Context Free Grammar

Declaration

|  |  |  |
| --- | --- | --- |
| <program> | → | <global> !START <statement> END! |
| <global> | → | <fixed><global> |
| <global> | → | <vardec><global> |
| <global> | → | λ |
| <fixed> | → | fixed <fdata\_type> . |
| <data\_type> | → | number id <values\_num> . |
| <data\_type> | → | decimal id <values\_dec> . |
| <data\_type> | → | string id <values\_str> . |
| <data\_type> | → | boolean id <values\_bool> . |
| <vardec> | → | <data\_type> |
| <values\_num> | → | = numberlit <more\_num> |
| <values\_num> | → | λ |
| <more\_num> | → | , id <values\_num> |
| <more\_num> | → | λ |
| <values\_num> | → | <more\_num> |
| <values\_dec> | → | = decimallit <more\_dec> |
| <values\_dec> | → | <more\_dec> |
| <values\_dec> | → | λ |
| <more\_dec> | → | , id <values\_dec> |
| <more\_dec> | → | λ |
| <values\_str> | → | = stringlit <more\_str> |
| <values\_str> | → | <more\_str> |
| <values\_str> | → | λ |
| <more\_str> | → | , id <values\_str> |
| <more\_str> | → | λ |
| <values\_bool> | → | = booleanlit <more\_bool> |
| <values\_bool> | → | <more\_bool> |
| <values\_bool> | → | λ |
| <more\_bool> | → | , id <values\_bool> |
| <more\_bool> | → | λ |
| <fdata\_type> | → | number id <fvalues\_num> |
| <fdata\_type> | → | decimal id <fvalues\_dec> |
| <fdata\_type> | → | string id <fvalues\_str> |
| <fdata\_type> | → | boolean id <fvalues\_bool> |
| <fvalues\_num> | → | = numberlit <fmore\_num> |
| <fmore\_num> | → | , id <fvalues\_num> |
| <fmore\_num> | → | λ |
| <fvalues\_dec> | → | = decimallit <fmore\_dec> |
| <fmore\_dec> | → | , id <fvalues\_dec> |
| <fmore\_dec> | → | λ |
| <fvalues\_str> | → | = stringlit <fmore\_str> |
| <fmore\_str> | → | , id <fvalues\_str> |
| <fmore\_str> | → | λ |
| <fvalues\_bool> | → | = booleanlit <fmore\_bool> |
| <fmore\_bool> | → | , id <fvalues\_bool> |
| <fmore\_bool> | → | λ |
| <statement> | → | <function> <statement> |
| <statement> | → | λ |
| <function> | → | <vardec> |
| <function> | → | λ |

I/O Statement

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | <program> | → | <global> !START <statement> END! |
| 2. | <statement> | → | <function> <statement> |
| 3. | <statement> | → | λ |
| 4. | <function> | → | λ |
| 5. | <function> | → | <io\_statement> |
| 6. | <io\_statement> | → | write <output> . |
| 7. | <io\_statement> | → | read id . |
| 8. | <output> | → | stringlit <output> |
| 9. | <output> | → | id <output> |
| 10. | <output> | → | λ |

If / Else If

|  |  |  |
| --- | --- | --- |
| <program> | → | <global> !START <statement> END! |
| <statement> | → | <function> <statement> |
| <statement> | → | λ |
| <function> | → | <if\_statement> |
| <if\_statement> | → | if ( <condition> ) <states> <elseif\_statement> <else\_statement> |
| <condition> | → | <conditional> |
| <conditional> | → | <compares> <relop> <compares> |
| <compares> | → | id |
| <compares> | → | (<exp\_num> <math\_op> <exp\_num> <exp\_numTail>) |
| <compares> | → | (<exp\_dewc> <math\_op> <exp\_dec> <exp\_decTail>) |
| <compares> | → | <values> |
| <values> | → | numberlit |
| <values> | → | decimallit |
| <values> | → | stringlit |
| <values> | → | booleanlit |
| <relop> | → | == |
| <relop> | → | != |
| <relop> | → | > |
| <relop> | → | < |
| <relop> | → | >= |
| <relop> | → | <= |
| <condition> | → | <not> ( <conditional> ) <logop\_end> |
| <not> | → | ! |
| <not> | → | λ |
| <logop\_end> | → | <logop> <logop\_more> <logop\_end> |
| <logop\_end> | → | λ |
| <logop> | → | and |
| <logop> | → | or |
| <logop\_more> | → | <not> ( <conditional> ) |
| <logop\_more> | → | booleanlit <logop\_end> |
| <states> | → | <statement> <control> <states> |
| <control> | → | Jump . |
| <control> | → | Stop. |
| <control> | → | λ |
| <elseif\_statement> | → | elseif ( <condition> ) start <states> end. <elseif\_statement> |
| <elseif\_statement> | → | λ |
| <elseif\_statement> | → | else start <states> end. |

Switch

|  |  |  |
| --- | --- | --- |
| <function> | → | <switch> |
| <switch> | → | switch id start choice <choices> end. |
| <choices> | → | <choice\_num> |
| <choices> | → | <choice\_str> |
| <choice\_num> | → | numberlit: <statement> Stop. <choice\_numtail> <default> |
| <choice\_numtail> | → | choice numlit: <statement> Stop. <choice\_numtail> |
| <choice\_numtail> | → | λ |
| <choice\_str> | → | stringlit: <statement> Stop. <choice\_strtail> <default> |
| <choice\_strtail> | → | choice stringlit: <statement> Stop. <choice\_strtail> |
| <choice\_strtail> | → | λ |
| <default> | → | default: <statement> |
| <default> | → | λ |

For

|  |  |  |
| --- | --- | --- |
| <program> | → | <global> !START <statement> END! |
| <statement> | → | <function> <statement> |
| <statement> | → | λ |
| <function> | → | <looping> |
| <looping> | → | for ( <init> ; <cond\_for> ; <for\_inc> ) start <states> end. |
| <init> | → | id = <for\_init> |
| <init> | → | λ |
| <for\_init> | → | numberlit |
| <for\_init> | → | id |
| <cond\_for> | → | <for\_init> <rel\_op> <for\_init> |
| <cond\_for> | → | λ |
| <for\_inc> | → | id <inc\_op> |
| <for\_inc> | → | <inc\_op> id |
| <inc\_op> | → | ++ |
| <inc\_op> | → | -- |

While / Do While

|  |  |  |
| --- | --- | --- |
| <program> | → | <global> !START <statement> END! |
| <statement> | → | <function> <statement> |
| <statement> | → | λ |
| <function> | → | <looping> |
| <looping> | → | while ( <conditional> ) start <states> end. |
| <looping> | → | do start <states> end. while ( <conditional> ). |
| <condition> | → | <conditional> |
| <conditional> | → | <compares> <relop> <compares> |
| <compares> | → | id |
| <compares> | → | (<exp\_num> <math\_op> <exp\_num> <exp\_numTail>) |
| <compares> | → | (<exp\_dewc> <math\_op> <exp\_dec> <exp\_decTail>) |
| <compares> | → | <values> |
| <values> | → | numberlit |
| <values> | → | decimallit |
| <values> | → | stringlit |
| <values> | → | booleanlit |
| <relop> | → | == |
| <relop> | → | != |
| <relop> | → | > |
| <relop> | → | < |
| <relop> | → | >= |
| <relop> | → | <= |
| <condition> | → | <not> ( <conditional> ) <logop\_end> |
| <not> | → | ! |
| <not> | → | λ |
| <logop\_end> | → | <logop> <logop\_more> <logop\_end> |
| <logop\_end> | → | λ |
| <logop> | → | and |
| <logop> | → | or |
| <logop\_more> | → | <not> ( <conditional> ) |
| <logop\_more> | → | booleanlit <logop\_end> |
| <states> | → | <statement> <control> <states> |
| <control> | → | Jump . |
| <control> | → | Stop. |
| <control> | → | λ |