

## ## Rules of Inference ##

$$\begin{array}{l} p \\ p \rightarrow q \\ \hline \therefore q \end{array}$$

Modus ponens ("method of placing")

$$\begin{array}{l} \neg q \\ p \rightarrow q \\ \hline \therefore \neg p \end{array}$$

Modus tollens ("method of taking")

$$\begin{array}{l} p \\ \hline \therefore p \vee q \end{array}$$

Addition

$$\begin{array}{l} p \wedge q \\ \hline \therefore p \end{array}$$

Simplification

$$\begin{array}{l} p \\ q \\ \hline \therefore p \wedge q \end{array}$$

Conjunction

$$\begin{array}{l} p \rightarrow q \\ q \rightarrow r \\ \hline \therefore p \rightarrow r \end{array}$$

Hypothetical syllogism (if r relies on q, and q relies on p, then r also relies on p)

$$\begin{array}{l} p \vee q \\ \neg p \\ \hline \therefore q \end{array}$$

Disjunctive syllogism (if p or q are needed for a job, and the job was done, but p did not do the job, then q did the job)

$$\begin{array}{l} p \vee q \\ \neg p \vee r \\ \hline \therefore q \vee r \end{array}$$

Resolution (p and  $\neg p$  cancel out, so the situation will be resolved by  $q \vee r$ )