4. Learning the expressions of the language will be easier (no need to learn rules).
   However, for longer expressions, both readability and writability are reduced.

8. Consider the integer expression $A + B + C$. Suppose the values of $A$, $B$, and $C$ are 20,000, 25,000, and -20,000, respectively. Further suppose that the machine has a maximum integer value of 32,767. If the first addition is computed first, it will result in overflow. If the second addition is done first, the whole expression can be correctly computed.

9.
(a) $( ( ( a * b )^1 - 1 )^2 + c )^3$
(b) $( ( ( a * ( b - 1 )^1 )^2 / c )^3 \mod d )^4$
(c) $( ( ( a - b )^1 / c )^2 & ( ( ( d * e )^3 / a )^4 - 3 )^5 )^6$
(d) $( ( ( - a )^1 or ( c = d )^2 )^3 and e )^4$
(e) $( ( a > b )^1 xor ( c or ( d <= 17 )^2 )^3 )^4$
(f) $(- ( a + b )^1 )^2$

10.
(a) $( a * ( b - ( 1 + c )^1 )^2 )^3$
(b) $( a * ( ( b - 1 )^2 / ( c \mod d )^1 )^3 )^4$
(c) $( ( a - b )^5 / ( c & ( d * ( e / ( a - 3 )^1 )^2 )^3 )^4 )^6$
(d) \( ( - ( a \lor ( c = ( d \land e ) ) ) ) ) \)

(e) \( ( a > ( \lor ( c \lor ( d <= 17 ) ) ) ) ) \)

(f) \( ( - ( a + b ) ) \)

11. \( \langle expr \rangle \rightarrow \langle expr \rangle \text{ or } \langle e1 \rangle | \langle expr \rangle \text{ xor } \langle e1 \rangle | \langle e1 \rangle \)

\( \langle e1 \rangle \rightarrow \langle e1 \rangle \text{ and } \langle e2 \rangle | \langle e2 \rangle \)

\( \langle e2 \rangle \rightarrow \langle e2 \rangle = \langle e3 \rangle | \langle e2 \rangle /= \langle e3 \rangle | \langle e2 \rangle < \langle e3 \rangle \)

\( | \langle e2 \rangle <= \langle e3 \rangle | \langle e2 \rangle > \langle e3 \rangle | \langle e2 \rangle >= \langle e3 \rangle | \langle e3 \rangle \)

\( \langle e3 \rangle \rightarrow \langle e4 \rangle \)

\( \langle e4 \rangle \rightarrow \langle e4 \rangle + \langle e5 \rangle | \langle e4 \rangle - \langle e5 \rangle | \langle e4 \rangle \& \langle e5 \rangle | \langle e4 \rangle \text{ mod } \langle e5 \rangle | \langle e5 \rangle \)

\( \langle e5 \rangle \rightarrow \langle e5 \rangle * \langle e6 \rangle | \langle e5 \rangle / \langle e6 \rangle | \langle not \rangle \langle e5 \rangle | \langle e6 \rangle \)

\( \langle e6 \rangle \rightarrow a | b | c | d | e | \text{ const } | ( \langle expr \rangle ) \)

13. (a) (left -> right) sum1 is 46; sum2 is 48

(b) (right -> left) sum1 is 48; sum2 is 46

19. (a) 7

(b) 12

Ch 8.

1.

a. A list of values is to be added to a \text{ SUM}, but the loop is to be exited if \text{ SUM} exceeds some prescribed value.
b. A list of values is to be read into an array, where the reading is to terminate when either a prescribed number of values have been read or some special value is found in the list.

c. The values stored in a linked list are to be moved to an array, where values are to be moved until the end of the linked list is found or the array is filled, whichever comes first.

4. Unique closing keywords on compound statements have the advantage of readability and the disadvantage of complicating the language by increasing the number of keywords.

8. The primary argument for using Boolean expressions exclusively as control expressions is the reliability that results from disallowing a wide range of types for this use. In C, for example, an expression of any type can appear as a control expression, so typing errors that result in references to variables of incorrect types are not detected by the compiler as errors.

Ch 9.

2. The main advantage of this method is the fast transfer of actual parameters to formal parameters. The disadvantages are that recursion is rarely useful when values cannot be passed, and also that a number of problems, such as aliasing, occur with the method.

4. This can be done in both Java and C#, using a static (or class) data member for the page number.

5. Assume the calls are not accumulative; that is, they are always called with the initialized values of the variables, so their effects are not accumulative.

   a. 2, 1, 3, 5, 7, 9  b. 1, 2, 3, 5, 7, 9  c. 1, 2, 3, 5, 7, 9
   2, 1, 3, 5, 7, 9  2, 3, 1, 5, 7, 9  2, 3, 1, 5, 7, 9
   2, 1, 3, 5, 7, 9  5, 1, 3, 2, 7, 9  5, 1, 3, 2, 7, 9 (unless the addresses of the actual parameters are recomputed on return, in which case there will be an index range error.)