Ken

Nobody

Ken came :(

Exercise 1

This is my alternative proof for showing that 'Ken is happy' follows from the assumptions, even if we omit $PN \to WT$ and $WT \to \neg KHo$.

Theorem: $\Gamma \quad \vdash \quad KHa$

Abbreviations: Γ is already defined in the assignment.

Derivation tree:

$$
\cfrac{
\cfrac{
\cfrac{}{\Gamma, KHo \vdash JS \to ML}\, hyp
\quad
\cfrac{
\cfrac{}{\Gamma, KHo \vdash JS \land PN}\, hyp
}{\Gamma, KHo \vdash JS}\, \land E1
}{
\cfrac{
\cfrac{\Gamma, KHo \vdash ML \quad \cfrac{}{\Gamma, KHo \vdash KHo}\, hyp}{\Gamma, KHo \vdash KHo \land ML}\, \land I
\quad
\cfrac{}{\Gamma, KHo \vdash KHo \land ML \to KHa}\, hyp
}{\Gamma, KHo \vdash KHa}\, \to E
}\, \to E
\quad
\cfrac{}{\Gamma \vdash KHo \lor \neg KHo}\, hyp
\quad
\Gamma, \neg KHo \vdash KHa\, B3
}{\Gamma \vdash KHa}\, \lor E
$$

B3:
$$
\cfrac{
\cfrac{}{\Gamma, \neg KHo \vdash \neg KHo}\, hyp
\quad
\cfrac{}{\Gamma \vdash \neg KHo \to KHa}\, hyp
}{\Gamma, \neg KHo \vdash KHa}\, \to E
$$