

# CNF Grammar of our language

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Our grammar is based on C-minus grammar which you can find in <http://www.csisnc.com/resources/ExamplesX/C-Syntax.pdf> here.

1.  $\text{program} \rightarrow \text{declaration-list}$
2.  $\text{declaration-list} \rightarrow \text{declaration-list declaration} \mid \text{declaration}$
3.  $\text{declaration} \rightarrow \text{var-declaration} \mid \text{fun-declaration}$
4.  $\text{var-declaration} \rightarrow \text{type-spec ID}; \mid \text{type-spec ID [NUM]};$
5.  $\text{type-spec} \rightarrow \text{int} \mid \text{float} \mid \text{string}$
6.  $\text{fun-declaration} \rightarrow \text{type-spec ID (params) compound-stmnt}$
7.  $\text{params} \rightarrow \text{param-list} \mid \epsilon$
8.  $\text{param-list} \rightarrow \text{param-list, param} \mid \text{param}$
9.  $\text{param} \rightarrow \text{type-spec ID} \mid \text{type-spec ID [ ]}$
10.  $\text{compound-stmnt} \rightarrow \{\text{stmnt-list}\}$
11.  $\text{stmnt-list} \rightarrow \text{stmnt-list stmnt} \mid \epsilon$
12.  $\text{stmnt} \rightarrow \text{compound-stmnt} \mid \text{cond-stmnt} \mid \text{iter-stmnt} \mid \text{return-stmnt} \mid \text{expression-stmnt} \mid \text{var-declaration}$
13.  $\text{cond-stmnt} \rightarrow \text{if (expression) compound-stmnt else compound-stmnt}$
14.  $\text{iter-stmnt} \rightarrow \text{while (expression) compound-stmnt}$
15.  $\text{return-stmnt} \rightarrow \text{return}; \mid \text{return expression};$
16.  $\text{expression-stmnt} \rightarrow \text{expression}; \mid ;$
17.  $\text{expression} \rightarrow \text{var} = \text{expression} \mid \text{simple-expression}$
18.  $\text{var} \rightarrow \text{ID} \mid \text{ID [expression]}$
19.  $\text{simple-expression} \rightarrow \text{logical-expression rel-op logical-expression} \mid \text{logical-expression}$
20.  $\text{rel-op} \rightarrow > \mid < \mid >= \mid <= \mid == \mid !=$

21.  $\text{logical-expression} \rightarrow \text{logical-expression log-op additive-expression} \mid \text{additive-expression}$
22.  $\text{log-op} \rightarrow \&\& \mid \parallel$
23.  $\text{additive-expression} \rightarrow \text{additive-expression add-op mul-expression} \mid \text{mul-expression}$
24.  $\text{add-op} \rightarrow + \mid -$
25.  $\text{mul-expression} \rightarrow \text{mul-expression mul-op term} \mid \text{term}$
26.  $\text{mul-op} \rightarrow * \mid /$
27.  $\text{term} \rightarrow (\text{expression}) \mid \text{var} \mid \text{call} \mid \text{NUM} \mid \text{FNUM} \mid \text{string-word}$
28.  $\text{call} \rightarrow \text{ID (args)} \mid \text{print(print-full-args)}$
29.  $\text{print-full-args} \rightarrow \text{string args}$
30.  $\text{args} \rightarrow \text{arg-list} \mid \epsilon$
31.  $\text{arg-list} \rightarrow \text{arg-list, expression} \mid \text{expression}$

keywords: if else int float string return while print  
 Special symbols:  $+ - * / \& \mid > < >= <= == != , ;$   
 $\text{ID} = \text{letter} (\text{letter} + \text{digit})^*$   
 $\text{NUM} = \text{digit}^+$   
 $\text{FNUM} = \text{NUM.NUM}$   
 $\text{string-word} = "(\text{letter} + \text{digit} + \text{whitespace})^*"$