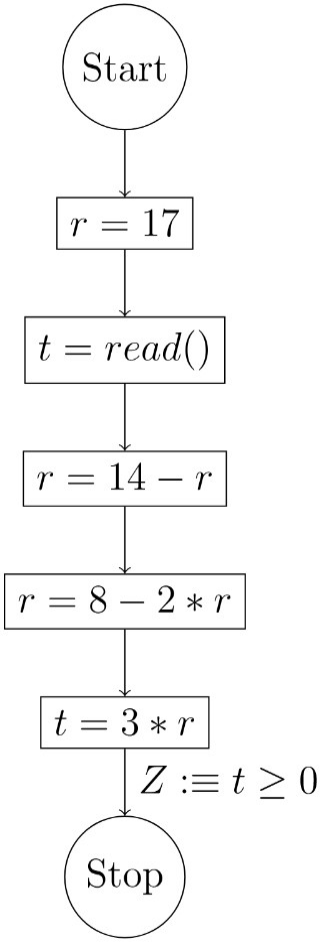
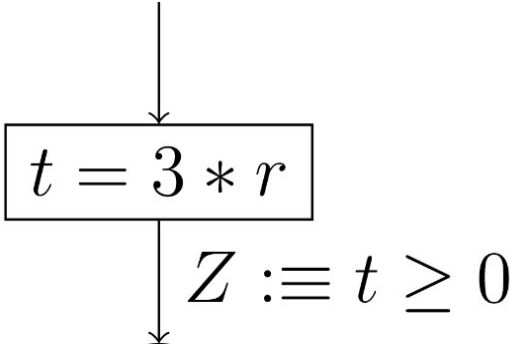
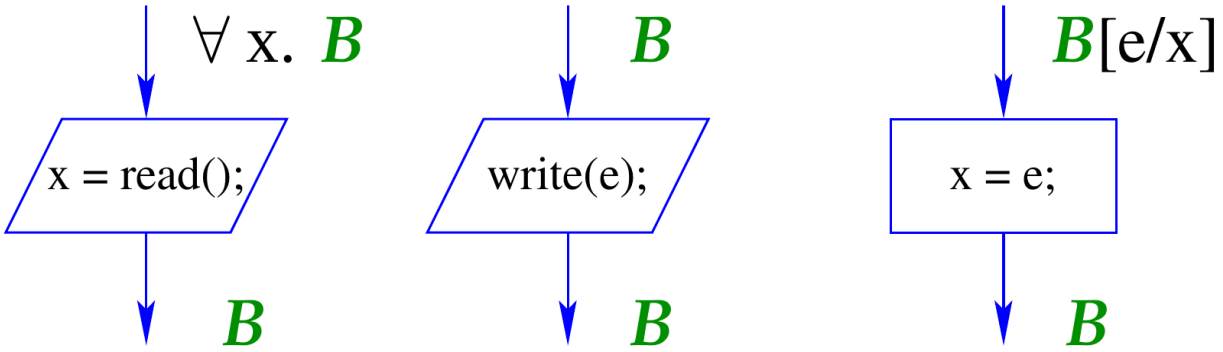
Week 2: Weakest Preconditions

Strongest Post → Weakest Pre



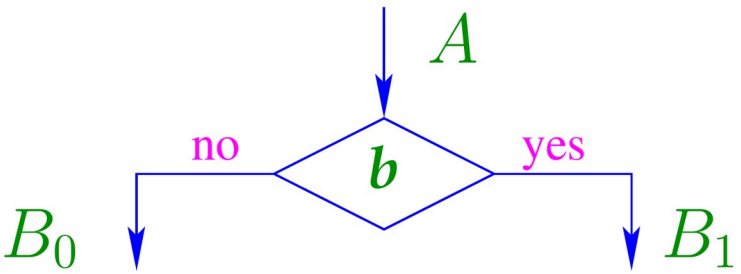


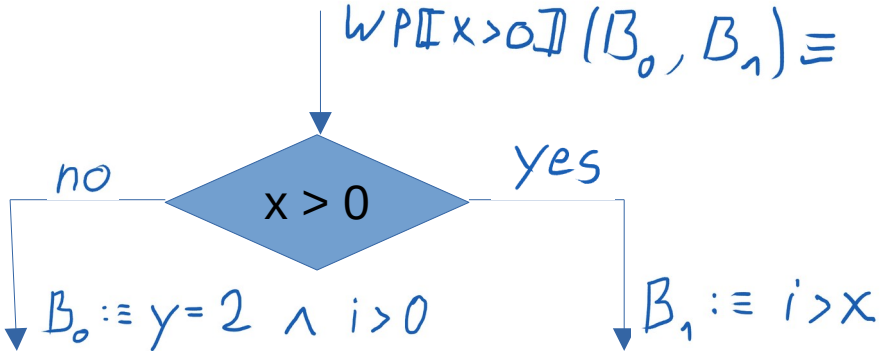
Strongest Post → Weakest Pre



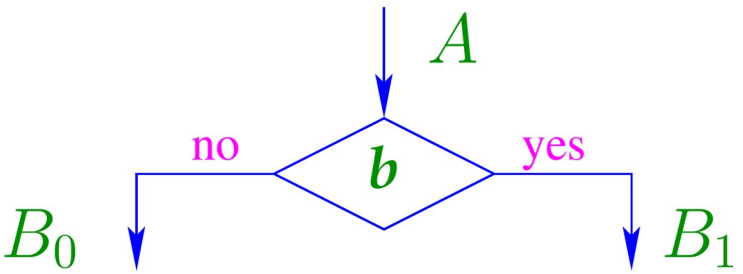
$$
\begin{array}{lcl}
\mathbf{WP}[\![\texttt{;}]\!](B) & \equiv & B \\
\mathbf{WP}[\![\texttt{x = e;}]\!](B) & \equiv & B[e/x] \\
\mathbf{WP}[\![\texttt{x = read();}]\!](B) & \equiv & \forall\, x.\, B \\
\mathbf{WP}[\![\texttt{write(e);}]\!](B) & \equiv & B
\end{array}
$$

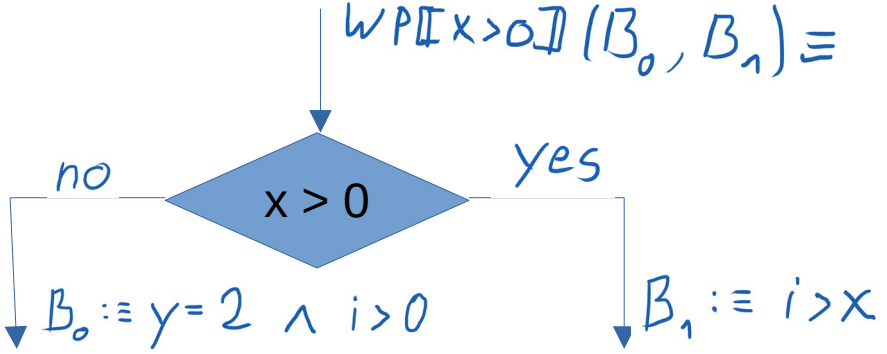
Strongest Post → Weakest Pre





Strongest Post → Weakest Pre

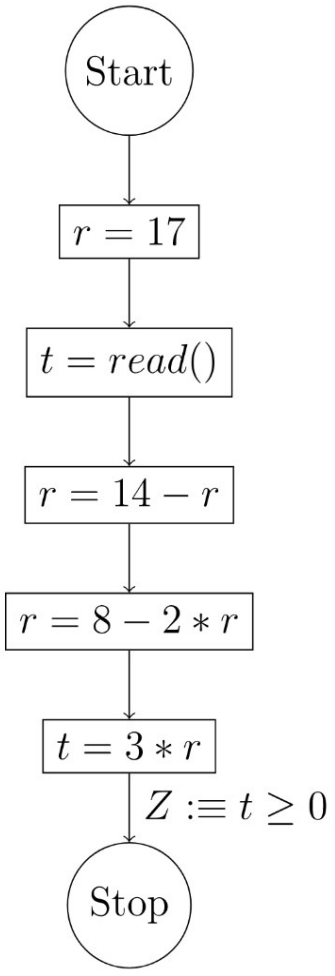




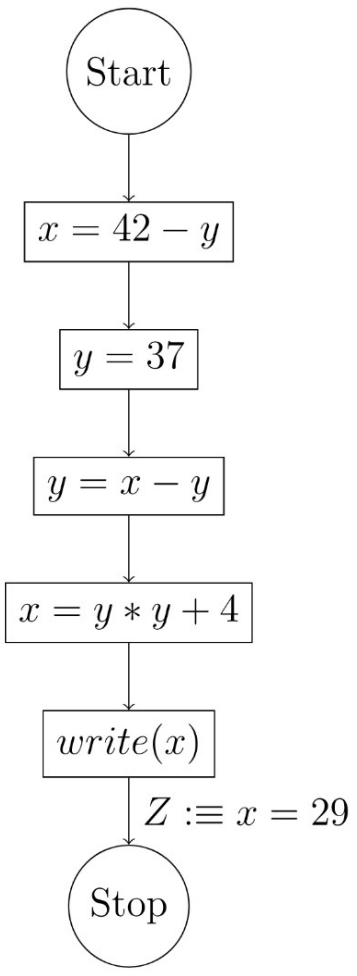
$$\mathbf{WP}[\![b]\!]\ (B_0, B_1) \equiv ((\neg b) \Rightarrow B_0) \wedge (b \Rightarrow B_1)$$
$$\equiv (\neg b \wedge B_0) \vee (b \wedge B_1)$$

Week 02 Tutorial 01 — From Post- to Preconditions

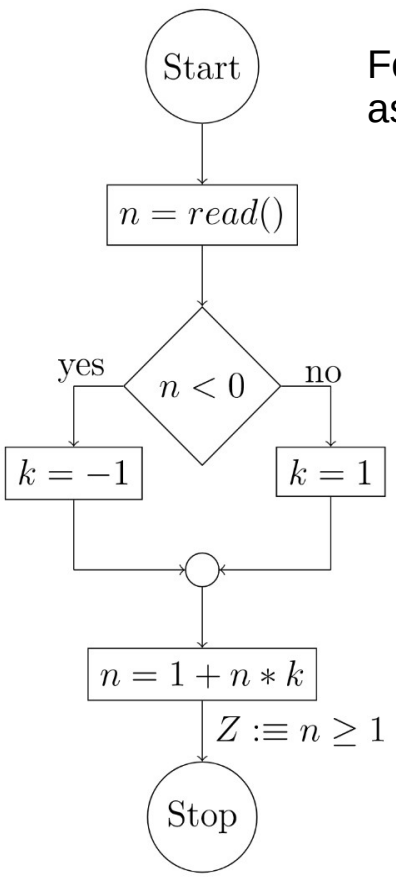
1.



2.



3.



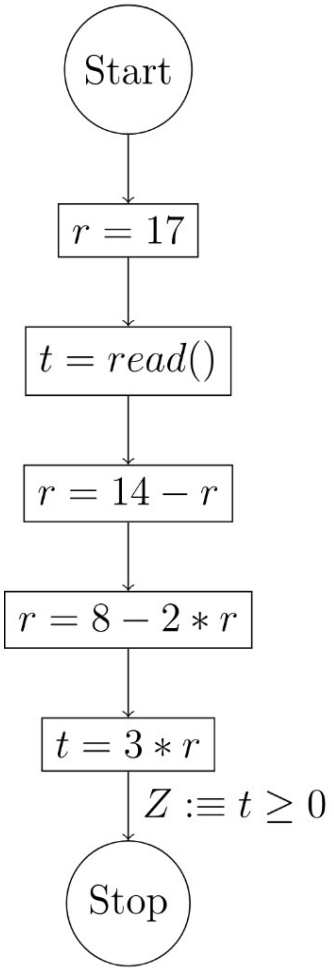
For each of these graphs show whether the assertion Z holds…

(a) …using strongest postconditions

(b) …using weakest preconditions.

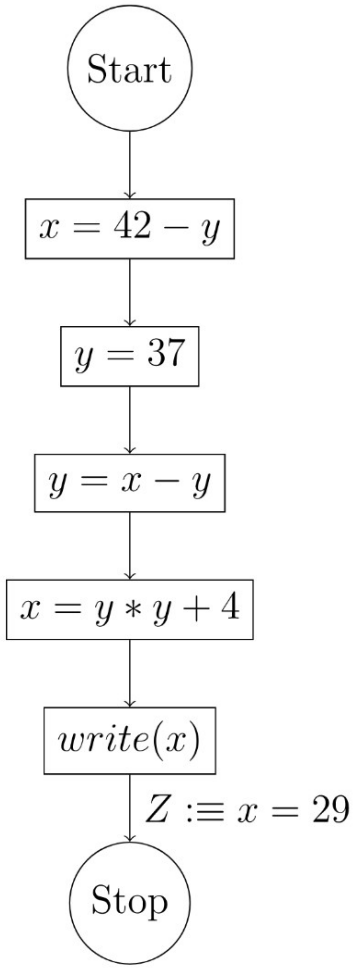
Week 02 Tutorial 01 — From Post- to Preconditions

1.



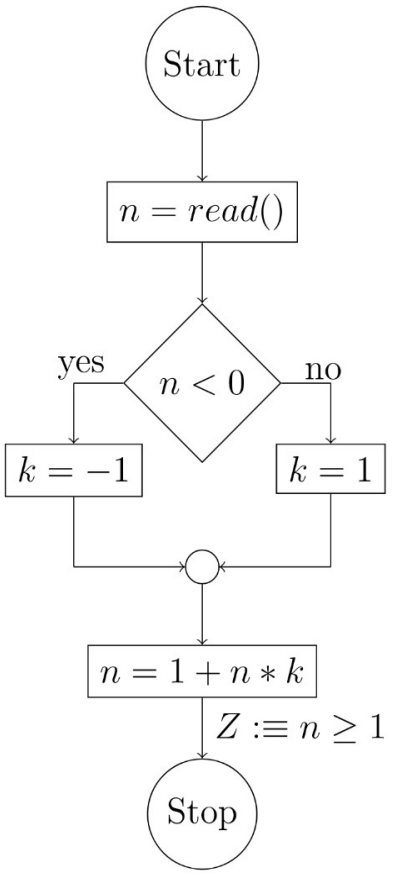
Week 02 Tutorial 01 — From Post- to Preconditions

2.

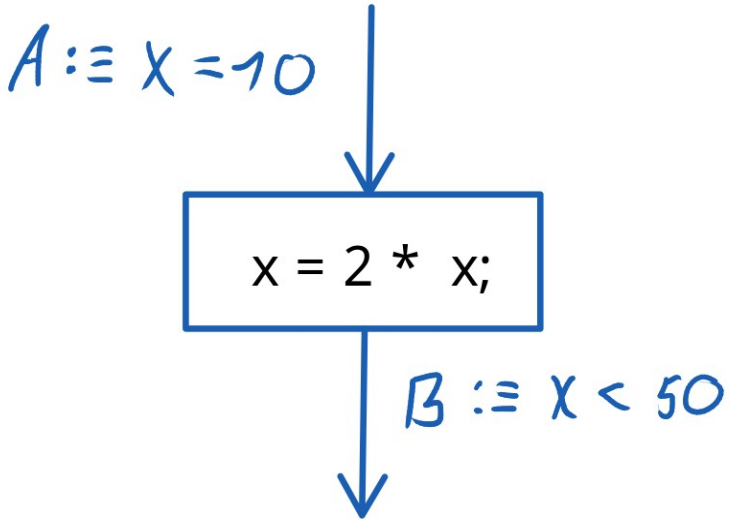


Week 02 Tutorial 01 — From Post- to Preconditions

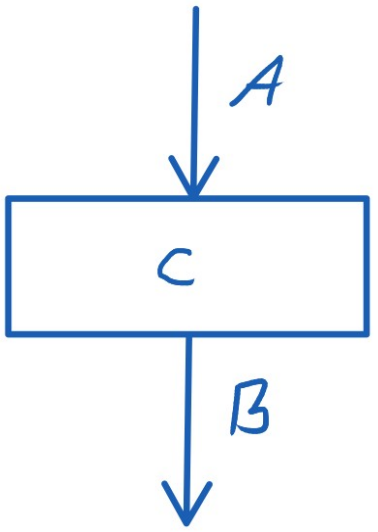
3.



Local Consistency



Local Consistency

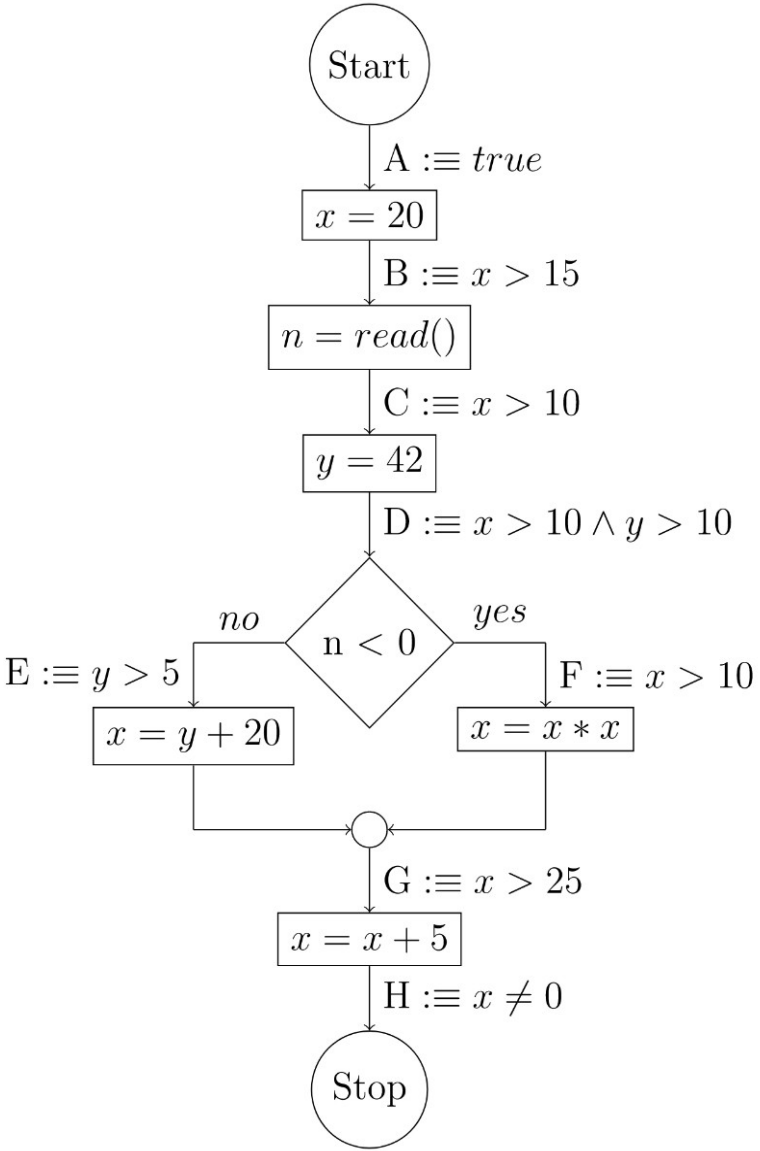


A, B und c sind Locally Consistent, falls eine der folgenden Aussagen gilt:

1) $A \Rightarrow wp[\![c]\!](B)$

2) $sp[\![c]\!](A) \Rightarrow B$

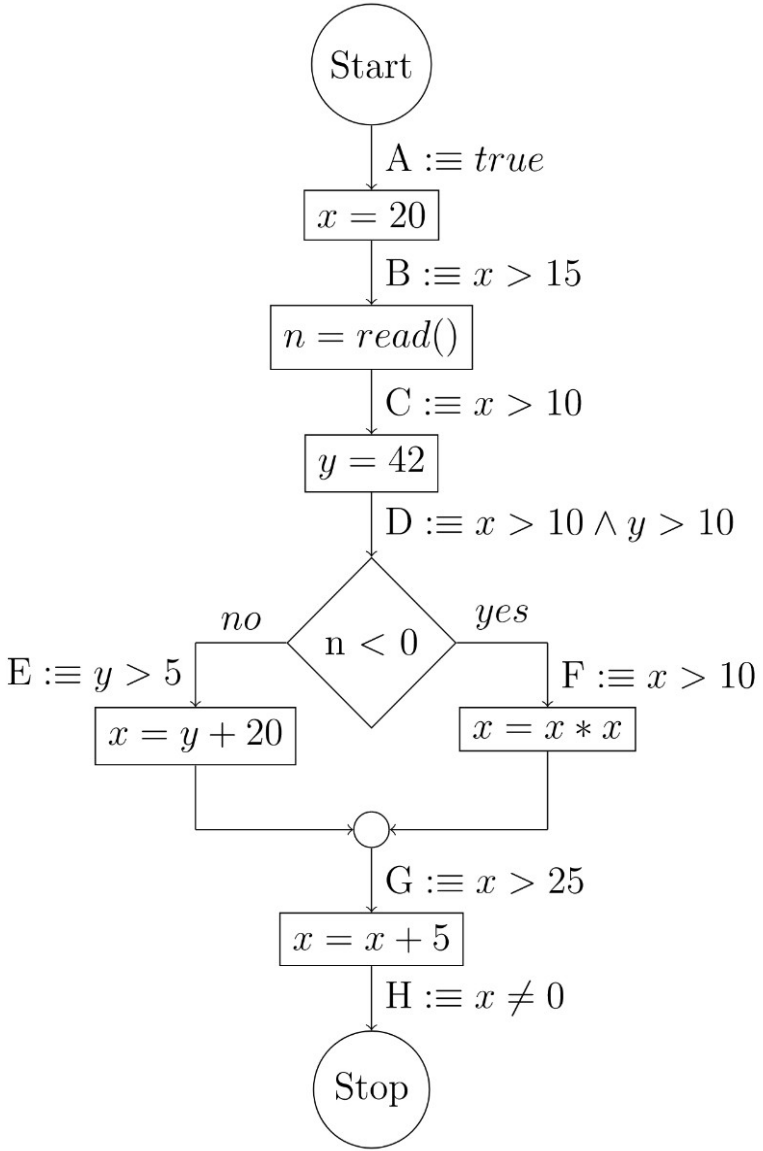
Beachte: 1) und 2) sind gleichbedeutend



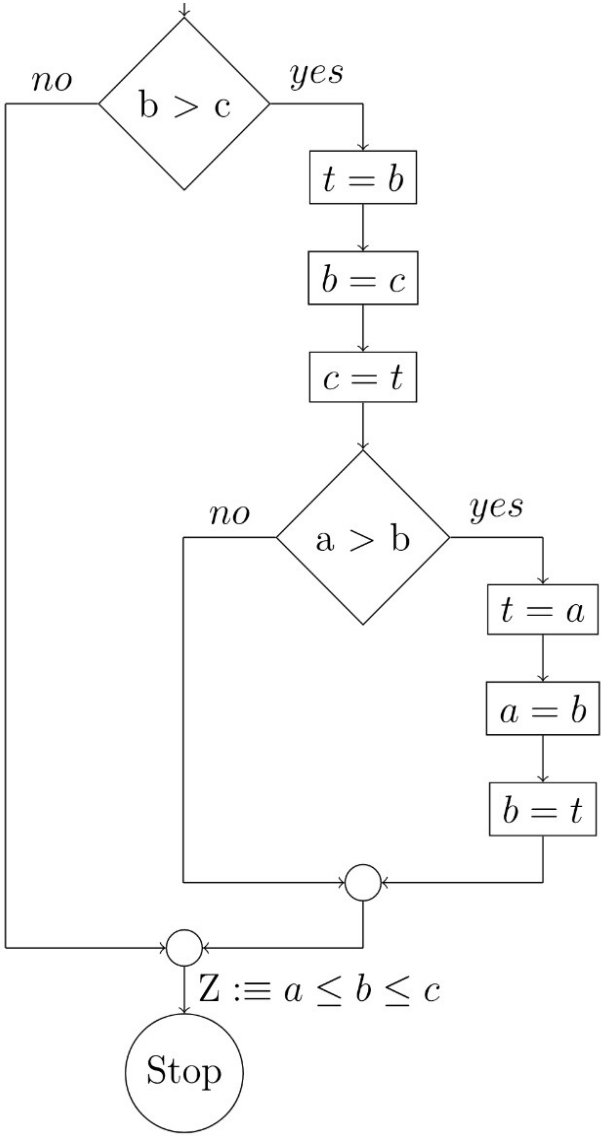
Week 02 Tutorial 02
Local Consistency

Check whether the annotated assertions prove that the program computes an x != 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