

Week 2: Weakest Preconditions

"The Virgin"

Postcondition

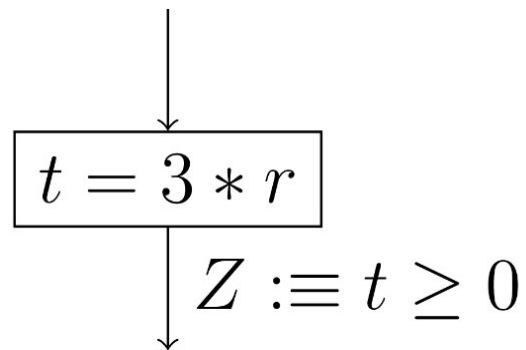
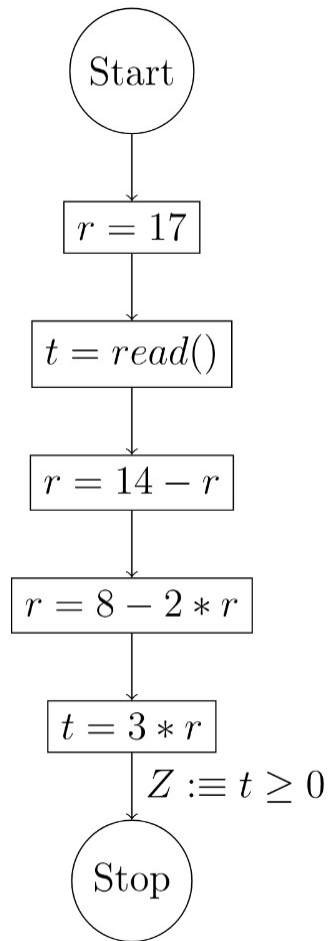


THE CHAD

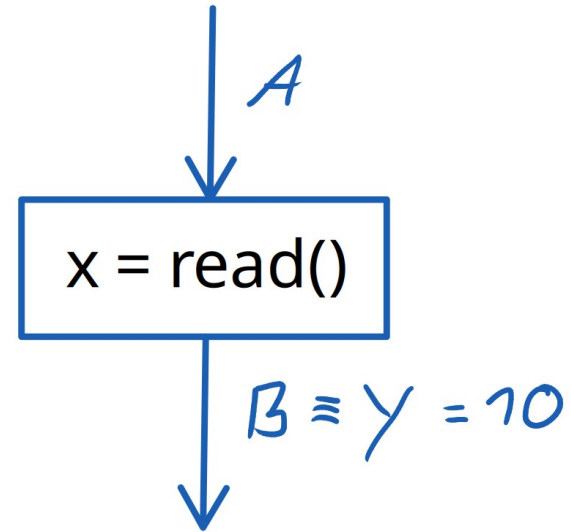
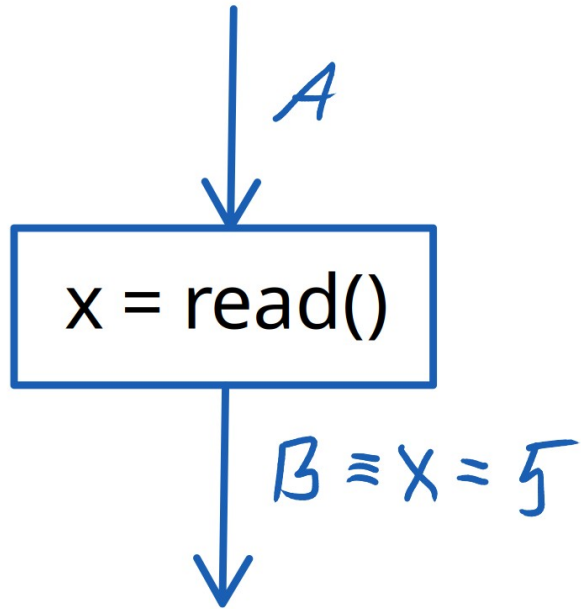
Precondition



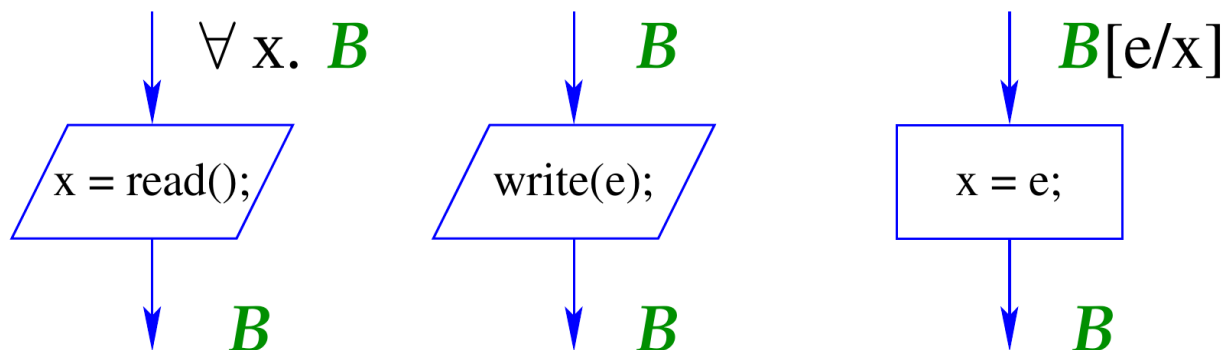
Strongest Post \rightarrow Weakest Pre



Strongest Post \rightarrow Weakest Pre

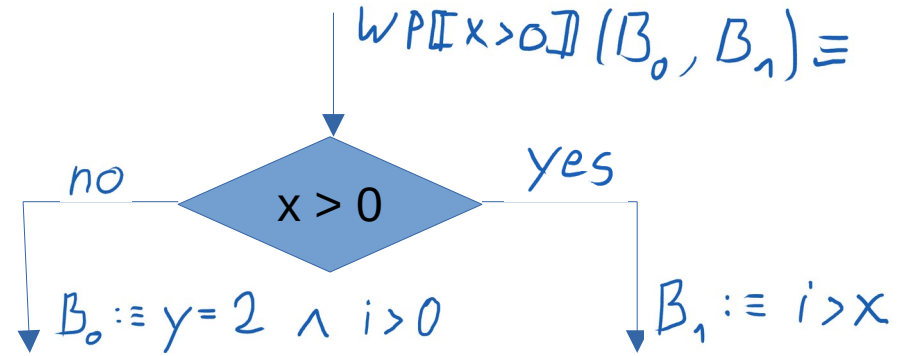
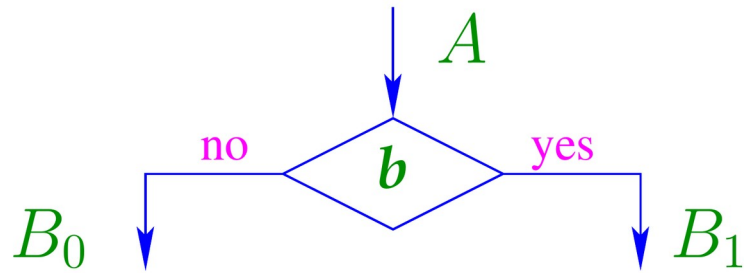


Strongest Post \rightarrow Weakest Pre

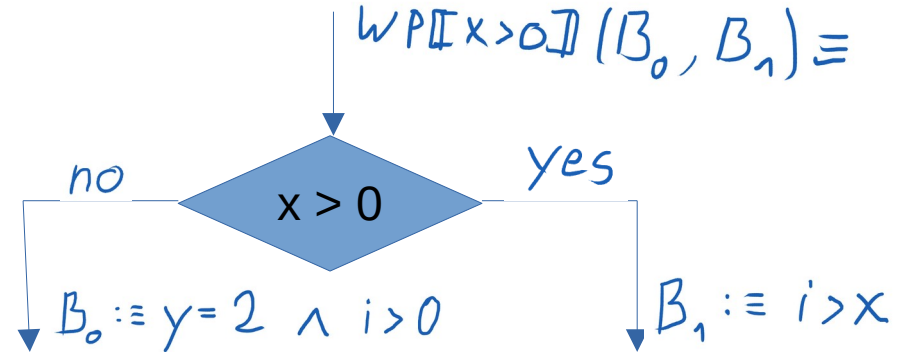
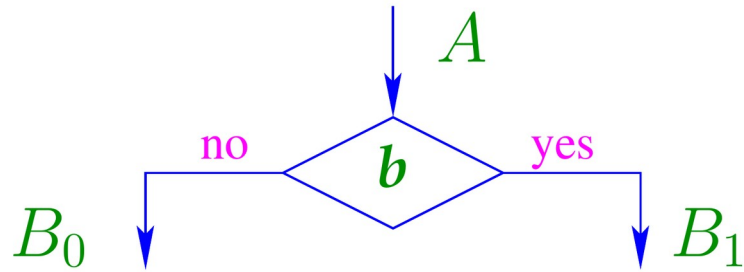


$$\begin{aligned}\mathbf{WP}[\text{;}] (B) &\equiv B \\ \mathbf{WP}[\text{x = e;}] (B) &\equiv B[e/x] \\ \mathbf{WP}[\text{x = read();}] (B) &\equiv \forall x. B \\ \mathbf{WP}[\text{write(e);}] (B) &\equiv B\end{aligned}$$

Strongest Post \rightarrow Weakest Pre



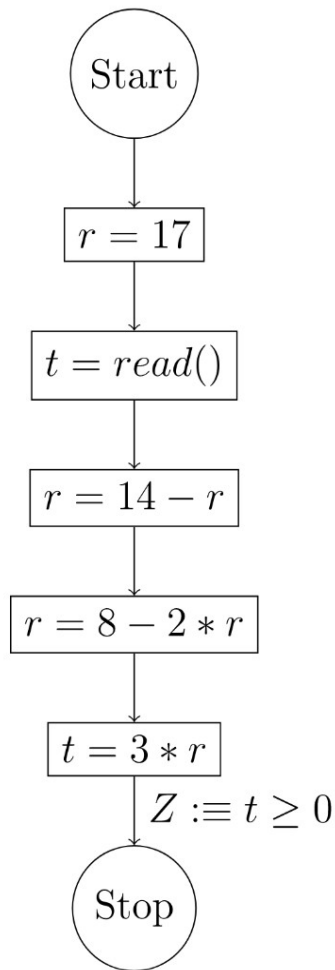
Strongest Post \rightarrow Weakest Pre



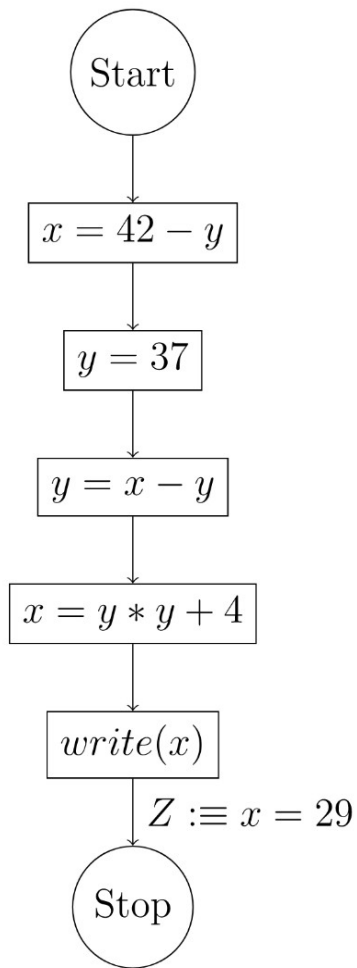
$$\begin{aligned}\mathbf{WP}[b](B_0, B_1) &\equiv ((\neg b) \Rightarrow B_0) \wedge (b \Rightarrow B_1) \\ &\equiv (\neg b \wedge B_0) \vee (b \wedge B_1)\end{aligned}$$

Week 02 Tutorial 01 — From Post- to Preconditions

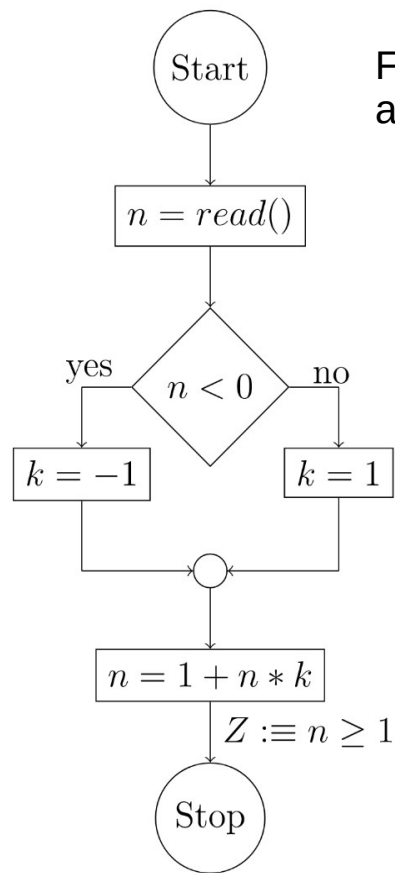
1.



2.



3.



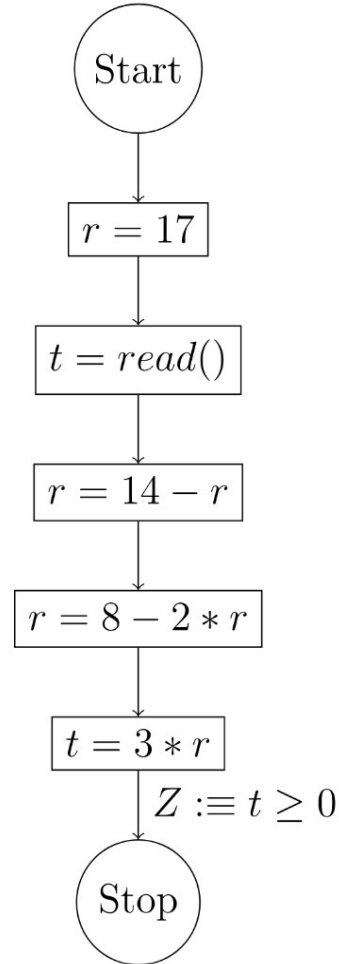
For each of these graphs show whether the assertion Z holds...

(a) ...using strongest postconditions

(b) ...using weakest preconditions.

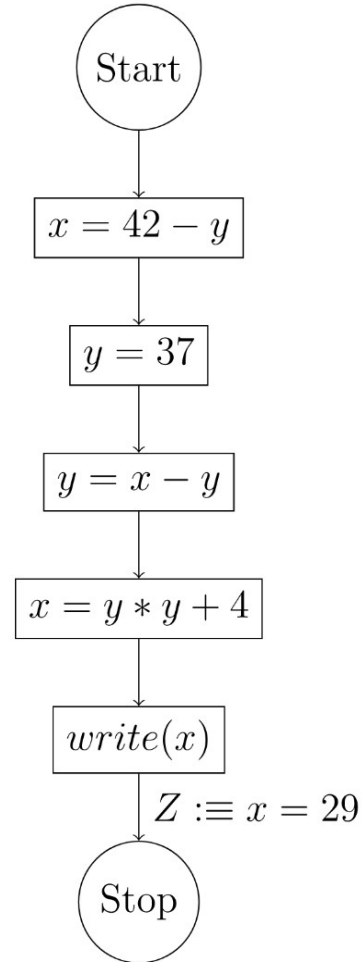
Week 02 Tutorial 01 — From Post- to Preconditions

1.



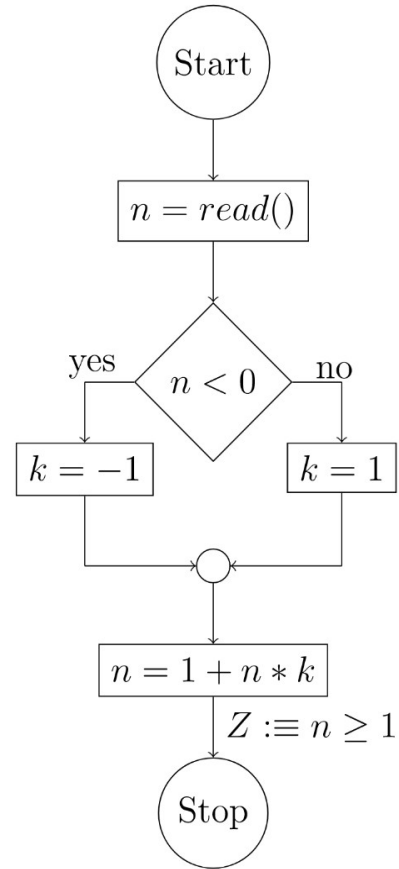
Week 02 Tutorial 01 — From Post- to Preconditions

2.

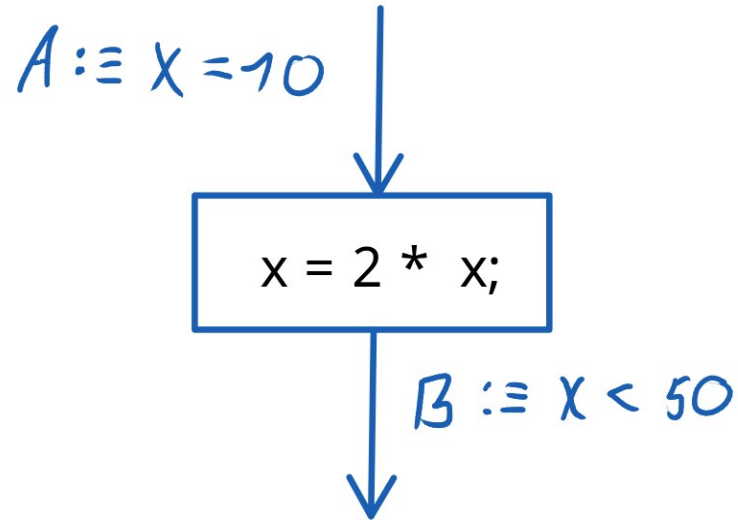


Week 02 Tutorial 01 — From Post- to Preconditions

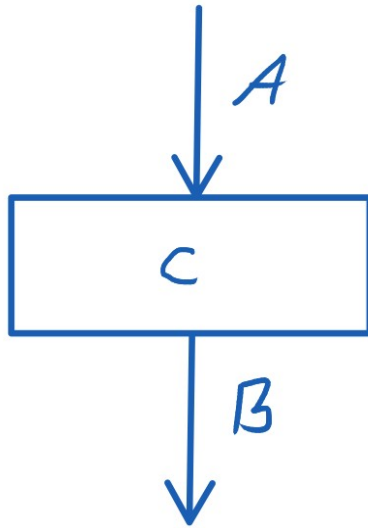
3.



Local Consistency



Local Consistency



A, B und c sind Locally Consistent, falls eine der folgenden Aussagen gilt:

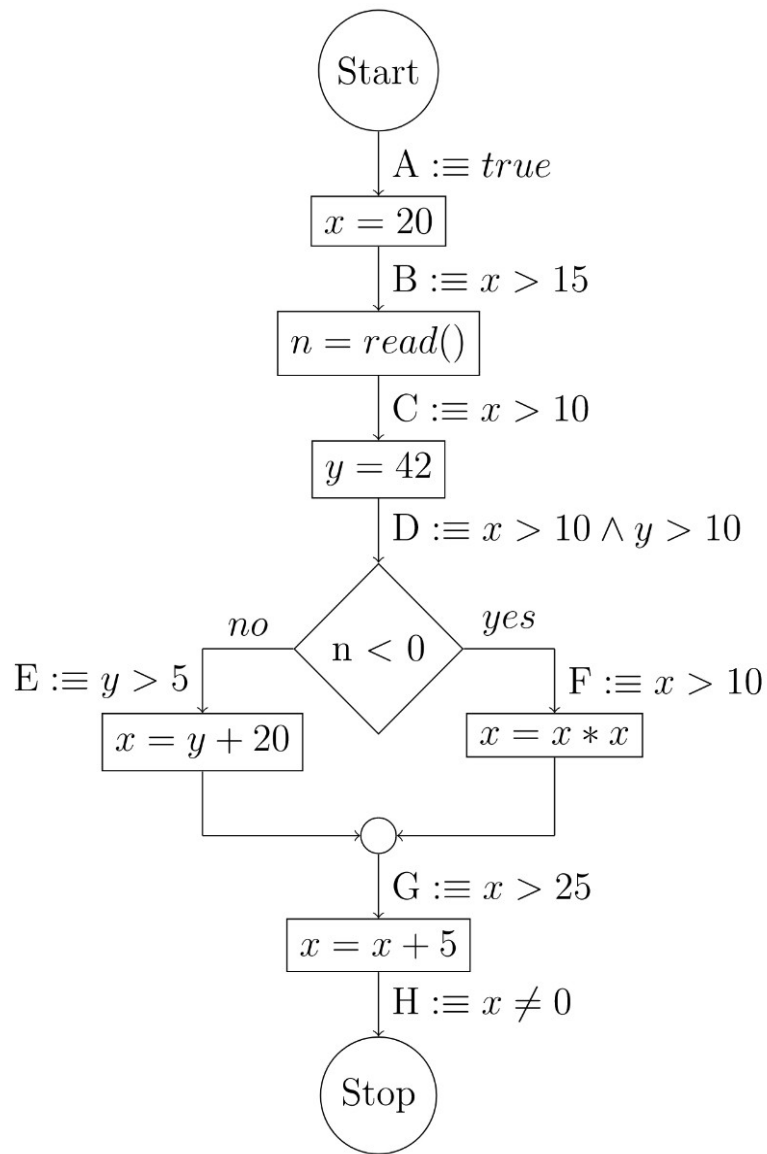
- 1) $A \Rightarrow WP[C](B)$
- 2) $SP[C](A) \Rightarrow B$

Beachte: 1) und 2) sind gleichbedeutend

Week 02 Tutorial 02

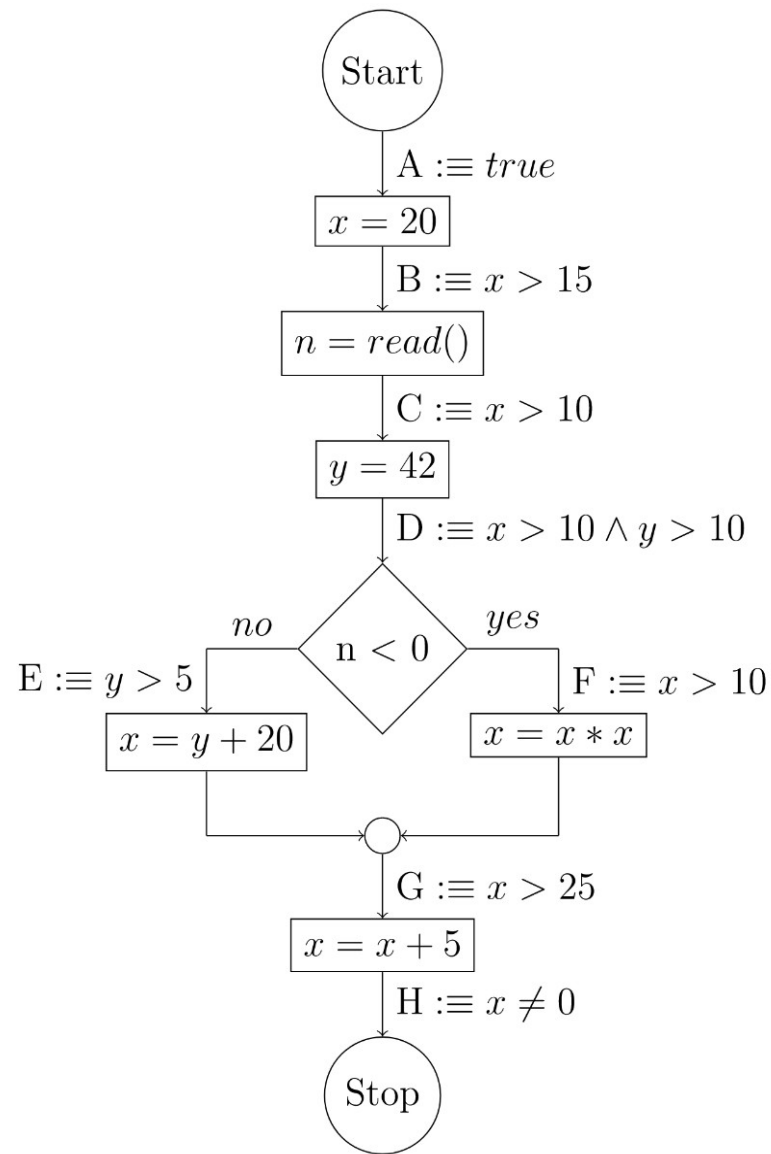
Local Consistency

Check whether the annotated assertions prove that the program computes an $x \neq 0$ and discuss why this is the case.

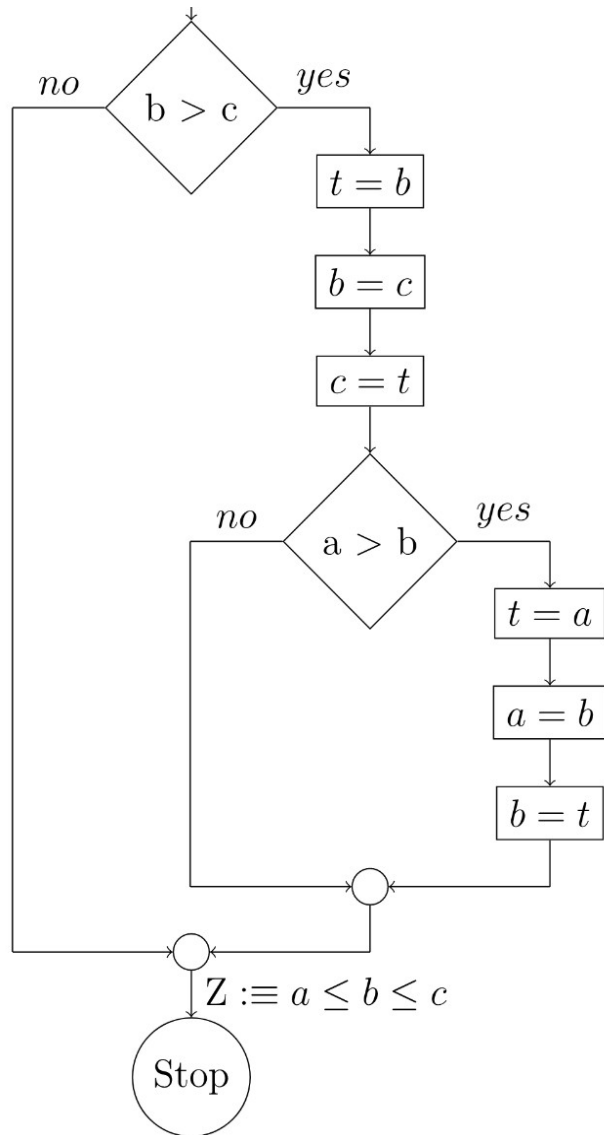


Week 02 Tutorial 02

Local Consistency



Week 02 Tutorial 03 — Trouble Sort



Week 02 Tutorial 03 — Trouble Sort

