Prove

\[(R \iff P. \text{if } b \text{ then } ok \text{ else } R \text{ fi}) \land (W \iff \text{if } b \text{ then } ok \text{ else } P. W \text{ fi})\] 
\[
\iff (R \iff P. W) \land (W \iff \text{if } b \text{ then } ok \text{ else } R \text{ fi})
\]

After trying the question, scroll down to the solution.
Starting with the bottom side,

\[(R \iff P. W) \land (W \iff \text{if } b \text{ then } ok \text{ else } R \text{ fi})\]  

\[= (R \iff P. W) \land (R \iff P. W) \land (W \iff \text{if } b \text{ then } ok \text{ else } R \text{ fi})\]

idempotent law

In the leftmost conjunct, strengthen \( W \) by using the rightmost conjunct.

This strengthens the antecedent of an implication, and so weakens the implication.

\[\Rightarrow (R \iff P. \text{if } b \text{ then } ok \text{ else } R \text{ fi}) \land (R \iff P. W) \land (W \iff \text{if } b \text{ then } ok \text{ else } R \text{ fi})\]

In the rightmost conjunct strengthen \( R \) by using the middle conjunct.

This strengthens the antecedent of an implication, and so weakens the implication.

\[\Rightarrow (R \iff P. \text{if } b \text{ then } ok \text{ else } R \text{ fi}) \land (R \iff P. W) \land (W \iff \text{if } b \text{ then } ok \text{ else } P. W \text{ fi})\]

Drop the middle conjunct.

\[\Rightarrow (R \iff P. \text{if } b \text{ then } ok \text{ else } R \text{ fi}) \land (W \iff \text{if } b \text{ then } ok \text{ else } P. W \text{ fi})\]