Conditional proof: prove $P \Rightarrow Q$ by assuming P on an indented line and showing that Q can be proved on a following line.

Indirect proof: prove P by assuming $\neg P$ on an indented line and showing that both Z and $\neg Z$ can be proved on following lines.

Equivalences.

$$\begin{aligned}
A \wedge (B \vee C) &\equiv (A \wedge B) \vee (A \wedge C) \\
A \vee (B \wedge C) &\equiv (A \vee B) \wedge (A \vee C) \\
\neg\neg A &\equiv A \\
A \vee A &\equiv A \\
A \vee \neg A &\equiv true \\
A \vee true &\equiv true \\
A \vee false &\equiv A
\end{aligned}$$

$$\begin{aligned}
A \wedge true &\equiv A \\
A \wedge false &\equiv false \\
A \wedge A &\equiv A \\
A \wedge \neg A &\equiv false \\
A \Rightarrow true &\equiv true \\
A \Rightarrow false &\equiv \neg A \\
true \Rightarrow A &\equiv A \\
false \Rightarrow A &\equiv true \\
A \Rightarrow A &\equiv true
\end{aligned}$$

$$\begin{aligned}
A \Rightarrow B &\equiv \neg A \vee B \\
A \Rightarrow B &\equiv \neg B \Rightarrow \neg A \\
\neg(A \Rightarrow B) &\equiv A \wedge \neg B \\
A \wedge (A \vee B) &\equiv A \\
A \vee (A \wedge B) &\equiv A \\
A \wedge (\neg A \vee B) &\equiv A \wedge B \\
A \vee (\neg A \wedge B) &\equiv A \vee B \\
\neg(A \wedge B) &\equiv \neg A \vee \neg B \\
\neg(A \vee B) &\equiv \neg A \wedge \neg B
\end{aligned}$$

- Modus Ponens

$$\frac{A \Rightarrow B, A}{B}$$

- Modus Tollens

$$\frac{A \Rightarrow B, \neg B}{\neg A}$$

- Conjunction

$$\frac{A, B}{A \wedge B}$$

- Simplification

$$\frac{A \wedge B}{A}$$

- Addition

$$\frac{A}{A \vee B}$$

- Disjunctive syllogism

$$\frac{A \vee B, \neg A}{B}$$

- Hypothetical syllogism

$$\frac{A \Rightarrow B, B \Rightarrow C}{A \Rightarrow C}$$

- Constructive dilemma

$$\frac{A \vee B, A \Rightarrow C, B \Rightarrow D}{C \vee D}$$

- Destructive dilemma

$$\frac{\neg C \vee \neg D, A \Rightarrow C, B \Rightarrow D}{\neg A \vee \neg B}$$

- Assignment Axiom

$$\{Q(x/t)\}\ \texttt{x := t}\ \{Q\}$$

- Composition

$$\frac{\{P\}\ \texttt{S1}\ \{R\}, \{R\}\ \texttt{S2}\ \{Q\}}{\{P\}\ \texttt{S1;S2}\ \{Q\}}$$

- Consequence

$$\frac{P \Rightarrow R, \{R\}\ \texttt{S}\ \{Q\}}{\{P\}\ \texttt{S}\ \{Q\}}$$

$$\frac{\{P\}\ \texttt{S}\ \{T\}, T \Rightarrow Q}{\{P\}\ \texttt{S}\ \{Q\}}$$

- If-then

$$\frac{\{P \wedge C\}\ \texttt{S}\ \{Q\}, P \wedge \neg C \Rightarrow Q}{\{P\}\ \texttt{if C then S}\ \{Q\}}$$

- If-then-else

$$\frac{\{P \wedge C\}\ \texttt{S1}\ \{Q\}, \{P \wedge \neg C\}\ \texttt{S2}\ \{Q\}}{\{P\}\ \texttt{if C then S1 else S2}\ \{Q\}}$$

- While

$$\frac{\{P \wedge C\}\ \texttt{S}\ \{P\}}{\{P\}\ \texttt{while C do S}\ \{P \wedge \neg C\}}$$

- Await rule

$$\frac{\{P \wedge B\}\ \texttt{S}\ \{Q\}}{\{P\}\ \langle \texttt{await (B) S;} \rangle\ \{Q\}}$$

- Co rule

$$\frac{\{P_i\}\ \texttt{Si}\ \{Q_i\} \text{ are interference free}}{\{P_1 \wedge ... \wedge P_n\}\ \texttt{co S1; // ... // Sn; oc}\ \{Q_1 \wedge ... \wedge Q_n\}}$$