Exercise Class 1
Truth Tables

For each of the arguments below, construct a truth table to check its validity. If the argument is invalid, describe a counterexample that shows this.

(Remember: the first step is to identify atomic propositions in the sentences, assign letters to them and translate the sentences into logical propositions)

1. If Alice goes to work early then Bob doesn't prepare breakfast.
   Alice didn't go to work early.
   Therefore Bob made breakfast.

2. If England beat France, then Wales finish third.
   If Wales finish third, then Wales are better than New Zealand.
   Therefore, if England beat France, then Wales are better than New Zealand.

3. If Thomas is not a goldsmith then John is not a merchant. Therefore Thomas is in fact a goldsmith because John is certainly a merchant.

4. If arachnids have eight legs then crabs spin webs and scorpions live underwater. Crabs do not spin webs. So arachnids do not have eight legs.