I. Administrative
   A. Schedule – see syllabus as well!
   B. Discussion of extra credit opportunities
   C. Questions?

II. MCEs
   A. Goals & motivation (why do we skip around the book?)
   B. What I take critical thinking to be – language analysis, argument analysis
   C. Critical thinking and fuzziness
   D. Specific issues

III. Refutation
   A. Arguments are typically used to establish conclusions. Sometimes, those conclusions are that other, target arguments are weak or ineffective. In these cases, the first arguments are known as refutations.

      1. In a debate or another form of argumentative dialogue, you will find arguments being delivered in a way that puts refutation in play as a strategy—perhaps there are differences of opinion about a range of conclusions, or about the best way to establish a favored conclusion.

      2. Refutations can be stronger or weaker.

         a. A particularly strong form affirmatively establishes that the target argument cannot work.
b. A weaker form simply raises questions about the target argument that cannot be answered or point to further, difficult questions

B. If the target argument is *deductive*, strong refutations can aim to accomplish their goal in one of two ways:

1. Establish that the target argument is *invalid*, that is, that the conclusion does not follow from the premises.

2. Establish that the target argument is *unsound*, which would amount to showing that a constituent claim is false on the assumption that this option was selected over B.1.

3. These are the arguments that the authors have in view in Ch. 17.

C. If the target argument is *non-deductive*, strong refutations will be somewhat different, since those arguments are by their very nature invalid. Still, the formal character of the refutation options remains the same:

1. Establish that the argument does not have the form it purports to have (e.g., it is not really an *argument by analogy*, or an *inference to the best explanation*).

2. Establish that one of the constituent claims of the argument is false.

D. In both cases, the refutations can focus either on the *form* of the target argument (e.g., validity), or on its *content* (e.g., the truth or falsity of specific claims). This distinction will frame what follows, with specific focus on deductive arguments.

### IV. Formal Refutations

A. Whether aimed at deductive or non-deductive targets, these refutations focus on the *structure* of the argument, which replaces concern about the truth and falsity of the constituent claims with concern about the logical form of those claims and the relationships among them.

B. *Refutation by Parallel Reasoning* – pp. 343-348 // (8.1)

1. Remember that deductive arguments work because their *form* conveys truth from premises to conclusion. This form comprises the structure of the constituent sentences and the relationships
among those sentences, and not so much their conceptual content (although there are exceptions).

2. Given this, if you can find an argument that has the same form as a target argument but does not work to establish its conclusion, then you can refute the target argument. (Can this work with non-deductive arguments? Why or why not?)

3. There are several keys:
   a. The arguments must really be parallel in structure.
   b. The premises of the refutation must be true.
   c. The conclusion of the refutation must be false.

4. How does this one work?

“If you vote against Obama because he can't get stuff done, it's kind of like saying 'This guy can't cure cancer. I'm gonna vote for cancer.'”
~Chris Rock
5. Produce a refutation by parallel reasoning of this argument: If tea is dangerous, so is coffee; tea isn’t dangerous; so coffee isn’t dangerous either (8.2)

C. Refutation by Counterexample – Form – pp. 334-337

1. This is a specific subtype of arguments by parallel reasoning.

2. These are especially powerful because you work with the same constituent statements, and not just parallel statements, and locate a circumstance in which the premises are true and the conclusion is false.

3. What would a refutation by counterexample be for this argument:

   P1. I’m a sports fan.

   P2. I work at Michigan State.

   Therefore, I root for the Spartans. (8.3)

V. Content Refutations

A. One way to do this is just to show that the claim in question is in fact false. No logical thought required…

B. Refutation by Counterexample – Content – pp. 334-337

1. For universal claims, a single contrary instance proves that they are false. This single contrary instance is a counterexample.

2. One can avoid counterexamples by guarding claims, but you must not excessively guard your claims or your argument will lose its force in that way.

3. Counterexamples can be strong or weak, depending on the kind of response they force. If the counterexample can be handled with a minimal adjustment, the refutation is weak.

4. Questions to ask:

   a. Is the target claim really a universal claim?
b. Does the purported counterexample get at the right kind of thing that figures into the universal claim?

c. Does this thing lack the characteristic it should have if the universal claim is true?

d. Can the universal claim be modified in a minor way to avoid the counterexample? (8.4, 8.5)

C. Refutation by *Reductio ad Absurdum* – pp. 337-340


2. *Example:*

   P1. Assume that an omnipotent god G exists.

   P2. If G is omnipotent, then G can do anything.

   3. G can do anything (from P1, P2)

   P4. If G can do anything, G can create a rock R that no one can lift

   5. G can create a rock R that no one can lift (from 3, P4)

   P6. If G can create a rock R that no one can lift, then G cannot lift R

   7. G cannot lift R (from 5, P6)

   P8. If G cannot lift R, then it is not the case that G can do anything

   9. It is not the case that G can do anything (from 7, P8)

   10. Contradiction (from 3, 9)

   C. Therefore, it is not the case that an omnipotent god G exists

3. If you can’t establish that a claim is obviously false, or supply a counterexample to it because it is universal, you might be able to call it into question by reducing it to absurdity.
4. Absurdity comes in different forms, from strong forms (e.g., contradiction) to weaker forms (e.g., ridiculous situations). (E.g., reduction to Hitler)

5. Reductios can be strong or weak, depending on the kind of response they force.

6. Questions to ask:
   
a. Does the reductio really reduce the target claim to an absurdity?

   b. Does the reductio establish that the target claim implies that absurdity?

   c. Can the target claim be modified in a minor way to avoid implying the absurdity? (8.6)

7. Construct a reductio ad absurdum for this argument: There is an exception to every universal claim.