

[retrieved from <http://www.cs.wm.edu/~noonan/Grammar/wirth.html>]

# Wirth BNF Grammars

Wirth uses his own meta language to define its own syntax (and serve as an example of its use):

```

grammar      = { production }.
production  = identifier "=" expression ".".
expression  = term { "|" term }.
term        = factor { factor }.
factor      = identifier | literal | "(" expression ")" |
              "[" expression "]" | "{" expression }".
literal     = """" character { character } """".
```

The word *identifier* is used to denote a nonterminal symbol, and *literal* denotes a terminal symbol. For brevity, *identifier* and *character* are not further defined.

Repetition is denoted by curly braces, i.e., { a } denotes: empty, a, aa, ... . Optionality is expressed by square brackets, i.e., [ a ] denotes a or empty. Parentheses merely serve for grouping, i.e., ( a | b ) c stands for: a c | b c.

Terminal symbols are either *literals*, i.e., are enclosed in quote marks or are *identifiers* which do not appear on the left hand side of the metasymbol =. If a quote mark appears a *literal* itself, then it is written twice (as is common in many programming languages).

As a machine readable form, I have added the following additional properties to Wirth BNF grammars:

- Each production must start on a new line and may not have leading spaces.
- Each symbol, whether meta, terminal, or nonterminal, must be separated from all other symbols by spaces, except the terminating period.
- Productions may be freely continued on a new line; for readability these lines are often indented.
- Grammars may contain comments, which are lines which begin with a #, followed by a space. The remainder of the line is ignored.
- Grammars may contain blank lines to improve readability.

Note that the spacing permits convenient processing by simple awk scripts.

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## References

Niklaus Wirth, What can we do about the unnecessary diversity of notation for syntactic descriptions, *CACM*, 20 (November 1977), pp. 822-823.

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Oct 21 97