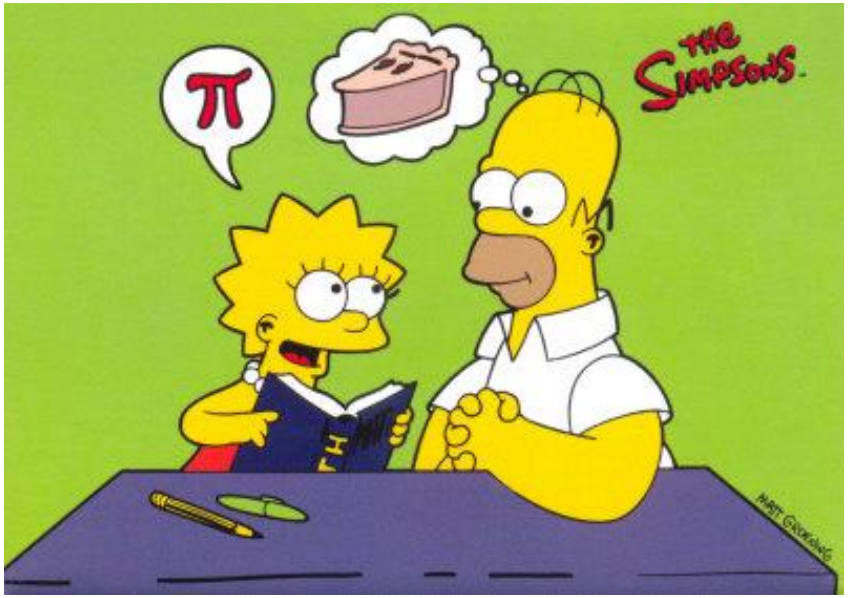
Semester 2, 2017

Lecture 3

Writabrata Bannerjee

- Enterprise Delivery Manager, Telstra.

- I am accountable as a People Leader who looks after Infrastructure Delivery Managers.
- My DRs look after deployment if IT infrastructure for domestic and international locations.
- Started as a graduate 7 years back.



Ref: http://experimentalmath.info/blog/2013/11/pi-in-the-simpsons/

Critical Thinking

Critical Thinking and Logical Arguments

- *Critical thinking* can be defined as:

  "the careful deliberate determination of whether we should accept, reject, or suspend judgment about a claim"

  Brook Moore and Richard Parker (2007)

- Claims, or statements, can be used in a form of reasoning called a *logical argument* or *argument*.

Logical Arguments

An argument can be defined as a:

form of reasoning **that attempts to establish the truth of one claim** (called a *conclusion*) **based on the assumed truth of the evidence in other claims** (called *premises*) **provided to support the conclusion.**

Arguments

An argument has *three* important characteristics or features :

(i) It is a ***form of reasoning****;*

(ii) It is comprised of ***claims*** (sometimes also called statements or assertions);

(iii) It aims at establishing a ***conclusion*** (i.e., one claim) based on evidence (provided by other claims called *premises*).

Structure of an Argument

- Premise 1
- Premise 2 optional
- … optional
- Premise N optional
- Conclusion

What do you think about this argument ? … and why? …

PREMISE 1. People who own Mac computers are smarter than those who own PCs

PREMISE 2. My roommate owns a Mac

PREMISE 3. I own a PC.

CONCLUSION. My roommate is smarter than me.

The Form of a Valid Argument

- **A valid argument** is valid by virtue of its *logical form*, not its content.
- An example of a valid logical form is:

PREMISE 1. All A are B.

PREMISE 2. C is A.

∴

CONCLUSION. C is B.

Argument Structure vs. Argument Strength

- Not all arguments are **strong**
  - - i.e., not all arguments succeed in establishing their conclusions.
- Any form of reasoning will qualify as an argument if it satisfies the three conditions we specified.
- Consider the following arguments and ask whether they are strong

Argument Structure vs. Argument Strength (continued)

- **Premise**: The Internet is in public space.

- **Conclusion**: Therefore, those who use the Internet should not expect to retain any personal privacy.

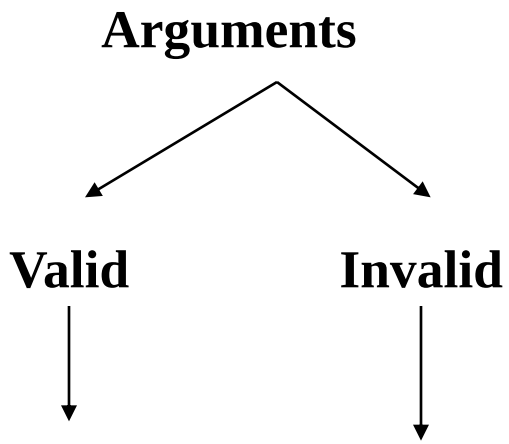
Counterexamples to Arguments

- A counterexample is:

  a possible case where the premises in an argument can be imagined to be true while, at the same time, the conclusion could still be false.

- If an argument is valid, no counterexample is possible.

Valid and Invalid Arguments



The assumed truth of the premises is sufficient to guarantee the conclusion.

Premises (even when true) do not guarantee the conclusion.

Sound and Unsound Arguments

For an argument to be ***sound***, it must be:

- (a) *valid* (i.e., the *assumed* truth of the premises would guarantee the truth of the argument's conclusion);
- (b) the (valid) argument's premises must also be *true in the actual* world.

Sound Arguments

- Sound arguments are very rare.
- The following argument is sound:

PREMISE 1. CEOs of major computer corporations are high-school graduates.

PREMISE 2. Bill Gates was the CEO of a major computer corporation.

CONCLUSION. Bill Gates is a high-school graduate.

Invalid Arguments

An argument is *invalid* if you can give one counterexample to the argument.

- A *counterexample* is:

  a possible case where the premises can be assumed to be true while, at the same time, the conclusion could be false.

Invalid arguments will be either:

- *inductive*, or
- *fallacious*.

Fallacious Arguments

- An argument is *fallacious* when:

  the conclusion would not likely follow from the argument's premises, even when all of the premises are assumed true.

- Multiple counterexamples to a fallacious argument can be provided.

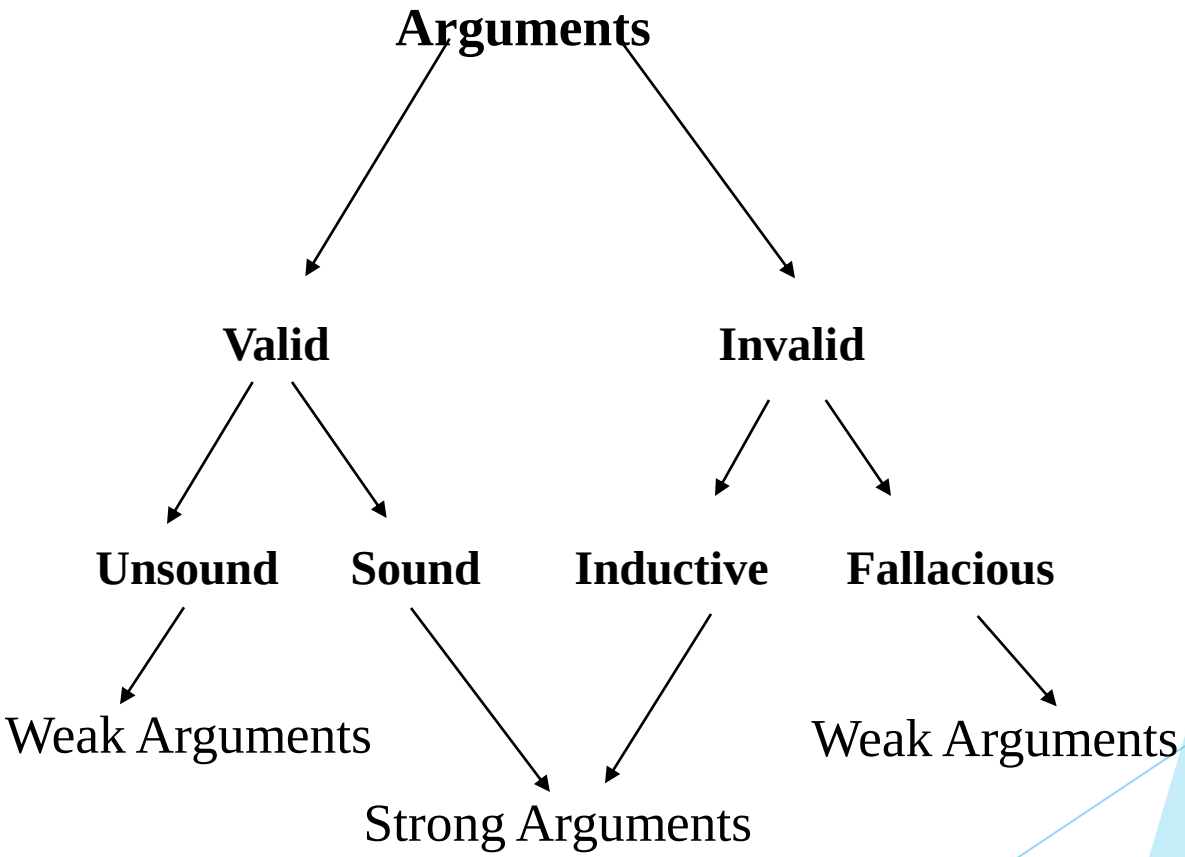
An example of a fallacious argument

PREMISE 1. Ten percent of people who own iPods also own Mac computers.

PREMISE 2. My roommate currently owns an iPod.

CONCLUSION. My roommate also owns a Mac computer.

A Comprehensive Scheme for Viewing Arguments



Strategy for evaluating arguments

1. Convert to standard form (List premises and conclusion)
2. Test valid – assuming premises true, is conclusion true? Can you find a counterexample?
3. If valid go to 4, else 5
4. Test sound – are the premises true in the real world?
    1. If yes, then argument valid and sound
    2. If no, argument valid but unsound = inconclusive argument
5. Test if invalid argument is inductive or fallacious – how likely is the conclusion to be true if the premises are true?
    1. If likely, then argument is invalid and inductive
    2. If unlikely, then argument is fallacious.

Some Common Informal Fallacies

- *Ad Hominem Argument*
- *Slippery Slope Argument*
- *Fallacy of Appeal to Authority*
- *False Cause Fallacy*
- *Begging the Question*
- *Fallacy of Composition/Fallacy of Division*
- *Fallacy of Ambiguity*
- *Appeal to the People (Argumentum ad Populum)*
- *Non Sequitur*
- *The Many/Any Fallacy*
- *Appeal to the Popular*
- *Red Herring*
- *The Virtuality Fallacy*
- *Post hoc ergo propter hoc*

Ad Hominem Argument

- *Ad hominem* arguments **attack the person** rather than the substance of the person's argument.
- Suppose that a minister X opposes a bill before Parliament.
- Also suppose that minister Y argues:

> *How can we take seriously a position regarding the future of our national defence,*
>
> *that has been proposed by minister X, who has been arrested for drink driving?*

The Slippery Slope Fallacy

- The Slippery Slope is a fallacy in which a person asserts that some event must inevitably follow from another without any argument for the inevitability of the event in question. In most cases, there are a series of steps or gradations between one event and the one in question and no reason is given as to why the intervening steps or gradations will simply be bypassed. This "argument" has the following form:
  - Event X has occurred (or will or might occur).
  - Therefore event Y will inevitably happen.
- Examples-

  "You can never give anyone a break. If you do, they'll walk all over you."

  "We've got to stop them from banning pornography. Once they start banning one form of literature, they will never stop. Next thing you know, they will be burning all the books!"

The Fallacy of Appeal to Authority

- The *Fallacy of Appeal to Popular Authority* has the form:

  X is an authority in field Y;

  X said Z;

  therefore, Z.

- The following argument commits this fallacy:

  The Prime Minister said PCP is an important course, he is an expert on ethics, so it must be!!

  Can you think of a better example?

The False Cause Fallacy

- The *false cause fallacy* reasons from the fact that **event X preceded event Y** to the conclusion that **event X is necessarily the cause of event Y**.
- Consider the following argument about the Netscape Navigator Web browser vis-à-vis Microsoft's Windows 98 operating system:

> Shortly after the release of Windows 98, Netscape's stock plummeted severely. Hence, there is no doubt that the release of Windows 98 is responsible for the decline in Netscape's fortunes in the stock market.

The Fallacy of Begging the Question

- An argument commits the *fallacy of* ***begging the question*** when one or more of its premises presuppose the truth of the conclusion it is trying to establish.
- The reasoning that used is circular.
- Consider the following argument:

> Object-oriented programming languages are superior to non-structured programming languages because the former type of programming languages are structured.

Fallacy of Composition

- The *fallacy of composition* confuses the characteristics that apply to the parts of a whole, or to the individual members of a group, with the characteristics of the whole itself.
- Consider the following argument:

  The new XYZ Desktop Computer is the best system on the market. XYZ has the fastest processor currently available on any PC; it comes with twice the amount of RAM than any of its competitors; and it comes equipped with a suite of office applications that are superior to those on any currently available system. Also, its monitor offers the best resolution and graphic display currently available on any commercial desktop computer.

The Fallacy of Division

- The *fallacy of division* mistakenly infers that the same attributes or characteristics that apply to the whole or to the group must also apply to every part of the whole or to every member of the group.
- Consider the fallacy in the following argument:

> ANU (Canberra) is the number one ranked university in the country. Thus, ANU must have Australia's top computer science department.

The Fallacy of Ambiguity

- The *fallacy of ambiguity occurs* whenever one or more terms in an argument are used *ambiguously*.
- Ambiguous terms have more than one meaning.
- Consider the following fallacy:

> Computers have memory. Having memory enables us to recall experiences from our childhood. Therefore, computers can recall experiences from their childhood.

The Fallacy of Appeal to the People

- The *fallacy of the appeal to the people* assumes that because X is popular, or because the majority of people agree with X, then X must be an acceptable standard.
- The following argument commits the fallacy of popular appeal.

  The majority of people believe that it is perfectly acceptable to share copyrighted music over the Internet. So, despite the objections of greedy entrepreneurs in the recording industry, Peer-to-Peer (P2P) networks such as KaZaA and Morpheus should be allowed to serve the wishes of the people.

The Fallacy of Appeal to the Popular

- *Some of you might think – this is not a fallacy at all*☺
- The *fallacy of the appeal to the popular* is when someone tries to validate a statement based on the number of people that support or do not support the statement.
- Examples-

  - Look how many people are using the Samsung phone, it must be the best phone.

  - Everyone is copying the game, why shouldn't you?

Red Herring

- A Red Herring is a fallacy in which an irrelevant topic is presented in order to divert attention from the original issue. The basic idea is to "win" an argument by leading attention away from the argument and to another topic. This sort of "reasoning" has the following form:
  - Topic A is under discussion.
  - Topic B is introduced under the guise of being relevant to topic A (when topic B is actually not relevant to topic A).
  - Topic A is abandoned.
- This sort of "reasoning" is fallacious because merely changing the topic of discussion hardly counts as an argument against a claim.

Red Herring

- Example

  Original Argument: “We must let the banks fail for their bad practices”

  Red Herring: “Yea but in tough economic times we need to support our president”

  Original Argument: “I did not pick up your clothes from the dry cleaner, I forgot!”

  Red Herring: “But you don’t like me anyway, you don’t like the way I do things.”

Non Sequitur

- (Latin for "it does not follow"), in formal logic, is an argument in which its conclusion does not follow from its premises.
- Examples

  Life is life and fun is fun, but it's all so quiet when the goldfish die.

  I had a crazy music teacher in primary school. Music teachers are all crazy.

The Many/Any Fallacy

- The *many/any fallacy* assumes that because many things of a certain kind have a feature, anything of that kind has that feature.
- Consider that there are many programming languages—Basic, Fortran, Ada, Cobol, Java, C++, etc.—that *could* be used to write the code for a particular kind of software application for the Internet
- Does it follow that any programming language can be used to write the code for an Internet application *efficiently*?

The Virtuality Fallacy

- The *virtuality fallacy* has the following form:

PREMISE 1. X exists in cyberspace.

PREMISE 2. Cyberspace is virtual.

CONCLUSION. X (or the effect of X) is not real.

Post hoc ergo propter hoc

- Post hoc ergo propter hoc (Latin: "after this, therefore because of this") is a logical fallacy that states "Since event Y followed event X, event Y must have been caused by event X." It is often shortened to simply post hoc.
- Post hoc is a particularly tempting error because temporal sequence appears to be integral to causality. The fallacy lies in coming to a conclusion based solely on the order of events, rather than taking into account other factors that might rule out the connection.

Post hoc ergo propter hoc

- Example-

  Joan is scratched by a cat while visiting her friend. Two days later she comes down with a fever. Joan concludes that the cat's scratch must be the cause of her illness.

  The picture on Jim's old TV set goes out of focus. Jim goes over and strikes the TV soundly on the side and the picture goes back into focus. Jim tells his friend that hitting the TV fixed it.

Textbook suggested reading

- Please read these-
  - Chapter 1: Introduction to Cyberethics..
    - Pages 1-13, 24-28
  - Chapter 3: Critical Reasoning Skills..
    - Pages 74-87, 91-98

Lecture Quiz 1

- Go to Blackboard for PCP 1147
- Find Assignments tab
  - Click on Lecture Quizzes
- Select and do quiz 1

- There are 10 questions in quiz 1 for 1 mark.

- You have 15 mins to answer = 1 min per question + 5 extra minutes allowing for getting into Blackboard
- You cannot go back and change an answer
- The system will give you your number of questions correct, but not the answers till next week.