

MAIN FORMAL LANGUAGES USED IN THIS COURSE

1. P (Hunter's language for truth-functional logic):

Propositional Symbols: 'p' followed by one or more primes: p', p'', p''', \dots

Connectives: ' \sim ' [negation], ' \supset ' [material conditional]

Parentheses: '(' and ')'

Wffs are defined on p. 55 of Hunter. (But he usually drops the outermost parentheses.)

Metavariables: 'A', 'B', 'C', etc., possibly with numeric subscripts, are variables Hunter uses in his *talk about* wffs of P, and are not symbols of P itself.

2. SL (Bergmann et al.'s language for truth-functional logic)

Atomic Formulae: Capital letters followed by one or more numeric subscripts: A, B, C, ... $A_1, B_1, C_1, \dots A_2, B_2, C_2, \dots$ etc.

Connectives: ' \sim ' [negation], '&' [conjunction], ' \vee ' [disjunction], ' \supset ' [material conditional], ' \equiv ' [material biconditional]

Parentheses: '(' and ')'

Wffs are defined on p. 227 of Bergmann et al. (But they usually drop the outermost parentheses.) Square brackets '[' ']' and curly brackets '{' '}' are sometimes used instead of parentheses, just to make the groupings clearer.

Metavariables: 'P', 'Q', and 'R' are variables used to talk about wffs of SL, and are not symbols of SL itself.

3. Q and Q+ (Hunter's languages for predicate/quantificational logic)

Q includes P, but also includes...

Variables: 'x' followed by one or more primes: x', x'', x''', \dots

Constants: 'a' followed by one or more primes: a', a'', a''', \dots

Functors: 'f' followed by one or more asterisks, followed by one or more primes: $f^*, f^{**}, f^{***}, \dots f^{**'}, f^{***'}, f^{****'}, \dots$ [to express n -ary functions]

N.B., Terms are defined as the variables, the constants, and any n -place functor when followed by n terms. (See Hunter, p. 137)

Predicates: 'F' followed by one or more asterisks, followed by one or more primes: $F^*, F^{**}, F^{***}, \dots F^{**'}, F^{***'}, F^{****'}, \dots$ [to express n -ary relations]

N.B., Primes sometimes get replaced with numeric subscripts. (The point is just to mark different predicates as distinct; ditto with other symbols). Also, asterisks are often replaced by the corresponding number of terms. (The purpose of asterisks on 'f' or 'F' is merely to indicate how many terms are supposed to follow the symbol.)

Quantifiers: ' \wedge ' [universal quantification], ' \vee ' [existential quantification].

Wffs are defined on pp. 137-8.

Metavariables:

‘v’, ‘c’, and ‘t’, possibly with numeric subscripts, are metavariables Hunter uses in his talk *about* variables, constants, and terms of Q (respectively). But none are symbols of Q itself. Similarly, ‘g’ and ‘F’ (without primes), possibly followed by metavariables $t_1 \dots t_n$, are metavariables for talking about n -place functors or predicates of Q (respectively).

N.B., Additional metavariables for Q-expressions are added *ad hoc* as Hunter’s book progresses. E.g., ‘ Gx_1x_2 ’ is used to represent an arbitrary two-place predicate of Q. (He’s usually good at flagging these things however.)

As with P, Hunter uses ‘A’, ‘B’, ‘C’, etc., possibly with numeric subscripts, as metavariables in his talk about wffs of Q.

‘At/v’ is a compound metavariable (again, not part of Q itself), understood as “the wff that results when you replace all occurrences of the variable ‘v’ with the term ‘t’ in A.”

Q+ includes Q, but it has denumerably many additional constants that can be recursively enumerated. (No specific constants are identified here...any enrichment of Q in this manner will count as “Q+”).

4. The Language of System H. (Hunter’s language for his theory of arithmetic)

This is the same as Q, except that we revise it in a few ways to increase readability. Namely:

Parentheses: Use square brackets ‘[’ ‘]’ to indicate some groupings.

Variables: Use the last four lowercase letters: x, y, z, w . (These replace: $x', x'', x''',$ and x'''')

Constant: Use the zero-symbol: 0. (This replaces: a')

Functors and Predicates: Use the following symbols for the following functions/relations:

St [successor function]	replaces	f^t
$t_1 + t_2$ [addition]	replaces	$f^t t_1 t_2$
$t_1 \cdot t_2$ [multiplication]	replaces	$f'' t_1 t_2$
$Pt_1 t_2$ [exponentiation]	replaces	$f''' t_1 t_2$
$t_1 = t_2$ [equality]	replaces	$F^t t_1 t_2$
$t_1 < t_2$ [less-than]	replaces	$F'' t_1 t_2$

Wffs: Use formulae of the following forms:

$(A \wedge B)$ [conjunction]	replaces wffs of the form	$\sim(A \supset \sim B)$
$(A \vee B)$ [disjunction]	replaces wffs of the form	$(\sim A \supset B)$

Metavariables: Same as those used for expressions of Q.