Exercise 4

$xs @ (ys @ zs) = (xs @ ys) @ zs$

Base case $xs = []$

given $ws @ (ys @ zs) = (ws @ ys) @ zs$

WTS $(w :: ws) @ (ys @ zs) = ((w :: ws @ ys) @ zs)$

$\Leftrightarrow w :: (ws @ ys @ zs))$

$\Leftrightarrow w :: ((ws @ ys) @ zs))$

$\Leftrightarrow (w :: (ws @ ys))@ zs$

$\Leftrightarrow (w :: ws) @ ys) @ zs$

Exercise 5

$rev2 (xs, ys) = rev(xs) @ ys$

$xs = []$

$rev2 ([], ys) = ys = rev[] @ ys = ys$

assue $rev2 (xs, ys) = rev(xs) @ ys$

$rev2 (x :: xs, ys) = rev(x :: xs) @ ys$

$\shortparallel$

$rev 2 (xs, x :: ys)$

$\shortparallel$

$rev (xs) @ (x :: ys)$

$rev (xs) @ ((x :: []) @ ys)$

$rev (xs) @ ([x] @ ys)$

$rev (xs @ [x]) @ ys$

$rev (x :: xs) @ ys$

$rev2 (xs, []) = rev (xs) @ []$

$= rev (xs)$

Modal logic $\Diamond R \to \Box V$

$\Box F \to \Diamond L$

$\Diamond \neg R$

$\neg \Diamond \neg R$ $\Box R$

$\Diamond \phi \Leftrightarrow \neg \Box \neg \phi$

$M, w \models \Diamond \phi$ For some Rww' $M, w' \models \phi$

Then $w' \not\models \neg \phi$

Such that $w \not\models \neg \Box \neg \phi$

$S \to$

$\mid 1$

$\mid AS$

$\mid SA$

$\mid 0S0$

$\mid 1S1$

$A \to 00 \mid 11$

$S' \to S \mid \varepsilon$

$A \to \varepsilon$ $\mid 0$

$\mid 0A1$

$\mid 1A0$

$\mid AA$

$S \to A0A$

$M = (W, R)$ is symmetric frame.

$M, w \models_\rho A \to \Box\Diamond A$.

$M, w \models_\rho A$.

Rww' $M, w' \models_\rho \Diamond A$.

$\because Rww'$

$\therefore Rw'w$ $M, w \models_\rho \Box\Diamond A$.

$A \to \Box A$. reflexive.

$\Box A \to \Box\Box A$ transitive frame