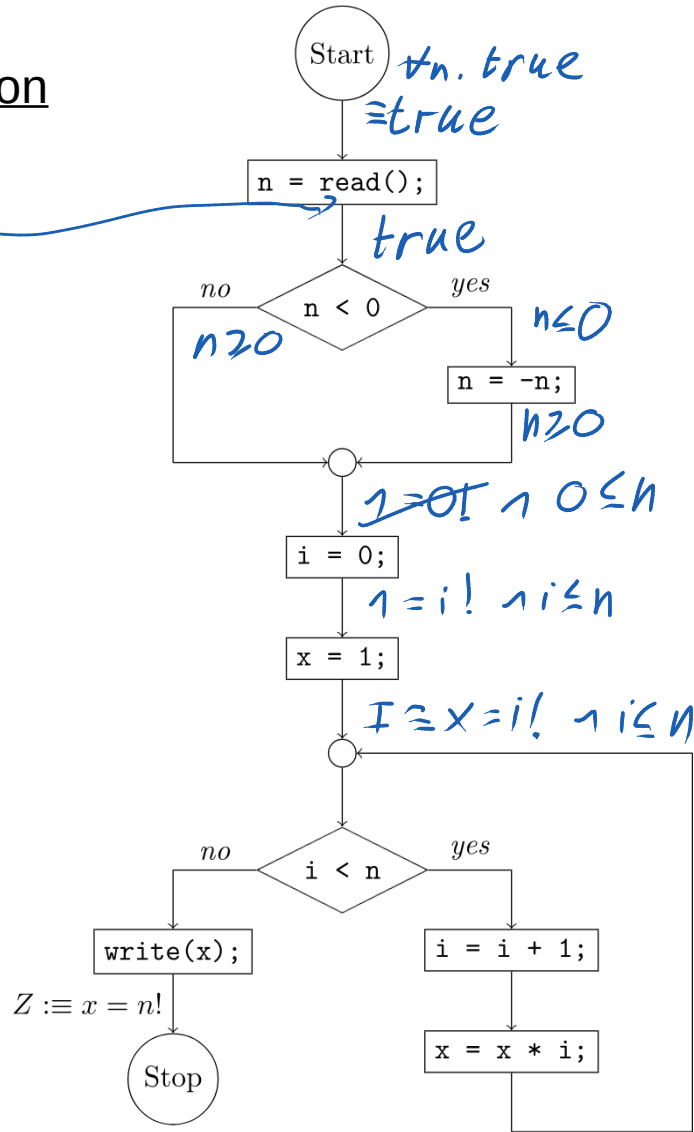
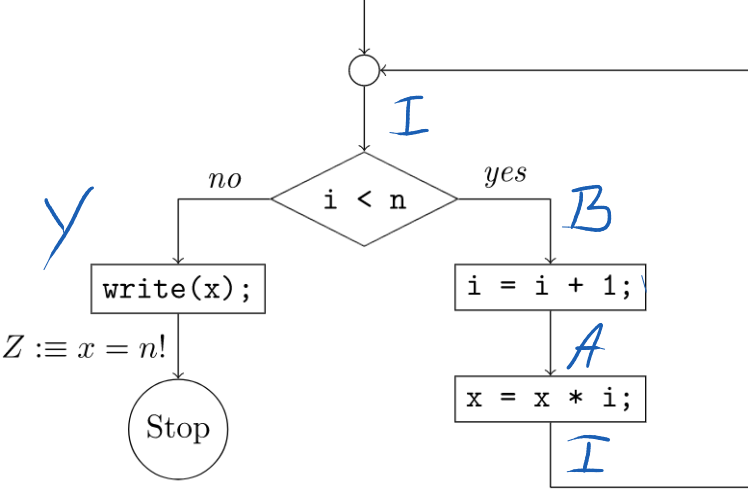


Prove Z using Weakest Precondition

$$\begin{aligned} & (n \geq 0 \wedge n \neq 0) \\ & \vee (n < 0 \wedge n \leq 0) \\ & \equiv n \geq 0 \vee n < 0 \\ & \equiv \text{true} \end{aligned}$$



$A \Rightarrow B$
 $\equiv A$ is stronger
than B



$$Y \equiv WP[write(x)](x = n!) \equiv x = n!$$

$$I \equiv x = i! \wedge i \leq n$$

$$A \equiv WP[x = x * i](I) \equiv x \cdot i = i! \wedge i \leq n$$

$$\begin{aligned}
 B \equiv WP[i = i + 1](A) &\equiv x(i+1) = (i+1)! \wedge i+1 \leq n \\
 &\equiv x(i+1) = \cancel{(i+1)} \cdot i! \wedge i < n \\
 &\equiv x = i! \wedge i < n
 \end{aligned}$$

check for I

$$I \wedge i < n \Rightarrow B$$

$$① \quad x = i! \wedge i \leq n \wedge i < n \Rightarrow x = i! \wedge i < n \quad \checkmark$$

$$I \wedge i \geq n \Rightarrow Y$$

$$② \quad x = i! \wedge i \leq n \wedge i \geq n \Rightarrow x = n! \quad \checkmark$$