

$$\begin{aligned}
 1 \quad & wp(\text{if } (x=0) \{\text{skip}\} \text{ else } \{x := 1+x\} [\frac{1}{3}] x := 6, x) \\
 &= [x=0] \cdot wp(\text{skip}, x) + [\neg x=0] \cdot wp(x := 1+x [\frac{1}{3}] x := 6, x) \\
 &= [x=0] \cdot X + [\neg x=0] \cdot \left(\frac{1}{3} \cdot wp(x := 1+x, x) + \frac{2}{3} \cdot wp(x := 6, x) \right) \\
 &= 0 + [x \neq 0] \cdot \left(\frac{1}{3} \cdot [1+x] + \frac{2}{3} \cdot 6 \right) \\
 &= [x \neq 0] \cdot \left(\frac{1}{3} [1+x] + 4 \right)
 \end{aligned}$$

$$\begin{aligned}
 6 \quad & wp(\{\text{while}(\text{true}) \{x := 1\}\} [\frac{1}{2}] \{\text{diverge}\}, 1) \\
 &= \frac{1}{2} \cdot wp(\text{while}(\text{true}) \{x := 1\}, 1) + \frac{1}{2} \cdot wp(\text{diverge}, 1) \\
 &= \frac{1}{2} \cdot \text{lfp } X \cdot ([\text{true}] \cdot wp(x := 1, X) + [\neg \text{true}] \cdot 1) + \frac{1}{2} \cdot 0 \\
 &= \frac{1}{2} \cdot \text{lfp } X \cdot wp(x := 1, X) \\
 &= \frac{1}{2} \cdot 0 \\
 &= 0
 \end{aligned}$$