

$\langle def \rangle ::= (\langle def \rangle)^*$

$\langle ctype \rangle ::=$

- Bool
- | Int8
- | Int16
- | Int32
- | Int64
- | Word8
- | Word16
- | Word32
- | Word64
- | Float
- | Double

$\langle def \rangle ::= (\langle id \rangle :: \text{Stream } \langle ctype \rangle) ? \langle id \rangle = \langle spec \rangle$

$\langle id \rangle ::= (\mathbf{a} - \mathbf{z})(\mathbf{a} - \mathbf{z} | \mathbf{A} - \mathbf{Z} | \mathbf{0} - \mathbf{9} | _ | - | ')^*$

$\langle string \rangle ::= "(\mathbf{a} - \mathbf{z} | \mathbf{A} - \mathbf{Z})(\mathbf{a} - \mathbf{z} | \mathbf{A} - \mathbf{Z} | _ | \mathbf{0} - \mathbf{9})^*_{\leq 30}"$

$\langle stream \rangle ::=$

- $\langle valueList \rangle ++ \langle stream \rangle$
- | $\langle funStream \rangle$

$\langle valueList \rangle ::=$

- $[(\langle vbool \rangle)^*]$
- | $[(\langle vint \rangle)^*]$
- | $[(\langle vfloat \rangle)^*]$

$\langle vbool \rangle ::=$

- true
- | false

$\langle vint \rangle ::= [+|-](\mathbf{0} - \mathbf{9})^+$

$\langle vfloat \rangle ::= \langle vint \rangle . (\mathbf{0} - \mathbf{9})^+$

$\langle funStream \rangle ::=$

- $\langle externV \rangle \langle string \rangle \langle contextV \rangle$
- | **label** $\langle string \rangle \langle funStream \rangle$
- | **externFun** $\langle string \rangle \langle argList \rangle \langle contextF \rangle$
- | $\langle externA \rangle \langle string \rangle \langle stream \rangle \langle int \rangle \langle contextA \rangle$
- | $\langle op1 \rangle \langle funStream \rangle$
- | $\langle funStream \rangle \langle op2Infix \rangle \langle funStream \rangle$
- | $\langle op3 \rangle \langle funStream \rangle \langle funStream \rangle \langle funStream \rangle$
- | $\langle dropStream \rangle$

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 $\langle \text{extern}V \rangle ::= \text{extern}$ 
|  $\text{externB}$ 
|  $\text{externI8}$ 
|  $\text{externI16}$ 
|  $\text{externI32}$ 
|  $\text{externI64}$ 
|  $\text{externW8}$ 
|  $\text{externW16}$ 
|  $\text{externW32}$ 
|  $\text{externW64}$ 
|  $\text{externF}$ 
|  $\text{externD}$ 

 $\langle \text{extern}A \rangle ::= \text{externArray}$ 
|  $\text{externArrayB}$ 
|  $\text{externArrayI8}$ 
|  $\text{externArrayI16}$ 
|  $\text{externArrayI32}$ 
|  $\text{externArrayI64}$ 
|  $\text{externArrayW8}$ 
|  $\text{externArrayW16}$ 
|  $\text{externArrayW32}$ 
|  $\text{externArrayW64}$ 
|  $\text{externArrayF}$ 
|  $\text{externArrayD}$ 

 $\langle \text{context}V \rangle ::= \text{Nothing}$ 
|  $\text{Just } \langle \text{stream} \rangle$ 

 $\langle \text{context}F \rangle ::= \text{Nothing}$ 
|  $\text{Just } \langle \text{stream} \rangle$ 

 $\langle \text{context}A \rangle ::= \text{Nothing}$ 
|  $\text{Just } [(\langle \text{valueList} \rangle)^*]$ 

 $\langle \text{argList} \rangle ::= [(\text{Arg } \langle \text{stream} \rangle)^*]$ 
|  $[]$ 
|  $(\text{Arg } \langle \text{stream} \rangle) : \langle \text{argList} \rangle$ 

```

```

<dropStream> ::= <id>
               | constant <value>
               | drop <int> <stream>

<op1>         ::= not | abs | signum | complement
               | recip | exp | sqrt
               | log | sin | cos | tan
               | asin | acos | atan
               | sinh | cosh | tanh
               | asinh | acosh | atanh
               | cast | unsafeCast

<op2Infix>    ::= + | - | * | 'mod' | 'div'
               | / | ** | 'logBase'
               | < | <= | == | /= | >= | >
               | || | && | 'xor' | ==>
               | .&. | .|. | .^ | .>> | .<<.

<op3>         ::= mux

```