Gryph Programming Language Syntax in EBNF

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June 13, 2018

Contents

1 Program

⟨program⟩ ⊨ ⟨program-unit⟩{⟨program-unit⟩}
⟨program-unit⟩ ⊨ ⟨stmt⟩ | ⟨subprog-decl⟩ | ⟨type-decl⟩

2 Identifiers

⟨id-list⟩ ⊨ ⟨identifier⟩{**,**⟨identifier⟩}
⟨identifier⟩ ⊨ ⟨alpha⟩⟨id-tail⟩
⟨user-type-id⟩ ⊨ ⟨upper-alpha⟩⟨id-tail⟩
⟨id-tail⟩ ⊨ {⟨alpha-num⟩}{**'**}
⟨alpha-num⟩ ⊨ ⟨alpha⟩ | (**0** | ... | **9**) | **_**
⟨alpha⟩ ⊨ ⟨upper-alpha⟩ | (**a** | ... | **z**)
⟨upper-alpha⟩ ⊨ **A** | ... | **Z**

3 Statements

⟨stmt-list⟩ ⊨ ⟨stmt⟩{⟨stmt⟩}
⟨stmt-block⟩ ⊨ **{** ⟨stmt-list⟩ **}**

⟨stmt⟩ ⊨ ⟨matched-stmt⟩ | ⟨unmatched-stmt⟩
⟨block-or-matched⟩ ⊨ ⟨stmt-block⟩ | ⟨matched-stmt⟩
⟨matched-stmt⟩ ⊨ ⟨matched-if-else⟩ | ⟨iteration-stmt⟩ | ⟨simple-stmt⟩
⟨unmatched-stmt⟩ ⊨ ⟨if-stmt⟩ | ⟨unmatched-if-else⟩
⟨simple-stmt⟩ ⊨ (⟨io-stmt⟩ | ⟨var-stmt⟩)**;**

3.1 IO

⟨io-stmt⟩ ⊨ ⟨read-stmt⟩ | ⟨write-stmt⟩
⟨read-stmt⟩ ⊨ **read** ⟨identifier⟩
⟨write-stmt⟩ ⊨ **print** ⟨expression⟩

3.2 Variables

⟨var-stmt-list⟩ ⊨ ⟨var-stmt⟩{**;**⟨var-stmt⟩}**;**
⟨var-stmt⟩ ⊨ ⟨var-decl-stmt⟩ | ⟨var-attr-stmt⟩
⟨var-decl-stmt⟩ ⊨ ⟨id-list⟩**:**⟨type⟩[⟨var-attr⟩]
⟨var-attr-stmt⟩ ⊨ ⟨id-list⟩⟨var-attr⟩
⟨var-attr⟩ ⊨ **=**⟨expr-list⟩

4 Subprograms

⟨subprog-decl⟩ ⊨ **sub**⟨identifier⟩**(**⟨parameters⟩**)**⟨stmt-block⟩
⟨parameters⟩ ⊨ ⟨var-stmt⟩{**;**⟨var-stmt⟩}
⟨subprog-call⟩ ⊨ ⟨identifier⟩**(**⟨expr-list⟩**)**

5 Control Structures

5.1 Conditionals

⟨if-expr⟩ ⊨ **if (**⟨expression⟩**)**
⟨if-stmt⟩ ⊨ ⟨if-expr⟩ ⟨stmt⟩**;**
⟨unmatched-if-else⟩ ⊨ ⟨if-expr⟩ ⟨matched-stmt⟩**; else** ⟨unmatched-stmt⟩**;**
⟨matched-if-else⟩ ⊨ ⟨if-expr⟩ ⟨block-or-matched⟩ **else** ⟨block-or-matched⟩ | ⟨if-expr⟩ ⟨stmt-block⟩

5.2 Iteration

⟨iteration-stmt⟩ ⊨ ⟨for-loop⟩ | ⟨while-loop⟩
⟨while-loop⟩ ⊨ **while**⟨expression⟩⟨block-or-matched⟩
⟨for-loop⟩ ⊨ **for**⟨id-list⟩**over**⟨id-list⟩⟨block-or-matched⟩

6 Types

⟨type-list⟩ ⊨ ⟨type⟩{**,**⟨type⟩}
⟨type⟩ ⊨ ⟨native-type⟩ | ⟨user-type-id⟩
⟨native-type⟩ ⊨ ⟨primitive-type⟩ | ⟨composite-type⟩
⟨primitive-type⟩ ⊨ **int** | **float** | **char** | **string**
⟨composite-type⟩ ⊨ **[**⟨type⟩**]** | **|**⟨type⟩**|** | **(**⟨type⟩**,**⟨type-list⟩**)** | ⟨graph-type⟩
⟨graph-type⟩ ⊨ **<**⟨type⟩**>** | **<**⟨type⟩**,**⟨type⟩**>**
⟨type-decl⟩ ⊨ ⟨user-type-id⟩**{**⟨var-stmt-list⟩**}**

Observation Although there is no maximum size for tuples in the definition above, there may be one for specific language implementations.

7 Expressions

⟨expression⟩ ⊨ ⟨logical-xor-expr⟩
⟨logical-xor-expr⟩ ⊨ ⟨logical-or-expr⟩ | ⟨logical-or-expr⟩⟨logical-xor-expr-aux⟩
⟨logical-xor-expr-aux⟩ ⊨ **xor** ⟨logical-or-expr⟩ | **xor** ⟨logical-or-expr⟩⟨logical-xor-expr-aux⟩
⟨logical-or-expr⟩ ⊨ ⟨logical-and-expr⟩ | ⟨logical-and-expr⟩⟨logical-or-expr-aux⟩
⟨logical-or-expr-aux⟩ ⊨ **or** ⟨logical-and-expr⟩ | **or** ⟨logical-and-expr⟩⟨logical-or-expr-aux⟩
⟨logical-and-expr⟩ ⊨ ⟨equality-expr⟩ | ⟨equality-expr⟩⟨logical-and-expr-aux⟩
⟨logical-and-expr-aux⟩ ⊨ **and** ⟨equality-expr⟩ | **and** ⟨equality-expr⟩⟨logical-and-expr-aux⟩
⟨equality-expr⟩ ⊨ ⟨rel-expr⟩ | ⟨rel-expr⟩⟨rel-expr-aux⟩
⟨equality-expr-aux⟩ ⊨ ⟨equality-op⟩ ⟨rel-expr⟩ | ⟨equality-op⟩ ⟨rel-expr⟩⟨equality-expr-aux⟩
⟨rel-expr⟩ ⊨ ⟨add-expr⟩⟨rel-expr-aux⟩
⟨rel-expr-aux⟩ ⊨ ⟨rel-op⟩⟨add-expr⟩ | ⟨rel-op⟩⟨add-expr⟩⟨rel-expr-aux⟩
⟨add-expr⟩ ⊨ ⟨mult-expr⟩ | ⟨mult-expr⟩⟨add-expr-aux⟩
⟨add-expr-aux⟩ ⊨ ⟨add-op⟩⟨mult-expr⟩ | ⟨add-op⟩⟨mult-expr⟩⟨add-expr-aux⟩
⟨mult-expr⟩ ⊨ ⟨exp-expr⟩ | ⟨exp-expr⟩⟨mult-expr-aux⟩
⟨mult-expr-aux⟩ ⊨ ⟨mult-op⟩⟨exp-expr⟩ | ⟨mult-op⟩⟨exp-expr⟩⟨mult-expr-aux⟩
⟨exp-expr⟩ ⊨ ⟨cast-expr⟩ | ⟨cast-expr⟩⟨exp-op⟩⟨exp-expr⟩
⟨cast-expr⟩ ⊨ ⟨unary-expr⟩ | ⟨unary-expr⟩⟨cast-expr-aux⟩
⟨cast-expr-aux⟩ ⊨ **@**⟨type⟩ | **@**⟨type⟩⟨cast-expr-aux⟩
⟨unary-expr⟩ ⊨ ⟨unary-op⟩⟨cast-expr⟩ | ⟨postfix-expr⟩
⟨postfix-expr⟩ ⊨ ⟨primary-expr⟩ | ⟨ident⟩**|**⟨expression⟩**|** |
⟨ident⟩**<**⟨expression⟩**>** |
⟨ident⟩**[**⟨expression⟩**]** |
⟨ident⟩**{**⟨ident⟩**}** |
⟨ident⟩**.**⟨expression⟩
⟨primary-expr⟩ ⊨ **(**⟨expression⟩**)** | ⟨ident⟩ | ⟨subprogcall⟩ | ⟨constant⟩
⟨constant⟩ ⊨ ⟨int-lit⟩ | ⟨float-lit⟩ | ⟨string-lit⟩ | ⟨bool-lit⟩ | ⟨list-lit⟩ | ⟨graph-lit⟩
⟨rel-op⟩ ⊨ > | < | <= | >=
⟨equality-op⟩ ⊨ == | **!** =
⟨unary-op⟩ ⊨ + | −
⟨add-op⟩ ⊨ + | -
⟨mult-op⟩ ⊨ * | / | % | ++ | **

⟨exp-op⟩ ⊨ ^