Implications

- Implication $P$ implies $Q$ (conditional of $P$ and $Q$)
  is written $P \to Q$ (if $P$ then $Q$)
  - False when $P$ is true and $Q$ is false
  - True otherwise

  ex) $P$: you live in America
  $Q$: you live in the greatest nation in the world
  IF you live in $A$, you live in the greatest nation

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<th>$Q$</th>
<th>$P \to Q$</th>
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ex) $P$: If everyone gets an A
$Q$: Alzalg will make cookies

* says nothing about what will happen if everyone does NOT get an A
$\neg Q$ can be anything

All propositions are implications, i.e., clauses 1, 2, 4 are true and line 3 is false
A) 1) If a person is the president of the US, she is at least 35 years old
   Q

   2) A person being at least 35 years old is necessary for being President
   3) Being the President is sufficient for being at least 35
   5) A person is the President only if they are at least 35

B) A passing score is required to receive a passing grade in the course
ex) let $x$ be a real number.
   A) If $x \geq 10$, then $x \geq 0$ **TRUE**
   B) If $x = 0$, then $x \geq 10$ **FALSE**
   C) If $x^2 \geq 0$, then $x = 42$ **FALSE**
   D) If $x^2 < 0$, then $x = 42$ **TRUE**
       always false, so $Q$ doesn't matter
   E) IF Riemann hypothesis holds, then $x^2 \geq 0$ **TRUE**
       always true, so $P$ doesn't matter

**Homework:**