

## BNF GRAMMAR

$\langle \text{program} \rangle ::= \langle \text{stmt\_list} \rangle$

$\langle \text{stmt\_list} \rangle ::= \langle \text{stmt} \rangle$

$| \langle \text{stmt\_list} \rangle \langle \text{stmt} \rangle$

$\langle \text{stmt} \rangle ::= \langle \text{assign\_stmt} \rangle$

$| \langle \text{io\_stmt} \rangle$

$| \langle \text{control\_stmt} \rangle$

$| \langle \text{loop\_stmt} \rangle$

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

$\langle \text{io\_stmt} \rangle ::= "plot" \langle \text{expr} \rangle ":"$

$| "ask" \text{ IDENT} ":"$

$\langle \text{loop\_stmt} \rangle ::= "loop" \text{ IDENT} "in" \langle \text{expr} \rangle ".. \langle \text{expr} \rangle$

$"\{" \langle \text{stmt\_list} \rangle "\}"$

$\langle \text{control\_stmt} \rangle ::= \langle \text{check\_stmt} \rangle$

$| \langle \text{choose\_stmt} \rangle$

$\langle \text{check\_stmt} \rangle ::= "check" \langle \text{expr} \rangle "\{" \langle \text{stmt\_list} \rangle "\}"$

$"else" "\{" \langle \text{stmt\_list} \rangle "\}"$

$\langle \text{choose\_stmt} \rangle ::= "choose" \langle \text{expr} \rangle "\{" \langle \text{case\_list} \rangle$

$\langle \text{default\_case} \rangle "\}"$

$\langle \text{case\_list} \rangle ::= \langle \text{case\_item} \rangle$

$| \langle \text{case\_list} \rangle \langle \text{case\_item} \rangle$

$\langle \text{case-item} \rangle ::= \langle \text{literal} \rangle \rightarrow \langle \text{stmt-list} \rangle$

$\langle \text{default-case} \rangle ::= \text{"default"} \rightarrow \langle \text{stmt-list} \rangle$

$\langle \text{expr} \rangle ::= \langle \text{logic-or} \rangle$

$\langle \text{logic-or} \rangle ::= \langle \text{logic-and} \rangle$

|  $\langle \text{logic-or} \rangle \parallel \langle \text{logic-and} \rangle$

$\langle \text{logic-and} \rangle ::= \langle \text{equality} \rangle$

|  $\langle \text{logic-and} \rangle \& \langle \text{equality} \rangle$

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

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

|  $\langle \text{equality} \rangle != \langle \text{relational} \rangle$

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

|  $\langle \text{addictive} \rangle < \langle \text{addictive} \rangle$

|  $\langle \text{addictive} \rangle > \langle \text{addictive} \rangle$

|  $\langle \text{addictive} \rangle \leq \langle \text{addictive} \rangle$

|  $\langle \text{addictive} \rangle \geq \langle \text{addictive} \rangle$

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

|  $\langle \text{addictive} \rangle + \langle \text{term} \rangle$

|  $\langle \text{addictive} \rangle - \langle \text{term} \rangle$

|  $\langle \text{addictive} \rangle \sim \langle \text{term} \rangle$

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

|  $\langle \text{term} \rangle * \langle \text{factor} \rangle$

|  $\langle \text{term} \rangle / \langle \text{factor} \rangle$

|  $\langle \text{term} \rangle \% \langle \text{factor} \rangle$

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

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

### 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