- If statements

  - If C_1 and C_2 are two pieces of code and if B is some condition then what interpretation does a statement of the form:
    if B **then** C_1 **else** C_2

  - How do you tell whether an if-statement is correct or not with respect to a precondition P and a postcondition Q?

  - Is $\{P\}$ if B then C_1 else $C_2\{Q\}$ correct?

  - Consider the cases when B is true and when B is false

- Rule for Conditions with Else Clause: If C_1 and C_2 are two pieces of code and if B is a logical expression, then one has

$$\frac{\{P \wedge B\}C_1\{Q\} \quad \{P \wedge \neg B\}C_2\{Q\}}{\{P\} \text{ if } \{B\} \text{ then } C_1 \text{ else } C_2\{Q\}}$$

- Consider some examples:

  - $\{\}$ if $x > y$ $\{max = x\}$ else $\{max = y\}$
    $\{(max \geq x) \wedge (max \geq y)\}$

  - $\{i \geq j - 1\}$
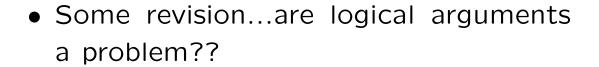   if $i > j$ $\{j = j + 1\}$ else $\{i = i + 1\}$
    $\{i \geq j\}$

- Rule for Conditions(no else clause): If C is a piece of code and if B is a logical expression, then one has

$$\frac{\{P \wedge B\}C\{Q\} \quad \{P \wedge \neg B\} \implies \{Q\}}{\{P\} \text{ if } \{B\} \text{ then } C_1\{Q\}}$$

- Consider some examples:

  - $\{\}$ if $x < 0$ $\{x = 0\}\{x \geq 0\}$

  - $\{\}$ if $max > 10\{max = 10\}\{max \leq 10\}$

- Some revision...are logical arguments a problem??

- Lets look at some logical rules