HW#2. Due Oct 17th (Wed 11AM)

KAIST

1. Prove in $\mathcal{G}$ and $\mathcal{H}$

$$\vdash (A \to B) \to (\neg B \to \neg A),$$
$$\vdash (A \to B) \to ((\neg A \to B) \to B),$$
$$\vdash ((A \to B) \to A) \to A.$$

2. Prove that if $\vdash U$ in $\mathcal{G}$ then there is a closed semantic tableau for $\bar{U}$ (the forward direction of Theorem 3.6).

3. Prove the derived rule called *modus tollens*:

$$\frac{\vdash \neg B \qquad\qquad \vdash A \to B}{\vdash \neg A}.$$

4. Give proofs in $\mathcal{G}$ for each of the three axioms of $\mathcal{H}$.

5. Prove $\vdash (\neg A \to A) \to A$ (Theorem 3.29).