

用BNF描述MUA语言

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lexeme 语素

- 0,1,2,3,4,5,6,7,8,9,.
 - a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z
 - [,],-,"
 - true,false
 - //,:;,make,thing,erase,isname,print,read,readlnst,add,sub,mul,div,mod,eq,gt,lt,and,or,not,random,sqrt,isnumber,isword,islist,isbool,isempty,test,iftrue,iffalse,word,list,join,first,last,butfirst,butlast,item,repeat,stop,wait,save,load,erall,poall,output,local,if,run
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token 标记

- 由0,1,2,3,4,5,6,7,8,9 构成的集合：digit
 - 由a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z 构成的集合：letter
 - 由所有合法的 _number 构成的集合：数字 number
 - 由所有合法的 _word ,并且不包含所有lexeme所构成的集合：单词 word
 - 由所有合法的 _list 构成的集合：列表 list
 - 由lexeme中 true,false 构成的集合：布尔 bool，即{true,false}
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terminals 终结符

- 所有的lexeme 和 token 均为终结符
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non-terminals 非终结符

- `<_number0>` `<_number1>` `<_number>`
- `<_word0>` `<_word>`
- `<_list_element>` `<_list>`
- `<program>`
- `<set_of_stmts>` `<stmts>` `<stmt>` `<///>` `<charset>`
- `<word>` `<number>` `<bool>` `<list>` `<value>`

- `<op1_word>` `<op1_number>` `<op1_value>` `<one_word_operator>`
`<one_number_operator>` `<one_value_operator>` `<number_operator>`
`<numword_operator>` `<andor_operator>`
 - `<op_number>` `<op_numword>` `<op_and_or>` `<op_not>`
 - `<make>` `<iftrue>` `<iffalse>` `<word_link>` `<list_link>` `<first_wl>`
`<last_wl>` `<butfirst_wl>` `<butlast_wl>` `<item_n_wl>` `<check_empty>`
 - `<functionName>` `<arglist>` `<funciton_define>` `<function_use>`
 - `<pi>`
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start 起始符号

- `<program>`
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production rules 生成规则

- `<_number0>` -> `digit` | `<_number0>digit`
 - `<_number1>` -> `<_number0>` | `<_number0>.<_number0>`
 - `<_number>` -> `-<_number1>` | `<_number1>`
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- `<_word0>` -> `letter` | `<_word0>letter`
 - `<_word>` -> `"<_word0>`
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- `<_list_element>` -> `<_list_element>` `(<_word>|<_number>)` | `(<_word>|<_number>)`
 - `<_list>` -> `[<_list_element>]`
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- `<program>` -> `<set_of_stmts>`
 - `<set_of_stmts>` -> `<stmts>` | `<stmts>'\\n'<stmts>`
 - `<stmts>` -> `<stmt>` | `<stmt> <\\/>` | `<stmt><\\/>`
 - `<\\/>` -> `\\/<charset>` | `\\/ <charset>`
 - `<charset>` -> `word` | `number` | `<charset> <charset>`
 - `<stmt>` -> `print <value>` | `erase <word>` | `<make>` | `<iftrue>` | `<iffalse>` |
`join <list> <value>` | `repeat <number> <list>` | `stop` | `wait <number>` |
`save <word>` | `load <word>` | `erall` | `poall` | `<function_define>` |
`<function_use>` | `output <value>` | `local <value>` | `run <list>` | `if`
`<bool> <list> <list>`
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- `<word>` -> `word`
- `<number>` -> `number` | `<pi>`

- `<bool>` -> `bool`
 - `<list>` -> `list`
 - `<value>` -> `read` | `readlist` | `<op1_word>` | `<op1_number>` | `<op1_value>` | `<op_number>` | `<op_numword>` | `<op_and_or>` | `<op_not>` | `<word_link>` | `<list_link>` | `<first_wl>` | `<last_wl>` | `<butfirst_wl>` | `<butlast_wl>` | `<item_n_wl>` | `<check_empty>`
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- `<op1_word>` -> `<one_word_operator>` `<word>`
 - `<op1_number>` -> `<one_number_operator>` `<number>`
 - `<op1_value>` -> `<one_value_operator>` `<value>`
 - `<one_word_operator>` -> `thing` | `:` | `isname`
 - `<one_number_operator>` -> `random` | `sqrt`
 - `<one_value_operator>` -> `isnumber` | `isword` | `islist` | `isbool` | `test` | `isempty`
 - `<number_operator>` -> `add` | `sub` | `mul` | `div` | `mod`
 - `<numword_operator>` -> `eq` | `gt` | `lt`
 - `<andor_operator>` -> `and` | `or`
 - `<op_number>` -> `<number_operator>` `<number>` `<number>`
 - `<op_numword>` -> `<numword_operator>` `<number>` `<number>` | `<numword_operator>` `<word>` `<word>`
 - `<op_and_or>` -> `<andor_operator>` `<bool>` `<bool>`
 - `<op_not>` -> `not` `<bool>`
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- `<make>` -> `make` `<word>` `<value>`
 - `<iftrue>` -> `iftrue` `<list>`
 - `<iffalse>` -> `iffalse` `<list>`
 - `<word_link>` -> `word` `<word>` `<word>` | `word` `<word>` `<number>` | `word` `<word>` `<bool>`
 - `<list_link>` -> `list` `<list>` `<list>`
 - `<first_wl>` -> `first` `<word>` | `first` `<list>`
 - `<last_wl>` -> `last` `<word>` | `last` `<list>`
 - `<butfirst_wl>` -> `butfirst` `<word>` | `butfirst` `<list>`
 - `<butlast_wl>` -> `butlast` `<word>` | `butlast` `<list>`
 - `<item_n_wl>` -> `item` `<number>` `<word>` | `item` `<number>` `<list>`
 - `<check_empty>` -> `isempty` `<list>`
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- `<functionName>` -> `letter``<functionName>` | `letter`
 - `<arglist>` -> `<list>`
 - `<function_define>` -> `make` `<functionName>` [`<arglist>` `<list>`]
 - `<function_use>` -> `<functionName>` `<arglist>`
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- `<pi>` -> 3.14159