

The Formal Language

1. Vocabulary.

1) Sentence Letters:

① P, Q, R, \dots, Z

② P_1, \dots, Z_1

③ P_2, \dots, Z_2

④ P_n, \dots, Z_n .

2) Connectives: \neg (not), \wedge (and), \vee (or), \rightarrow (if... then...), \leftrightarrow (if and only if)

3) Parentheses: $(,)$

2. The Rules.

1) Every sentence letter is a symbolic sentence.

2) If ' \square ' is a symbolic sentence, then so is ' $\sim \square$ '

3) If ' \square ' and ' \triangle ' are symbolic sentences, then so is ' $\square \wedge \triangle$ '

4) If ' \square ' and ' \triangle ' are symbolic sentences, then so is ' $\square \vee \triangle$ '

5) -----, so is ' $\square \rightarrow \triangle$ '.

6) -----, so is ' $\square \leftrightarrow \triangle$ '.

e.g.

$\sim P$	Yes.	$(\sim P)$	No.
$P \wedge Q$	No.	$(P \wedge Q)$	Yes.
$(P \wedge Q) \rightarrow R$	No.	$P \wedge Q \rightarrow R$	No.
$(P \wedge Q \rightarrow R)$	No.	$((P \wedge Q) \rightarrow R)$	Yes.
$P \wedge Q \vee R$	No.	$(P \wedge Q) \vee R$	No.
$P \wedge (Q \vee R)$	No.	$((P \wedge Q) \vee R)$	Yes.

除了 \sim 以外, 其它要构成一个完整的都必须加上括号.

Putting all the correct parentheses in to get a sentence in correct official notation.

3. Informal Conventions: for suppressing parentheses.

1) Outermost parentheses may be omitted.

① $P \rightarrow Q$ is informal N for $(P \rightarrow Q)$

② $(P \wedge Q) \vee R$ for $((P \wedge Q) \vee R)$

③ $P \wedge (Q \vee R)$ for $(P \wedge (Q \vee R))$

2) Parentheses always go around \wedge and \vee before \rightarrow and \leftrightarrow .

① $P \wedge R \rightarrow R$ for $((P \wedge R) \rightarrow R)$

② $S \leftrightarrow \sim P \vee R$ for $(S \leftrightarrow (\sim P \vee R))$

③ $\sim P \vee S \rightarrow Q \wedge \sim R$ for $((\sim P \vee S) \rightarrow (Q \wedge \sim R))$

3) Repeated conjunctions or disjunctions

① $P \wedge Q \wedge R$ for $((P \wedge Q) \wedge R)$

② $P \vee Q \vee R$ for $((P \vee Q) \vee R)$

③ $\sim P \wedge Q \wedge \sim R$ for $((\sim P \wedge Q) \wedge \sim R) \rightarrow ((S \wedge \sim Q) \vee P)$

4. Not well formed

1) $A \sim$: the \sim belongs on the left side of negated proposition.

2) (A) : parentheses are only introduced when joining two wff.

3) $(A \wedge)$: no wff at right side of \wedge .

4) $(A \wedge B) \vee C$: missing parentheses

