

BNF GRAMMAR

$\langle \text{program} \rangle ::= \langle \text{stmt_list} \rangle$

$\langle \text{stmt_list} \rangle ::= \langle \text{stmt} \rangle$
 $\quad \mid \langle \text{stmt_list} \rangle \langle \text{stmt} \rangle$

$\langle \text{stmt} \rangle ::= \langle \text{assign_stmt} \rangle$
 $\quad \mid \langle \text{io_stmt} \rangle$
 $\quad \mid \langle \text{control_stmt} \rangle$
 $\quad \mid \langle \text{loop_stmt} \rangle$

$\langle \text{assign_stmt} \rangle ::= \text{IDENT} "=" \langle \text{expr} \rangle ":"$

$\langle \text{io_stmt} \rangle ::= \text{"plot"} \langle \text{expr} \rangle ":"$
 $\quad \mid \text{"ask"} \text{IDENT} ":"$

$\langle \text{loop_stmt} \rangle ::= \text{"loop"} \text{IDENT} \text{"in"} \langle \text{expr} \rangle "::" \langle \text{expr} \rangle$
 $\quad \text{"{"} \langle \text{stmt_list} \rangle \text{"}"}$

$\langle \text{control_stmt} \rangle ::= \langle \text{check_stmt} \rangle$
 $\quad \mid \langle \text{choose_stmt} \rangle$

$\langle \text{check_stmt} \rangle ::= \text{"check"} \langle \text{expr} \rangle \text{"{"} \langle \text{stmt_list} \rangle \text{"}"}$
 $\quad \text{"else"} \text{"{"} \langle \text{stmt_list} \rangle \text{"}"}$

$\langle \text{choose_stmt} \rangle ::= \text{"choose"} \langle \text{expr} \rangle \text{"{"} \langle \text{case_list} \rangle$
 $\quad \langle \text{default_case} \rangle \text{"}"}$

$\langle \text{case_list} \rangle ::= \langle \text{case_item} \rangle$
 $\quad \mid \langle \text{case_list} \rangle \langle \text{case_item} \rangle$

$\langle \text{case_item} \rangle ::= \langle \text{literal} \rangle \rightarrow \langle \text{stmt_list} \rangle$

$\langle \text{default_case} \rangle ::= \text{"default"} \rightarrow \langle \text{stmt_list} \rangle$

$\langle \text{expr} \rangle ::= \langle \text{logic_or} \rangle$

$\langle \text{logic_or} \rangle ::= \langle \text{logic_and} \rangle$

$\mid \langle \text{logic_or} \rangle \text{"||"} \langle \text{logic_and} \rangle$

$\langle \text{logic_and} \rangle ::= \langle \text{equality} \rangle$

$\mid \langle \text{logic_and} \rangle \text{"\&\&"} \langle \text{equality} \rangle$

$\langle \text{equality} \rangle ::= \langle \text{relational} \rangle$

$\mid \langle \text{equality} \rangle \text{"=="} \langle \text{relational} \rangle$

$\mid \langle \text{equality} \rangle \text{"!="} \langle \text{relational} \rangle$

$\langle \text{relational} \rangle ::= \langle \text{addictive} \rangle$

$\mid \langle \text{addictive} \rangle \text{"<"} \langle \text{addictive} \rangle$

$\mid \langle \text{addictive} \rangle \text{">"} \langle \text{addictive} \rangle$

$\mid \langle \text{addictive} \rangle \text{"<="} \langle \text{addictive} \rangle$

$\mid \langle \text{addictive} \rangle \text{">="} \langle \text{addictive} \rangle$

$\langle \text{addictive} \rangle ::= \langle \text{term} \rangle$

$\mid \langle \text{addictive} \rangle \text{"+"} \langle \text{term} \rangle$

$\mid \langle \text{addictive} \rangle \text{"-"} \langle \text{term} \rangle$

$\mid \langle \text{addictive} \rangle \text{"\sim"} \langle \text{term} \rangle$

$\langle \text{term} \rangle ::= \langle \text{factor} \rangle$

$\mid \langle \text{term} \rangle \text{"*"} \langle \text{factor} \rangle$

$\mid \langle \text{term} \rangle \text{" / " } \langle \text{factor} \rangle$

$\mid \langle \text{term} \rangle \text{"\%"} \langle \text{factor} \rangle$

$\langle \text{factor} \rangle ::= \text{IDENT} \mid \langle \text{literal} \rangle \mid "(" \langle \text{expr} \rangle ")"$
 $\mid "!" \langle \text{factor} \rangle \mid "-" \langle \text{factor} \rangle$

$\langle \text{literal} \rangle ::= \text{NUMBER}$
 $\mid \text{STRING}$

Syntax Design Notes.

- Terminator: The colon (:) acts as a statement terminator
- Case Separation: The arrow (\rightarrow) separates case literals from their execution blocks in 'choose' statements
- Precedence: Unary minus > Multiplication > Addition > logic