# Language, Style and Format drivers
# for **Listings**

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**Abstract**

This article describes the implementation of the language drivers for the listings package.

# Contents

# 1 Installation and configuration

```
1 %% The listings package is copyright 1996--2004 Carsten Heinz, and
2 %% continued maintenance on the package is copyright 2006--2007 Brooks
3 %% Moses. From 2013 on the maintenance is done by Jobst Hoffmann.
4 %% The drivers are copyright 1997/1998/1999/2000/2001/2002/2003/2004/2006/
5 %% 2007/2013 any individual author listed in this file.
6 %%
7 %% This file is distributed under the terms of the LaTeX Project Public
8 %% License from CTAN archives in directory  macros/latex/base/lppl.txt.
9 %% Either version 1.3c or, at your option, any later version.
10 %%
11 %% This file is completely free and comes without any warranty.
12 %%
13 %% Send comments and ideas on the package, error reports and additional
14 %% programming languages to Jobst Hoffmann at <j.hoffmann@fh-aachen.de>.
15 %%

16 ⟨∗install⟩
17 \input docstrip
18 \preamble
19 \endpreamble
20
21 \ifToplevel{
22 \usedir{tex/latex/listings}
23 \keepsilent
24 \askonceonly
25 }
```

```
26
27
28 \generate{
29     \file{lstlang1.sty}{\from{lstdrvrs.dtx}{lang1}}
30     \file{lstlang2.sty}{\from{lstdrvrs.dtx}{lang2}}
31     \file{lstlang3.sty}{\from{lstdrvrs.dtx}{lang3}}
32 }
33
34 \generate{
35     \file{listings-acm.prf}{\from{lstdrvrs.dtx}{acm-prf}}
36     \file{listings-bash.prf}{\from{lstdrvrs.dtx}{bash-prf}}
37     \file{listings-fortran.prf}{\from{lstdrvrs.dtx}{fortran-prf}}
38     \file{listings-hansl.prf}{\from{lstdrvrs.dtx}{hansl-prf}}
39     \file{listings-lua.prf}{\from{lstdrvrs.dtx}{lua-prf}}
40     \file{listings-python.prf}{\from{lstdrvrs.dtx}{python-prf}}
41     \file{listings-rexx.prf}{\from{lstdrvrs.dtx}{rexx-prf}}
42 }
43
44
45 \ifToplevel{
46 \Msg{*}
47 \Msg{* You probably need to move all created '.sty' and '.cfg'}
48 \Msg{* files into a directory searched by TeX.}
49 \Msg{*}
50 \Msg{* Run 'lstdrvrs.dtx' through LaTeX2e to get the documentation.}
51 \Msg{*}
52 }
53
54 \endbatchfile
55 ⟨/install⟩
56 ⟨∗config⟩
```

We mainly define default dialects.

```
57 \ProvidesFile{listings.cfg}[2024/09/23 1.10c listings configuration]
58 \def\lstlanguagefiles
59     {lstlang0.sty,lstlang1.sty,lstlang2.sty,lstlang3.sty}
60 \lstset{defaultdialect=[R/3 6.10]ABAP,
61         defaultdialect=[2005]Ada,
62         defaultdialect=[68]Algol,
63         defaultdialect=[gnu]Awk,
64         defaultdialect=[ANSI]C,
65         defaultdialect=[light]Caml,
66         defaultdialect=[1985]Cobol,
67         defaultdialect=[WinXP]command.com,
68         defaultdialect=[ISO]C++,
69         defaultdialect=[95]Fortran,
70         defaultdialect=[11.0]Mathematica,
71         defaultdialect=[OMG]OCL,
72         defaultdialect=[Standard]Pascal,
73         defaultdialect=[2]Python,
```

4

```
74          defaultdialect=[67]Simula,
75          defaultdialect=[plain]TeX,
76          defaultdialect=[97]VRML}
77 \lstalias[]{TclTk}[tk]{tcl}
```

And now some shortcuts for the ABAP versions (provided by Knut Lickert). I
(Knut) think the leading R/2, R/3 is not necessary (The support for R/2 is finished). The version number with letter is important for the runtime-system, but
the programming language should be the same for each version.

```
78 \lstalias[6.1]{ABAP}[R/3 6.10]{ABAP}
79 \lstalias[3.1]{ABAP}[R/3 3.1C]{ABAP}
80 \lstalias[4.6]{ABAP}[R/3 4.6C]{ABAP}

81 ⟨/config⟩

82 ⟨+lang1⟩\ProvidesFile{lstlang1.sty}
83 ⟨+lang2⟩\ProvidesFile{lstlang2.sty}
84 ⟨+lang3⟩\ProvidesFile{lstlang3.sty}
85 ⟨+acm-prf⟩\ProvidesFile{listings-acm.prf}
86 ⟨+bash-prf⟩\ProvidesFile{listings-bash.prf}
87 ⟨+fortran-prf⟩\ProvidesFile{listings-fortran.prf}
88 ⟨+hansl-prf⟩\ProvidesFile{listings-hansl.prf}
89 ⟨+lua-prf⟩\ProvidesFile{listings-lua.prf}
90 ⟨+python-prf⟩\ProvidesFile{listings-python.prf}
91 ⟨+rexx-prf⟩\ProvidesFile{listings-rexx.prf}
92 ⟨-config⟩   [2024/09/23 1.10c listings language file]
```

# 2   Language drivers

## 2.1   Abap

Knut Lickert added support for Abap.[1]

```
93 ⟨*lang2⟩

94 %%
95 %% Abap definition by Knut Lickert
96 %%
```

There are some other new commands in release 6.10. They will follow later,
but up to now I don't work with 6.10.

```
97 \lst@definelanguage[R/3 6.10]{ABAP}[R/3 4.6C]{ABAP}%
98   {morekeywords={try,endtry},%
99   }[keywords,comments,strings]

100 \lst@definelanguage[R/3 4.6C]{ABAP}[R/3 3.1]{ABAP}%
101   {morekeywords={method,ref,class,create,object,%
102        methods,endmethod,private,protected,public,section,%
103        catch,system-exceptions,endcatch,%
104        },%
```

---

[1]In this section 'I' is Knut Lickert.

```
105    moreprocnamekeys={class},%
106    literate={->}{{$\rightarrow$}}1{=>}{{$\Rightarrow$}}1,%
107  }[keywords,comments,strings,procnames]
```

Yes there are also some more releases in R/3 (2.1...), but I know them not really. So let's start with R/3 3.1.

```
108 \lst@definelanguage[R/3 3.1]{ABAP}[R/2 5.0]{ABAP}{}%
```

As I remember all this commands exists in R/2. Many commands are new in R/2 5.0 (compared with R/2 4.3). But as I am not using R/2 4.3 any more, I start with R/2 5.0.

```
109 \lst@definelanguage[R/2 5.0]{ABAP}{%
110   sensitive=f,%
111   procnamekeys={report,program,form,function,module},%
112   morekeywords={*, add, after, alias, analyzer, and, append, appending,%
113     area, assign, at, authority-check, before, binary, blank, break-point,%
114     calendar, call, case, change, changing, check, clear, cnt, co, collect,%
115     commit, common, component, compute, condense, corresponding, cos, cp,%
116     cs, currency-conversion, cursor, data, database, dataset, decimals,%
117     define, delete, deleting, dequeue, describe, detail, dialog, directory,%
118     div, divide, do, documentation, during, dynpro, else, end-of-page,%
119     end-of-selection, endat, endcase, enddo, endfor, endform, endif,%
120     endloop, endmodule, endselect, endwhile, enqueue, exceptions, exit,%
121     exp, export, exporting, extract, field, fields, field-groups,%
122     field-symbols, find, for, form, format, free, from, function,%
123     generating, get, giving, hide, id, if, import, importing, in, incl,%
124     include, initial, initialization, input, insert, interrupt, into, is,%
125     language, leave, leading, left-justified, like, line, lines,%
126     line-count, line-selection, list-processing, load, local, log, logfile,%
127     loop, margin, mark, mask, memory, menue, message, mod, modify, module,%
128     move, move-text, multiply, na, new, new-line, new-page, no-gaps, np,%
129     ns, number, obligatory, occurs, of, on, or, others, output, parameter,%
130     parameters, parts, perform, pf-status, places, position, process,%
131     raise, raising, ranges, read, refresh, refresh-dynpro, reject, remote,%
132     replace, report, reserve, reset, restart, right-justified, run, screen,%
133     scroll, search, segments, select, select-options, selection-screen,%
134     set, shift, sin, single, sqrt, start-of-selection, statement,%
135     structure, submit, subtract, summary, summing, suppress, system, table,%
136     tables, task, text, time, to, top-of-page, trace, transaction,%
137     transfer, transfer-dynpro, translate, type, unpack, update,%
138     user-command, using, value, when, where, while, window, with, workfile,%
139     write},%
140   morecomment=[l]",%
141   morecomment=[f][commentstyle][0]*,%
142   morestring=[d]'%
143 }[keywords,comments,strings,procnames]
```

This section for R/2 4.3 is not really maintained. It is just what I remember of the past.

```
144 \lst@definelanguage[R/2 4.3]{ABAP}[R/2 5.0]{ABAP}%
```

```
145  {deletekeywords={function,importing,exporting,changing,exceptions,%
146       raise,raising}%
147  }[keywords,comments,strings]
```

148 ⟨/lang2⟩

## 2.2 ACM

ACM is the language of the Aspen Custom Modeler ([http://www.aspentech.com/products/aspen-custom-modeler.aspx](http://www.aspentech.com/products/aspen-custom-modeler.aspx)), the language definition was provided by Stefan Pinnow. It is intended for writing models. Maximilian Dammann pointed out the missing keyword "Description".

149 ⟨∗lang2⟩

```
150 %%
151 %% ACM and ACMscript definition
152 %% (c) 2013 Stefan Pinnow
153 %%
154 \lst@definelanguage{ACM}{%
155   morekeywords={ abs, After, acos, And, As, asin, atan, At, Call,%
156     Compatibility, Connect, cos, cosh, Create, Delay, Description,%
157     Difference, Do, Else, ElseIf, End, EndFor, EndIf, EndParallel,%
158     EndState, EndSwitch, EndText, EndWith, exp, External, Fixed, For,%
159     ForEach, Free, Global, Hidden, If, Implementation, In, Initial, Input,%
160     InterSection, IntegerSet, Invoke, Is, Language, Library, Link, Log10,%
161     LogE, Max, Min, Model, Of, Once, Options, Output, Parallel, Parameter,%
162     Pause, Port, Print, Private, Procedure, Product, Ramp, Repeat, Restart,%
163     Return, Round, Runs, Sigma, sin, sinh, Size, SnapShot, sqr, sqrt,%
164     SRamp, State, Stream, StringSet, Structure, Switch, SubRoutine,%
165     SymDiff, tan, tanh, Task, Text, Time, Then, Truncate, Union, Until,%
166     Uses, Variable, Wait, When, With, WithIn, WorkSpace},%
167   sensitive=false,%
168   morecomment=[l]{//},%
169   morecomment=[s]{/*}{*/},%
170   string=[b]{"},%
171 }[keywords,comments,strings]
```

172 ⟨/lang2⟩

In addition to writing models there is a language ACMscript, which is similar to VBScript. According to Stefan Pinnow this language is used for writing scripts for the models.

173 ⟨∗lang2⟩

```
174 \lst@definelanguage{ACMscript}[]{VBScript}{%
175   morekeywords={%
176     ElseIf,False,In,Resume,True%
177   },%
178   deletekeywords={%
179     Abs,Array,Clear,CreateObject,CStr,Err,ForReading,ForWriting,%
180     OpenTextFile,Replace,WriteLine%
```

```
181    }%
182 }[keywords,comments,strings]
```

183 ⟨/lang2⟩

Stefan Pinnow also supplied a definition of a style for printing ACM code:

184 ⟨∗acm-prf⟩

```
185 \usepackage[rgb, x11names]{xcolor}
186
187 \definecolor{Comments}{rgb}{0.00,0.50,0.00}
188 \definecolor{KeyWords}{rgb}{0.00,0.00,0.63}
189 \definecolor{Strings}{rgb}{0.84,0.00,0.00}
190
191 \lstdefinestyle{ACM}{%
192   basicstyle=\scriptsize\ttfamily,%
193   keywordstyle=\color{KeyWords},%
194   showstringspaces=false,%
195   identifierstyle=\color{black},%
196   commentstyle=\color{Comments},%
197   stringstyle=\color{Strings},%
198   frame=shadowbox,%              % for ACM-Code scrartcl commented out
199 %   frame=l,%                    % line on the left side
200   rulesepcolor=\color{black},%
201   numbers=left,%                 % left
202   firstnumber=1,%
203   stepnumber=5,%
204   columns=fixed,%                % to prevent inserting spaces
205   fontadjust=true,%
206   basewidth=0.5em,%
207   captionpos=t,%
208   abovecaptionskip=\smallskipamount,% same amount as default
209   belowcaptionskip=\smallskipamount,% in caption package
210 }%
```

This code is provided in the file `listings-acm.prf`, see section 2.4.1 (Preferences)
of the listings documentation.

211 ⟨/acm-prf⟩

## 2.3   ACSL

This language was provided by Andreas Matthias. I'm sorry for forgetting to add
this language for a long time.

212 ⟨∗lang1⟩

```
213 %%
214 %% ACSL definition (c) 2000 by Andreas Matthias
215 %%
216 \lst@definelanguage{ACSL}[90]{Fortran}%
217     {morekeywords={algorithm,cinterval,constant,derivative,discrete,%
218           dynamic,errtag,initial,interval,maxterval,minterval,%
```

```
219        merror,xerror,nsteps,procedural,save,schedule,sort,%
220        table,terminal,termt,variable},%
221     sensitive=false,%
222     morecomment=[l]!%
223     }[keywords, comments]%
```

224 ⟨/lang1⟩

## 2.4  Ada

Data come from

- BARNES, JOHN GILBERT PRESSLIE: **Programming in Ada plus language reference manual**; © 1991 Addison-Wesley Publishing Company, Inc.; ISBN 0-201-56539-0.

Torsten Neuer added support for Ada 95. I changed the definition to reduce the required string memory.

225 ⟨∗lang1⟩

```
226 %%
227 %% Ada 95 definition (c) Torsten Neuer
228 %%
229 %% Ada 2005 definition (c) 2006 Santiago Urue\~{n}a Pascual
230 %%                        <Santiago.Uruena@upm.es>
231 %%
232 \lst@definelanguage[2005]{Ada}[95]{Ada}%
233   {morekeywords={interface,overriding,synchronized}}%
```

```
234 \lst@definelanguage[95]{Ada}[83]{Ada}%
235   {morekeywords={abstract,aliased,protected,requeue,tagged,until}}%
```

```
236 \lst@definelanguage[83]{Ada}%
237   {morekeywords={abort,abs,accept,access,all,and,array,at,begin,body,%
238        case,constant,declare,delay,delta,digits,do,else,elsif,end,entry,%
239        exception,exit,for,function,generic,goto,if,in,is,limited,loop,%
240        mod,new,not,null,of,or,others,out,package,pragma,private,%
241        procedure,raise,range,record,rem,renames,return,reverse,select,%
242        separate,subtype,task,terminate,then,type,use,when,while,with,%
243        xor},%
244     sensitive=f,%
245     morecomment=[l]--,%
246     morestring=[m]",% percent not defined as stringizer so far
247     morestring=[m]'%
248   }[keywords,comments,strings]
```

249 ⟨/lang1⟩

## 2.5  Algol

Data come from

- UWE PAPE: **Programmieren in ALGOL 60**; © 1973 Carl Hanser Verlag München; ISBN 3-446-11605-2

- FRANK G. PAGAN: **A practical guide to ALGOL 68**; © 1976 by John Wiley & Sohn Ltd.; ISBN 0-471-65746-8 (Cloth); ISBN 0-471-65747-6 (Pbk).

The definition of Algol 68 doesn't support comments enclosed by ¢.

```
250 ⟨∗lang3⟩

251 \lst@definelanguage[68]{Algol}%
252 % ??? should 'i' be a keyword
253   {morekeywords={abs,and,arg,begin,bin,bits,bool,by,bytes,case,channel,%
254       char,co,comment,compl,conj,divab,do,down,elem,elif,else,empty,%
255       end,entier,eq,esac,exit,false,fi,file,flex,for,format,from,ge,%
256       goto,gt,heap,if,im,in,int,is,isnt,le,leng,level,loc,long,lt,lwb,%
257       minusab,mod,modab,mode,ne,nil,not,od,odd,of,op,or,ouse,out,over,%
258       overab,par,plusab,plusto,pr,pragmat,prio,proc,re,real,ref,repr,%
259       round,sema,shl,short,shorten,shr,sign,skip,string,struct,then,%
260       timesab,to,true,union,up,upb,void,while},%
261     sensitive=f,% ???
262     morecomment=[s]{\#}{\#},%
263     keywordcomment={co,comment}%
264   }[keywords,comments,keywordcomments]%

265 \lst@definelanguage[60]{Algol}%
266   {morekeywords={array,begin,Boolean,code,comment,div,do,else,end,%
267       false,for,goto,if,integer,label,own,power,procedure,real,step,%
268       string,switch,then,true,until,value,while},%
269     sensitive=f,% ???
270     keywordcommentsemicolon={end}{else,end}{comment}%
271   }[keywords,keywordcomments]%
272 ⟨/lang3⟩
```

## 2.6   Assembler

Credits go to Michael Franke.

```
273 ⟨∗lang3⟩
274 %%
275 %% Motorola 68K definition (c) 2006 Michael Franke
276 %%
277 \lst@definelanguage[Motorola68k]{Assembler}{%
278   morekeywords={ABCD,ADD,%
279     ADDA,ADDI,ADDQ,ADDX,AND,ANDI,ASL,ASR,BCC,BLS,BCS,BLT,BEQ,BMI,BF,BNE,%
280     BGE,BPL,BGT,BT,BHI,BVC,BLE,BVS,BCHG,BCLR,BRA,BSET,BSR,BTST,CHK,CLR,%
281     CMP,CMPA,CMPI,CMPM,DBCC,DBLS,DBCS,DBLT,DBEQ,DBMI,DBF,DBNE,DBGE,DBPL,%
282     DBGT,DBT,DBHI,DBVC,DBLE,DBVS,DIVS,DIVU,EOR,EORI,EXG,EXT,ILLEGAL,JMP,%
283     JSR,LEA,LINK,LSL,LSR,MOVE,MOVEA,MOVEM,MOVEP,MOVEQ,MULS,MULU,NBCD,NEG,%
284     NEGX,NOP,NOT,OR,ORI,PEA,RESET,ROL,ROR,ROXL,ROXR,RTE,RTR,RTS,SBCD,%
285     SCC,SLS,SCS,SLT,SEQ,SMI,SF,SNE,SGE,SPL,SGT,ST,SHI,SVC,SLE,SVS,STOP,%
286     SUB,SUBA,SUBI,SUBQ,SUBX,SWAP,TAS,TRAP,TRAPV,TST,UNLK},%
```

```
287    sensitive=false,%
288    morecomment=[l]*,%
289    morecomment=[l];%
290    }[keywords,comments,strings]
291 ⟨/lang3⟩
```

Credits go to Andrew Zabolotny.

```
292 ⟨*lang3⟩
293 %%
294 %% x86masm definition (c) 2002 Andrew Zabolotny
295 %%
296 \lst@definelanguage[x86masm]{Assembler}%
297    {morekeywords={al,ah,ax,eax,bl,bh,bx,ebx,cl,ch,cx,ecx,dl,dh,dx,edx,%
298        si,esi,di,edi,bp,ebp,sp,esp,cs,ds,es,ss,fs,gs,cr0,cr1,cr2,cr3,%
299        db0,db1,db2,db3,db4,db5,db6,db7,tr0,tr1,tr2,tr3,tr4,tr5,tr6,tr7,%
300        st,aaa,aad,aam,aas,adc,add,and,arpl,bound,bsf,bsr,bswap,bt,btc,%
301        btr,bts,call,cbw,cdq,clc,cld,cli,clts,cmc,cmp,cmps,cmpsb,cmpsw,%
302        cmpsd,cmpxchg,cwd,cwde,daa,das,dec,div,enter,hlt,idiv,imul,in,%
303        inc,ins,int,into,invd,invlpg,iret,ja,jae,jb,jbe,jc,jcxz,jecxz,%
304        je,jg,jge,jl,jle,jna,jnae,jnb,jnbe,jnc,jne,jng,jnge,jnl,jnle,%
305        jno,jnp,jns,jnz,jo,jp,jpe,jpo,js,jz,jmp,lahf,lar,lea,leave,lgdt,%
306        lidt,lldt,lmsw,lock,lods,lodsb,lodsw,lodsd,loop,loopz,loopnz,%
307        loope,loopne,lds,les,lfs,lgs,lss,lsl,ltr,mov,movs,movsb,movsw,%
308        movsd,movsx,movzx,mul,neg,nop,not,or,out,outs,pop,popa,popad,%
309        popf,popfd,push,pusha,pushad,pushf,pushfd,rcl,rcr,rep,repe,%
310        repne,repz,repnz,ret,retf,rol,ror,sahf,sal,sar,sbb,scas,seta,%
311        setae,setb,setbe,setc,sete,setg,setge,setl,setle,setna,setnae,%
312        setnb,setnbe,setnc,setne,setng,setnge,setnl,setnle,setno,setnp,%
313        setns,setnz,seto,setp,setpe,setpo,sets,setz,sgdt,shl,shld,shr,%
314        shrd,sidt,sldt,smsw,stc,std,sti,stos,stosb,stosw,stosd,str,sub,%
315        test,verr,verw,wait,wbinvd,xadd,xchg,xlatb,xor,fabs,fadd,fbld,%
316        fbstp,fchs,fclex,fcom,fcos,fdecstp,fdiv,fdivr,ffree,fiadd,ficom,%
317        fidiv,fidivr,fild,fimul,fincstp,finit,fist,fisub,fisubr,fld,fld1,%
318        fldl2e,fldl2t,fldlg2,fldln2,fldpi,fldz,fldcw,fldenv,fmul,fnop,%
319        fpatan,fprem,fprem1,fptan,frndint,frstor,fsave,fscale,fsetpm,%
320        fsin,fsincos,fsqrt,fst,fstcw,fstenv,fstsw,fsub,fsubr,ftst,fucom,%
321        fwait,fxam,fxch,fxtract,fyl2x,fyl2xp1,f2xm1},%
322    morekeywords=[2]{.align,.alpha,assume,byte,code,comm,comment,.const,%
323        .cref,.data,.data?,db,dd,df,dosseg,dq,dt,dw,dword,else,end,endif,%
324        endm,endp,ends,eq,equ,.err,.err1,.err2,.errb,.errdef,.errdif,%
325        .erre,.erridn,.errnb,.errndef,.errnz,event,exitm,extrn,far,%
326        .fardata,.fardata?,fword,ge,group,gt,high,if,if1,if2,ifb,ifdef,%
327        ifdif,ife,ifidn,ifnb,ifndef,include,includelib,irp,irpc,label,%
328        .lall,le,length,.lfcond,.list,local,low,lt,macro,mask,mod,.model,%
329        name,ne,near,offset,org,out,page,proc,ptr,public,purge,qword,.%
330        radix,record,rept,.sall,seg,segment,.seq,.sfcond,short,size,%
331        .stack,struc,subttl,tbyte,.tfcond,this,title,type,.type,width,%
332        word,.xall,.xcref,.xlist},%
333    alsoletter=.,alsodigit=?,%
334    sensitive=f,%
```

```
335    morestring=[b]",%
336    morestring=[b]',%
337    morecomment=[l];%
338    }[keywords,comments,strings]
339 ⟨/lang3⟩
```

## 2.7  Awk

Thanks to Dr. Christoph Giess for providing these definitions.

```
340 ⟨∗lang1⟩
341 %%
342 %% awk definitions (c) Christoph Giess
343 %%
344 \lst@definelanguage[gnu]{Awk}[POSIX]{Awk}%
345    {morekeywords={and,asort,bindtextdomain,compl,dcgettext,gensub,%
346        lshift,mktime,or,rshift,strftime,strtonum,systime,xor,extension}%
347    }%

348 \lst@definelanguage[POSIX]{Awk}%
349    {keywords={BEGIN,END,close,getline,next,nextfile,print,printf,%
350        system,fflush,atan2,cos,exp,int,log,rand,sin,sqrt,srand,gsub,%
351        index,length,match,split,sprintf,strtonum,sub,substr,tolower,%
352        toupper,if,while,do,for,break,continue,delete,exit,function,%
353        return},%
354    sensitive,%
355    morecomment=[l]\#,%
356    morecomment=[l]//,%
357    morecomment=[s]{/*}{*/},%
358    morestring=[b]"%
359    }[keywords,comments,strings]
360 ⟨/lang1⟩
```

## 2.8  Basic

Credits go to Robert Frank.

```
361 ⟨∗lang1⟩
362 %%
363 %% Visual Basic definition (c) 2002 Robert Frank
364 %%
365 \lst@definelanguage[Visual]{Basic}
366    {morekeywords={Abs,Array,Asc,AscB,AscW,Atn,Avg,CBool,CByte,CCur,%
367        CDate,CDbl,Cdec,Choose,Chr,ChrB,ChrW,CInt,CLng,Command,Cos,%
368        Count,CreateObject,CSng,CStr,CurDir,CVar,CVDate,CVErr,Date,%
369        DateAdd,DateDiff,DatePart,DateSerial,DateValue,Day,DDB,Dir,%
370        DoEvents,Environ,EOF,Error,Exp,FileAttr,FileDateTime,FileLen,%
371        Fix,Format,FreeFile,FV,GetAllStrings,GetAttr,%
372        GetAutoServerSettings,GetObject,GetSetting,Hex,Hour,IIf,%
373        IMEStatus,Input,InputB,InputBox,InStr,InstB,Int,Integer,IPmt,%
374        IsArray,IsDate,IsEmpty,IsError,IsMissing,IsNull,IsNumeric,%
```

```
375        IsObject,LBound,LCase,Left,LeftB,Len,LenB,LoadPicture,Loc,LOF,%
376        Log,Ltrim,Max,Mid,MidB,Min,Minute,MIRR,Month,MsgBox,Now,NPer,%
377        NPV,Oct,Partition,Pmt,PPmt,PV,QBColor,Rate,RGB,Right,RightB,Rnd,%
378        Rtrim,Second,Seek,Sgn,Shell,Sin,SLN,Space,Spc,Sqr,StDev,StDevP,%
379        Str,StrComp,StrConv,String,Switch,Sum,SYD,Tab,Tan,Time,Timer,%
380        TimeSerial,TimeValue,Trim,TypeName,UBound,Ucase,Val,Var,VarP,%
381        VarType,Weekday,Year},% functions
382      morekeywords=[2]{Accept,Activate,Add,AddCustom,AddFile,AddFromFile,%
383        AddFromTemplate,AddItem,AddNew,AddToAddInToolbar,%
384        AddToolboxProgID,Append,AppendChunk,Arrange,Assert,AsyncRead,%
385        BatchUpdate,BeginTrans,Bind,Cancel,CancelAsyncRead,CancelBatch,%
386        CancelUpdate,CanPropertyChange,CaptureImage,CellText,CellValue,%
387        Circle,Clear,ClearFields,ClearSel,ClearSelCols,Clone,Close,Cls,%
388        ColContaining,ColumnSize,CommitTrans,CompactDatabase,Compose,%
389        Connect,Copy,CopyQueryDef,CreateDatabase,CreateDragImage,%
390        CreateEmbed,CreateField,CreateGroup,CreateIndex,CreateLink,%
391        CreatePreparedStatement,CreatePropery,CreateQuery,%
392        CreateQueryDef,CreateRelation,CreateTableDef,CreateUser,%
393        CreateWorkspace,Customize,Delete,DeleteColumnLabels,%
394        DeleteColumns,DeleteRowLabels,DeleteRows,DoVerb,Drag,Draw,Edit,%
395        EditCopy,EditPaste,EndDoc,EnsureVisible,EstablishConnection,%
396        Execute,ExtractIcon,Fetch,FetchVerbs,Files,FillCache,Find,%
397        FindFirst,FindItem,FindLast,FindNext,FindPrevious,Forward,%
398        GetBookmark,GetChunk,GetClipString,GetData,GetFirstVisible,%
399        GetFormat,GetHeader,GetLineFromChar,GetNumTicks,GetRows,%
400        GetSelectedPart,GetText,GetVisibleCount,GoBack,GoForward,Hide,%
401        HitTest,HoldFields,Idle,InitializeLabels,InsertColumnLabels,%
402        InsertColumns,InsertObjDlg,InsertRowLabels,InsertRows,Item,%
403        KillDoc,Layout,Line,LinkExecute,LinkPoke,LinkRequest,LinkSend,%
404        Listen,LoadFile,LoadResData,LoadResPicture,LoadResString,%
405        LogEvent,MakeCompileFile,MakeReplica,MoreResults,Move,MoveData,%
406        MoveFirst,MoveLast,MoveNext,MovePrevious,NavigateTo,NewPage,%
407        NewPassword,NextRecordset,OLEDrag,OnAddinsUpdate,OnConnection,%
408        OnDisconnection,OnStartupComplete,Open,OpenConnection,%
409        OpenDatabase,OpenQueryDef,OpenRecordset,OpenResultset,OpenURL,%
410        Overlay,PaintPicture,Paste,PastSpecialDlg,PeekData,Play,Point,%
411        PopulatePartial,PopupMenu,Print,PrintForm,PropertyChanged,Pset,%
412        Quit,Raise,RandomDataFill,RandomFillColumns,RandomFillRows,%
413        rdoCreateEnvironment,rdoRegisterDataSource,ReadFromFile,%
414        ReadProperty,Rebind,ReFill,Refresh,RefreshLink,RegisterDatabase,%
415        Reload,Remove,RemoveAddInFromToolbar,RemoveItem,Render,%
416        RepairDatabase,Reply,ReplyAll,Requery,ResetCustom,%
417        ResetCustomLabel,ResolveName,RestoreToolbar,Resync,Rollback,%
418        RollbackTrans,RowBookmark,RowContaining,RowTop,Save,SaveAs,%
419        SaveFile,SaveToFile,SaveToolbar,SaveToOle1File,Scale,ScaleX,%
420        ScaleY,Scroll,Select,SelectAll,SelectPart,SelPrint,Send,%
421        SendData,Set,SetAutoServerSettings,SetData,SetFocus,SetOption,%
422        SetSize,SetText,SetViewport,Show,ShowColor,ShowFont,ShowHelp,%
423        ShowOpen,ShowPrinter,ShowSave,ShowWhatsThis,SignOff,SignOn,Size,%
424        Span,SplitContaining,StartLabelEdit,StartLogging,Stop,%
```

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```
425        Synchronize,TextHeight,TextWidth,ToDefaults,TwipsToChartPart,%
426        TypeByChartType,Update,UpdateControls,UpdateRecord,UpdateRow,%
427        Upto,WhatsThisMode,WriteProperty,ZOrder},% methods
428    morekeywords=[3]{AccessKeyPress,AfterAddFile,AfterChangeFileName,%
429        AfterCloseFile,AfterColEdit,AfterColUpdate,AfterDelete,%
430        AfterInsert,AfterLabelEdit,AfterRemoveFile,AfterUpdate,%
431        AfterWriteFile,AmbienChanged,ApplyChanges,Associate,%
432        AsyncReadComplete,AxisActivated,AxisLabelActivated,%
433        AxisLabelSelected,AxisLabelUpdated,AxisSelected,%
434        AxisTitleActivated,AxisTitleSelected,AxisTitleUpdated,%
435        AxisUpdated,BeforeClick,BeforeColEdit,BeforeColUpdate,%
436        BeforeConnect,BeforeDelete,BeforeInsert,BeforeLabelEdit,%
437        BeforeLoadFile,BeforeUpdate,ButtonClick,ButtonCompleted,%
438        ButtonGotFocus,ButtonLostFocus,Change,ChartActivated,%
439        ChartSelected,ChartUpdated,Click,ColEdit,Collapse,ColResize,%
440        ColumnClick,Compare,ConfigChageCancelled,ConfigChanged,%
441        ConnectionRequest,DataArrival,DataChanged,DataUpdated,DblClick,%
442        Deactivate,DeviceArrival,DeviceOtherEvent,DeviceQueryRemove,%
443        DeviceQueryRemoveFailed,DeviceRemoveComplete,DeviceRemovePending,%
444        DevModeChange,Disconnect,DisplayChanged,Dissociate,%
445        DoGetNewFileName,Done,DonePainting,DownClick,DragDrop,DragOver,%
446        DropDown,EditProperty,EnterCell,EnterFocus,Event,ExitFocus,%
447        Expand,FootnoteActivated,FootnoteSelected,FootnoteUpdated,%
448        GotFocus,HeadClick,InfoMessage,Initialize,IniProperties,%
449        ItemActivated,ItemAdded,ItemCheck,ItemClick,ItemReloaded,%
450        ItemRemoved,ItemRenamed,ItemSeletected,KeyDown,KeyPress,KeyUp,%
451        LeaveCell,LegendActivated,LegendSelected,LegendUpdated,%
452        LinkClose,LinkError,LinkNotify,LinkOpen,Load,LostFocus,%
453        MouseDown,MouseMove,MouseUp,NodeClick,ObjectMove,%
454        OLECompleteDrag,OLEDragDrop,OLEDragOver,OLEGiveFeedback,%
455        OLESetData,OLEStartDrag,OnAddNew,OnComm,Paint,PanelClick,%
456        PanelDblClick,PathChange,PatternChange,PlotActivated,%
457        PlotSelected,PlotUpdated,PointActivated,PointLabelActivated,%
458        PointLabelSelected,PointLabelUpdated,PointSelected,%
459        PointUpdated,PowerQuerySuspend,PowerResume,PowerStatusChanged,%
460        PowerSuspend,QueryChangeConfig,QueryComplete,QueryCompleted,%
461        QueryTimeout,QueryUnload,ReadProperties,Reposition,%
462        RequestChangeFileName,RequestWriteFile,Resize,ResultsChanged,%
463        RowColChange,RowCurrencyChange,RowResize,RowStatusChanged,%
464        SelChange,SelectionChanged,SendComplete,SendProgress,%
465        SeriesActivated,SeriesSelected,SeriesUpdated,SettingChanged,%
466        SplitChange,StateChanged,StatusUpdate,SysColorsChanged,%
467        Terminate,TimeChanged,TitleActivated,TitleSelected,%
468        TitleActivated,UnboundAddData,UnboundDeleteRow,%
469        UnboundGetRelativeBookmark,UnboundReadData,UnboundWriteData,%
470        Unload,UpClick,Updated,Validate,ValidationError,WillAssociate,%
471        WillChangeData,WillDissociate,WillExecute,WillUpdateRows,%
472        WithEvents,WriteProperties},% VB-events
473    morekeywords=[4]{AppActivate,Base,Beep,Call,Case,ChDir,ChDrive,%
474        Const,Declare,DefBool,DefByte,DefCur,DefDate,DefDbl,DefDec,%
```

```
475          DefInt,DefLng,DefObj,DefSng,DefStr,Deftype,DefVar,DeleteSetting,%
476          Dim,Do,Else,ElseIf,End,Enum,Erase,Event,Exit,Explicit,FileCopy,%
477          For,ForEach,Friend,Function,Get,GoSub,GoTo,If,Implements,Kill,%
478          Let,LineInput,Lock,Lset,MkDir,Name,Next,OnError,On,Option,%
479          Private,Property,Public,Put,RaiseEvent,Randomize,ReDim,Rem,%
480          Reset,Resume,Return,RmDir,Rset,SavePicture,SaveSetting,%
481          SendKeys,SetAttr,Static,Sub,Then,Type,Unlock,Wend,While,Width,%
482          With,Write},% statements
483      sensitive=false,%
484      keywordcomment=rem,%
485      MoreSelectCharTable=\def\lst@BeginKC@{% chmod
486          \lst@ResetToken
487          \lst@BeginComment\lst@GPmode{{\lst@commentstyle}%
488                      \lst@Lmodetrue\lst@modetrue}\@empty},%
489      morecomment=[l]{'},%
490      morecomment=[s]{/*}{*/},%
491      morestring=[b]",%
492    }[keywords,comments,strings,keywordcomments]
493 ⟨/lang1⟩
```

Thanks to Jonathan de Halleux for reporting a missing comma after `MoreSelectCharTable`, which was the cause of a problem reported by Robert Frank. Martina Hansel also found the bug and the fix.

## 2.9   Clean

Thanks to José Romildo Malaquias. Markus Pahlow found a missing comma.

```
494 ⟨*lang3⟩
495 %%
496 %% Clean definition (c) 1999 Jos\'e Romildo Malaquias
497 %%
498 %% Clean 1.3 :   some standard functional language: pure, lazy,
499 %%               polymorphic type system, modules, type classes,
500 %%               garbage collection, functions as first class citizens
501 %%
502 \lst@definelanguage{Clean}%
503   {otherkeywords={:,::,=,:==,=:,=>,->,<-,<-:,\{,\},\{|,|\},\#,\#!,|,\&,%
504       [,],!,.,\\\\,;,_},%
505   morekeywords={from,definition,implementation,import,module,system,%
506       case,code,if,in,let,let!,of,where,with,infix,infixl,infixr},%
507   morendkeywords={True,False,Start,Int,Real,Char,Bool,String,World,%
508       File,ProcId},%
509   sensitive,%
510   morecomment=[l]//,% missing comma: Markus Pahlow
511   morecomment=[n]{/*}{*/},%
512   morestring=[b]"%
513   }[keywords,comments,strings]
514 ⟨/lang3⟩
```

## 2.10 Corba IDL

This language definition is due to Jens T. Berger Thielemann.

```
515 ⟨∗lang2⟩
516 %%
517 %% Corba IDL definition (c) 1999 Jens T. Berger Thielemann
518 %%
519 \lst@definelanguage[CORBA]{IDL}%
520   {morekeywords={any,attribute,boolean,case,char,const,context,default,%
521       double,enum,exception,fixed,float,in,inout,interface,long,module,%
522       native,Object,octet,oneway,out,raises,readonly,sequence,short,%
523       string,struct,switch,typedef,union,unsigned,void,wchar,wstring,%
524       FALSE,TRUE},%
525   sensitive,%
526   moredirectives={define,elif,else,endif,error,if,ifdef,ifndef,line,%
527       include,pragma,undef,warning},%
528   moredelim=*[directive]\#,%
529   morecomment=[l]//,%
530   morecomment=[s]{/*}{*/},%
531   morestring=[b]"%
532   }[keywords,comments,strings,directives]%
533 ⟨/lang2⟩
```

## 2.11 C, C++, et al

```
534 ⟨∗lang1⟩
```

Michael Fiedler provided the following list of new introduced keywords for C++11.

```
535 \lst@definelanguage[11]{C++}[ISO]{C++}%
536   {morekeywords={alignas,alignof,char16_t,char32_t,constexpr,%
537       decltype,noexcept,nullptr,static_assert,thread_local},%
538   }%
```

Michael Piefel suggested some more changes and added GNU C++. For compatibility the 'ANSI' language is defined in terms of ISO.

```
539 \lst@definelanguage[ANSI]{C++}[ISO]{C++}{}%
```

Michael Piefel suggested some more changes and added GNU C++.

```
540 \lst@definelanguage[GNU]{C++}[ISO]{C++}%
541   {morekeywords={__attribute__,__extension__,__restrict,__restrict__,%
542       typeof,__typeof__},%
543   }%
544 \lst@definelanguage[Visual]{C++}[ISO]{C++}%
545   {morekeywords={__asm,__based,__cdecl,__declspec,dllexport,%
546       dllimport,__except,__fastcall,__finally,__inline,__int8,__int16,%
547       __int32,__int64,naked,__stdcall,thread,__try,__leave},%
548   }%
549 \lst@definelanguage[ISO]{C++}[ANSI]{C}%
550   {morekeywords={and,and_eq,asm,bad_cast,bad_typeid,bitand,bitor,bool,%
551       catch,class,compl,const_cast,delete,dynamic_cast,explicit,export,%
552       false,friend,inline,mutable,namespace,new,not,not_eq,operator,or,%
```

```
553        or_eq,private,protected,public,reinterpret_cast,static_cast,%
554        template,this,throw,true,try,typeid,type_info,typename,using,%
555        virtual,wchar_t,xor,xor_eq},%
556    }%
```

557 ⟨/lang1⟩

Objective-C is due to Detlev Dröge.

558 ⟨∗lang1⟩

```
559 %%
560 %% Objective-C definition (c) 1997 Detlev Droege
561 %%
562 \lst@definelanguage[Objective]{C}[ANSI]{C}
563   {morekeywords={bycopy,id,in,inout,oneway,out,self,super,%
564        @class,@defs,@encode,@end,@implementation,@interface,@private,%
565        @protected,@protocol,@public,@selector},%
566    moredirectives={import}%
567    }%
```

568 ⟨/lang1⟩

Jörg Viermann provided the keywords for Handel-C.

569 ⟨∗lang1⟩

```
570 %%
571 %% Handel-C definition, refer http://www.celoxica.com
572 %%
573 \lst@definelanguage[Handel]{C}[ANSI]{C}
574   {morekeywords={assert,chan,chanin,chanout,clock,delay,expr,external,%
575        external_divide,family,ifselect,in,inline,interface,internal,%
576        internal_divid,intwidth,let,macro,mpram,par,part,prialt,proc,ram,%
577        releasesema,reset,rom,select,sema,set,seq,shared,signal,try,%
578        reset,trysema,typeof,undefined,width,with,wom},%
579    }%
```

580 ⟨/lang1⟩

581 ⟨∗lang1⟩

```
582 \lst@definelanguage[ANSI]{C}%
583   {morekeywords={auto,break,case,char,const,continue,default,do,double,%
584        else,enum,extern,float,for,goto,if,int,long,register,return,%
585        short,signed,sizeof,static,struct,switch,typedef,union,unsigned,%
586        void,volatile,while},%
587    sensitive,%
588    morecomment=[s]{/*}{*/},%
589    morecomment=[l]//,% nonstandard
590    morestring=[b]",%
591    morestring=[b]',%
592    moredelim=*[directive]\#,%
593    moredirectives={define,elif,else,endif,error,if,ifdef,ifndef,line,%
594        include,pragma,undef,warning}%
595    }[keywords,comments,strings,directives]%
```

596 ⟨/lang1⟩

597 ⟨∗lang1⟩

Thanks go to Martin Brodbeck.

```
598 %%
599 %% C-Sharp definition (c) 2002 Martin Brodbeck
600 %%
601 \lst@definelanguage[Sharp]{C}%
602   {morekeywords={abstract,base,bool,break,byte,case,catch,char,checked,%
603       class,const,continue,decimal,default,delegate,do,double,else,%
604       enum,event,explicit,extern,false,finally,fixed,float,for,foreach,%
605       goto,if,implicit,in,int,interface,internal,is,lock,long,%
606       namespace,new,null,object,operator,out,override,params,private,%
607       protected,public,readonly,ref,return,sbyte,sealed,short,sizeof,%
608       static,string,struct,switch,this,throw,true,try,typeof,uint,%
609       ulong,unchecked,unsafe,ushort,using,virtual,void,while,%
610       as,volatile,stackalloc},% Kai K\"ohne
611   sensitive,%
612   morecomment=[s]{/*}{*/},%
613   morecomment=[l]//,%
614   morestring=[b]"
615   }[keywords,comments,strings]
```

616 ⟨/lang1⟩

## 2.12   Caml and Objective Caml

Patrick Cousot mailed me the definition. Tom Hirschowitz added two keywords.

617 ⟨∗lang2⟩

```
618 %%
619 %% (Objective) Caml definition (c) 1999 Patrick Cousot
620 %%
621 %% Objective CAML and Caml light are freely available, together with a
622 %% reference manual, at URL ftp.inria.fr/lang/caml-light for the Unix,
623 %% Windows and Macintosh OS operating systems.
624 %%
625 \lst@definelanguage[Objective]{Caml}[light]{Caml}
626   {deletekeywords={not,prefix,value,where},%
627   morekeywords={assert,asr,class,closed,constraint,external,false,%
628       functor,include,inherit,land,lazy,lor,lsl,lsr,lxor,method,mod,%
629       module,new,open,parser,private,sig,struct,true,val,virtual,when,%
630       object,ref},% TH
631   }%
632 \lst@definelanguage[light]{Caml}
633   {morekeywords={and,as,begin,do,done,downto,else,end,exception,for,%
634       fun,function,if,in,let,match,mutable,not,of,or,prefix,rec,then,%
635       to,try,type,value,where,while,with},%
636   sensitive,%
637   morecomment=[n]{(*}{*)},%
```

18

```
638    morestring=[b]",%
639    moredelim=*[directive]\#,%
640    moredirectives={open,close,include}%
641  }[keywords,comments,strings,directives]%
```

642 ⟨/lang2⟩

## 2.13   Common Intermediate Language

This language definition for CIL (Common Intermediate Language, part of Microsoft's .NET interface) was provided by Olaf Conradi Akim Demaille pointed out that the support for Algol was broken, but that came from a long missing '@' in the following `lst@definelanguage`.

643 ⟨∗lang3⟩

```
644 \lst@definelanguage{CIL}{%
645  morekeywords=[1]{assembly, beforefieldinit, class, default, cdecl, cil,%
646    corflags, culture, custom, data, entrypoint, fastcall, field, file,%
647    hidebysig, hash, il, imagebase, locals, managed, marshall, maxstack,%
648    mresource, method, module, namespace, publickey, stdcall, subsystem,%
649    thiscall, unmanaged, vararg, ver, vtfixup,%
650    % types
651    bool, char, float32, float64, int, int8, int16, int32, int64, method,%
652    native, object, string, modopt, modreq, pinned, typedref, valuetype,%
653    unsigned, void,%
654    % defining types
655    abstract, ansi, auto, autochar, beforefieldinit, boxed, class,%
656    explicit, extends, implements, interface, famandassem, family,%
657    famorassem, inherits, nested, override, pack, private, property,%
658    public, rtspecialname, sealed, sequential, serializable, size,%
659    specialname, static, unicode,%
660    % postfix
661    algorithm, alignment, extern, init, from, nometadata, with},%
662  morekeywords=[2]{add, and, arglist, beq, bge, bgt, ble, blt, bne, br,%
663    break, brfalse, brtrue, call, calli, ceq, cgt, ckfinite, clt, conv,%
664    cpblk, div, dup, endfilter, endfinally, initblk, jmp, ldarg, ldarga,%
665    ldc, ldftn, ldind, ldloc, ldloca, ldnull, leave, localloc, mul, neg,%
666    nop, not, or, pop, rem, ret, shl, shr, starg, stind, stloc, sub,%
667    switch, xor,%
668    % prefix
669    tail, unaligned, volatile,
670    % postfix
671    un, s, ovf,
672    % object
673    box, callvirt, castclass, cpobj, cctor, ctor, initobj, isinst, ldelem,%
674    ldelema, ldfld, ldflda, ldlen, ldobj, ldsfld, ldsflda, ldstr, ldtoken,%
675    ldvirtftn, mkrefany, newarr, newobj, refanytype, refanyval, rethrow,%
676    sizeof, stelem, stfld, stobj, stsfld, throw, unbox},%
677  sensitive=true,%
678  morecomment=[l]{//},%
```

19

```
679   morestring=[b]"%
680 }[keywords,comments,strings]
```

681 ⟨/lang3⟩

## 2.14  Cobol

Keywords are not marked if their names are broken by EOL, for example DEBUG-
CONTENTS. Sometimes portions of a string are not printed as a string. This
happens if the double quote is not doubled to insert a quote, e.g. `""bad" cobol"`
won't be printed correctly.

682 ⟨∗lang2⟩

```
683 \lst@definelanguage[ibm]{Cobol}[1985]{Cobol}%
684   {morekeywords={ADDRESS,BEGINNING,COMP-3,COMP-4,COMPUTATIONAL,%
685       COMPUTATIONAL-3,COMPUTATIONAL-4,DISPLAY-1,EGCS,EJECT,ENDING,%
686       ENTRY,GOBACK,ID,MORE-LABELS,NULL,NULLS,PASSWORD,RECORDING,%
687       RETURN-CODE,SERVICE,SKIP1,SKIP2,SKIP3,SORT-CONTROL,SORT-RETURN,%
688       SUPPRESS,TITLE,WHEN-COMPILED},%
689   }%
690 \lst@definelanguage[1985]{Cobol}[1974]{Cobol}%
691   {morekeywords={ALPHABET,ALPHABETIC-LOWER,ALPHABETIC-UPPER,%
692       ALPHANUMERIC,ALPHANUMERIC-EDITED,ANY,CLASS,COMMON,CONTENT,%
693       CONTINUE,DAY-OF-WEEK,END-ADD,END-CALL,END-COMPUTE,END-DELETE,%
694       END-DIVIDE,END-EVALUATE,END-IF,END-MULTIPLY,END-PERFORM,END-READ,%
695       END-RECEIVE,END-RETURN,END-REWRITE,END-SEARCH,END-START,%
696       END-STRING,END-SUBTRACT,END-UNSTRING,END-WRITE,EVALUATE,EXTERNAL,%
697       FALSE,GLOBAL,INITIALIZE,NUMERIC-EDITED,ORDER,OTHER,%
698       PACKED-DECIMAL,PADDING,PURGE,REFERENCE,RELOAD,REPLACE,STANDARD-1,%
699       STANDARD-2,TEST,THEN,TRUE},%
700   }%
701 \lst@definelanguage[1974]{Cobol}%
702   {morekeywords={ACCEPT,ACCESS,ADD,ADVANCING,AFTER,ALL,ALPHABETIC,ALSO,%
703       ALTER,ALTERNATE,AND,ARE,AREA,AREAS,ASCENDING,ASSIGN,AT,AUTHOR,%
704       BEFORE,BINARY,BLANK,BLOCK,BOTTOM,BY,CALL,CANCEL,CD,CF,CH,%
705       CHARACTER,CHARACTERS,CLOCK-UNITS,CLOSE,COBOL,CODE,CODE-SET,%
706       COLLATING,COLUMN,COMMA,COMMUNICATION,COMP,COMPUTE,CONFIGURATION,%
707       CONTAINS,CONTROL,CONTROLS,CONVERTING,COPY,CORR,CORRESPONDING,%
708       COUNT,CURRENCY,DATA,DATE,DATE-COMPILED,DATE-WRITTEN,DAY,DE,%
709       DEBUG-CONTENTS,DEGUB-ITEM,DEBUG-LINE,DEBUG-NAME,DEBUG-SUB1,%
710       DEBUG-SUB2,DEBUG-SUB3,DEBUGGING,DECIMAL-POINT,DECLARATIVES,%
711       DELETE,DELIMITED,DELIMITER,DEPENDING,DESCENDING,DESTINATION,%
712       DETAIL,DISABLE,DISPLAY,DIVIDE,DIVISION,DOWN,DUPLICATES,DYNAMIC,%
713       EGI,ELSE,EMI,ENABLE,END,END-OF-PAGE,ENTER,ENVIRONMENT,EOP,EQUAL,%
714       ERROR,ESI,EVERY,EXCEPTION,EXIT,EXTEND,FD,FILE,FILE-CONTROL,%
715       FILLER,FINAL,FIRST,FOOTING,FOR,FROM,GENERATE,GIVING,GO,GREATER,%
716       GROUP,HEADING,HIGH-VALUE,HIGH-VALUES,I-O,I-O-CONTROL,%
717       IDENTIFICATION,IF,IN,INDEX,INDEXED,INDICATE,INITIAL,INITIATE,%
718       INPUT,INPUT-OUTPUT,INSPECT,INSTALLATION,INTO,INVALID,IS,JUST,%
```

```
719    JUSTIFIED,KEY,LABEL,LAST,LEADING,LEFT,LENGTH,LESS,LIMIT,LIMITS,%
720    LINAGE,LINAGE-COUNTER,LINE,LINE-COUNTER,LINES,LINKAGE,LOCK,%
721    LOW-VALUE,LOW-VALUES,MEMORY,MERGE,MESSAGE,MODE,MODULES,MOVE,%
722    MULTIPLE,MULTIPLY,NATIVE,NEGATIVE,NEXT,NO,NOT,NUMBER,NUMERIC,%
723    OBJECT-COMPUTER,OCCURS,OF,OFF,OMITTED,ON,OPEN,OPTIONAL,OR,%
724    ORGANIZATION,OUTPUT,OVERFLOW,PAGE,PAGE-COUNTER,PERFORM,PF,PH,PIC,%
725    PICTURE,PLUS,POINTER,POSITION,PRINTING,POSITIVE,PRINTING,%
726    PROCEDURE,PROCEDURES,PROCEED,PROGRAM,PROGRAM-ID,QUEUE,QUOTE,%
727    QUOTES,RANDOM,RD,READ,RECEIVE,RECORD,RECORDING,RECORDS,REDEFINES,%
728    REEL,REFERENCES,RELATIVE,RELEASE,REMAINDER,REMOVAL,RENAMES,%
729    REPLACING,REPORT,REPORTING,REPORTS,RERUN,RESERVE,RESET,RETURN,%
730    REVERSED,REWIND,REWRITE,RF,RH,RIGHT,ROUNDED,RUN,SAME,SD,SEARCH,%
731    SECTION,SECURITY,SEGMENT,SEGMENT-LIMIT,SELECT,SEND,SENTENCE,%
732    SEPARATE,SEQUENCE,SEQUENTIAL,SET,SIGN,SIZE,SORT,SORT-MERGE,%
733    SOURCE,SOURCE-COMPUTER,SPACE,SPACES,SPECIAL-NAMES,STANDARD,START,%
734    STATUS,STOP,STRING,SUB-QUEUE-1,SUB-QUEUE-2,SUB-QUEUE-3,SUBTRACT,%
735    SUM,SYMBOLIC,SYNC,SYNCHRONIZED,TABLE,TALLYING,TAPE,TERMINAL,%
736    TERMINATE,TEXT,THAN,THROUGH,THRU,TIME,TIMES,TO,TOP,TRAILING,TYPE,%
737    UNIT,UNSTRING,UNTIL,UP,UPON,USAGE,USE,USING,VALUE,VALUES,VARYING,%
738    WHEN,WITH,WORDS,WORKING-STORAGE,WRITE,ZERO,ZEROES,ZEROS},%
739  alsodigit=-,%
740  sensitive=f,% ???
741  morecomment=[f][commentstyle][6]*,%
742  morestring=[d]"% ??? doubled
743  }[keywords,comments,strings]
```

`commentstyle` (not the surrounding brackets) have been added after a bug report
by Stephen Reindl.

```
744 ⟨/lang2⟩
```

## 2.15   Comal 80

The data is from

- BORGE R. CHRISTENSEN: **Strukturierte Programmierung mit CO-
  MAL 80** [aus dem Dänischen übertragen und bearbeitet von Margarete
  Kragh]; 2., verb. Auflage – München; Wien: Oldenburg, 1985; ISBN 3-486-
  26902-X.

```
745 ⟨*lang3⟩
```

```
746 \lst@definelanguage{Comal 80}%
747   {morekeywords={AND,AUTO,CASE,DATA,DEL,DIM,DIV,DO,ELSE,ENDCASE,ENDIF,%
748     ENDPROC,ENDWHILE,EOD,EXEC,FALSE,FOR,GOTO,IF,INPUT,INT,LIST,LOAD,%
749     MOD,NEW,NEXT,NOT,OF,OR,PRINT,PROC,RANDOM,RENUM,REPEAT,RND,RUN,%
750     SAVE,SELECT,STOP,TAB,THEN,TRUE,UNTIL,WHILE,ZONE},%
751   sensitive=f,% ???
752   morecomment=[l]//,%
753   morestring=[d]"%
754   }[keywords,comments,strings]
```

```
755 ⟨/lang3⟩
```

## 2.16 COMMAND.COM Batch Files

This definition for DOS and Windows batch files is from Stephan Hennig.

756 ⟨∗lang3⟩

```
757 \lst@definelanguage[WinXP]{command.com}%
758   {morekeywords={assoc,at,attrib,bootcfg,break,cacls,call,cd,chcp,chdir,%
759       chkdsk,chkntfs,cls,cmd,cmdextversion,color,comp,compact,convert,copy,%
760       date,defined,del,dir,diskcomp,diskcopy,do,doskey,echo,else,endlocal,%
761       erase,errorlevel,exist,exit,fc,find,findstr,for,format,ftype,goto,%
762       graftabl,help,if,in,label,md,mkdir,mode,more,move,not,off,path,%
763       pause,popd,print,prompt,pushd,rd,recover,ren,rename,replace,rmdir,%
764       set,setlocal,shift,sort,start,subst,time,title,tree,type,ver,%
765       verify,vol,xcopy},%
766   sensitive=false,%
767   alsoother={@},%
768   alsoletter={\%~:-/},%
769   morecomment=[l]{rem},%
770   morecomment=[l]{reM},%
771   morecomment=[l]{rEm},%
772   morecomment=[l]{rEM},%
773   morecomment=[l]{Rem},%
774   morecomment=[l]{ReM},%
775   morecomment=[l]{REm},%
776   morecomment=[l]{REM},%
777   morestring=[d]"%
778 }[keywords,comments,strings]
```

779 ⟨/lang3⟩

## 2.17 Comsol Multiphysics

Comsol Multiphysics (Prior to version 3.2 known as Femlab) can be used standalone or as an extension to MatLab. This definition is due to Martin Heller.

Unfortunately, there is a conflict in that Comsol is case-insensitive, whereas Matlab is case-sensitive; listings does not currently support different case-sensitivities in the same listing.

780 ⟨∗lang3⟩

```
781 \lst@definelanguage{Comsol}%
782   {morekeywords={%
783       adaption,arc1,arc2,arrayr,assemble,asseminit,beziercurve2,block2,%
784       block3,bsplinecurve2,bsplinecurve3,bsplinesurf3,bypassplot,cardg,%
785       ccoeffgroup,chamfer,checkgeom,circ1,circ2,coeff2cell,comsol,%
786       cone2,cone3,Contents,createhexes,createprisms,createquads,csgbl2,%
787       csgbl3,csgcmpbz,csgimplbz,csginitaux,csginitnr,csgproputil,%
788       csgrbconv,csgunique3,csguniquep,csgversion,csgvvovl,curve2,%
789       curve3,cylinder2,cylinder3,dat2str,defastget,display,drawgetobj,%
790       drawreobj,drawsetobj,dst,duplicate,dxflayers,dxfread,dxfwrite,%
791       econe2,econe3,eigloop,elcconstr,elcplbnd,elcplextr,elcplproj,%
```

```
792    elcplscalar,elempty,elemreobj,eleqc,eleqw,elevate,elgeom,ellip1,%
793    ellip2,ellipsoid2,ellipsoid3,ellipsoidgen_fl23,elmat,elovar,%
794    elpconstr,elshape,elvar,elvarm,embed,extrude,face3,faceprim3,%
795    fastsetop,fem2jxfem,femblocksu,femdiff,femeig,femexport,femgui,%
796    femimport,femiter,femlab,femlin,femmesh,femmeshexp,femnlin,%
797    femplot,femsfun,femsim,femsimlowlevel,femsimserver,femsol,%
798    femsolver,femstate,femstruct,femtime,femwave,festyle,fieldnames,%
799    fillet,fl1d,fl2d,fl3d,flaction,flafun,flappconvert,flappobj,%
800    flaxisequal,flbase,flbinary,flc1hs,flc2hs,flcanpnt,flcell2draw,%
801    flclear,flcolorbar,flcompact,flconeplot,flcontour2mesh,%
802    flcontour2meshaux,flconvreact,flconvreact1d,flconvreact2d,%
803    flconvreact3d,flcyl,fldc1hs,fldc2hs,fldegree,fldegreer3,%
804    fldegreet3,fldimvarsget,fldisp,fldraw2cell,fldrawnow,fldsmhs,%
805    fldsmsign,flevalmat,flexch,flexchprop,flfastgeom,flform,flgc,%
806    flgcbo,flgdconv,flgeom2cellstr,flgeomadj,flgeomarcize,flgeomec,%
807    flgeomed,flgeomepol,flgeomes,flgeomfc,flgeomfd,flgeomfdp,%
808    flgeomff1,flgeomff2,flgeomfn,flgeomfs,flgeomgetlocalsys,%
809    flgeominit,flgeominitprop,flgeomitransform,flgeomloft,flgeommesh,%
810    flgeomnbs,flgeomnes,flgeomnmr,flgeomnv,flgeompsinv,flgeomrmsing,%
811    flgeomrotp,flgeomsd,flgeomsdim,flgeomse,flgeomsf2,flgeomspm,%
812    flgeomtransform,flgeomud,flgeomvtx,flgetdraw,flheat,flheat1d,%
813    flheat2d,flheat3d,flhelmholtz,flhelmholtz1d,flhelmholtz2d,%
814    flhelmholtz3d,flim2curve,flinterp1,fliscont,flismember,%
815    flisnumeric,fljaction,fllaplace,fllaplace1d,fllaplace2d,%
816    fllaplace3d,flload,flloadfl,flloadmatfile,flloadmfile,%
817    fllobj2cellstr,flmakeevalstr,flmapsoljac,flmat2str,flmatch,%
818    flmesh2spline,flmesh2splineaux,flml65setup,flngdof,flnull,%
819    flnullorth,flpde,flpdeac,flpdec,flpdec1d,flpdec2d,flpdec3d,%
820    flpdedc,flpdedc2d,flpdedc3d,flpdedf,flpdedf1d,flpdedf2d,%
821    flpdedf3d,flpdees,flpdees2d,flpdees3d,flpdeg,flpdeg1d,flpdeg2d,%
822    flpdeg3d,flpdeht,flpdeht1d,flpdeht2d,flpdeht3d,flpdems,flpdems2d,%
823    flpdems3d,flpdens,flpdens2d,flpdens3d,flpdepn,flpdeps,flpdesm3d,%
824    flpdew,flpdew1d,flpdew2d,flpdew3d,flpdewb,flpdewb1d,flpdewb2d,%
825    flpdewb3d,flpdewc,flpdewc1d,flpdewc2d,flpdewc3d,flpdewe,%
826    flpdewe3d,flpdewp,flpdewp2d,flpdewp3d,flplot,flpoisson,%
827    flpoisson1d,flpoisson2d,flpoisson3d,flpric2,flpric3,flreobj,%
828    flreport,flresolvepath,flsave,flschrodinger,flschrodinger1d,%
829    flschrodinger2d,flschrodinger3d,flsde,flsdp,flsdt,flsetalpha,%
830    flsetdraw,flsmhs,flsmsign,flspnull,fltherm_cond1,fltrg,flversion,%
831    flversions,flverver,flwave,flwave1d,flwave2d,flwave3d,%
832    flwriteghist,formstr,gdsread,gencyl2,gencyl3,genextrude,%
833    genextrudeaux,geom,geom0,geom0get,geom1,geom1get,geom2,geom2get,%
834    geom3,geom3get,geom3j2m,geom3m2j,geomaddlblmargin,geomanalyze,%
835    geomarrayr,geomassign,geomcoerce,geomcomp,geomconnect,geomcopy,%
836    geomcsg,geomdel,geomedit,geomexport,geomfile,geomget,%
837    geomgetlabels,geomgetwrkpln,geomimport,geominfo,geominfoaux,%
838    geomlblplot,geomload,geomnumparse,geomobject,geomparse,geomplot,%
839    geomplot1,geomplot2,geomplot3,geomposition,geomproputil,%
840    geomreconstruct,geomreobj,geomserver,geomspline,geomsurf,%
841    geomupdate,get,getfemgeom,getisocurve,getjptr,getmesh,getsdim,%
```

```
842        getvmatrixexch,handlesolnumstr,helix1,helix2,helix3,hexahedron2,%
843        hexahedron3,histfrommat,idst,igesread,importplotdata,isempty,%
844        isfield,isfunc,isscript,javaclass,jproputil,jptr2geom,jptrgeom1,%
845        jptrgeom1_fl23,jptrgeom2,jptrgeom2_fl23,jptrgeom3,jptrgeom3_fl23,%
846        keiter,line1,line2,loadobj,loft,matlabinterpdata,mesh2geom,%
847        meshassign,meshcaseadd,meshcasedel,meshcaseutil,meshcheck,%
848        meshembed,meshenrich,meshenrich1,meshenrich2,meshenrich3,%
849        meshexport,meshextend,meshextrude,meshget,meshimport,meshinit,%
850        meshintegrate,meshmap,meshoptim,meshparse,meshplot,meshplot1,%
851        meshplot2,meshplot3,meshplotproputil,meshpoi,meshproputil,%
852        meshptplot,meshqual,meshrefine,meshrevolve,meshsmooth,%
853        meshsmooth2,meshsweep,meshvolume,minus,mirror,mkreflparams,%
854        mmsolve,modetype,move,moveglobalfields,mphproputil,mtimes,%
855        multiphysics,mypostinterp,notscript,onlyelsconstr,outassign,%
856        paramgeom,pde2draw,pde2equ,pde2fem,pde2geom,pdeblxpd,plus,point1,%
857        point2,point3,poisson,poly1,poly2,postanim,postapplysettings,%
858        postarrow,postarrowbnd,postcolorbar,postcont,postcontdomind,%
859        postcoord,postcopyprop,postcrossplot,postdistrprops,posteval,%
860        postflow,postfnd,postgeomplot,postgetfem,postgetstylecolor,%
861        postglobaleval,postglobalplot,postgp,postinit,postint,postinterp,%
862        postiso,postlin,postmakecontcol,postmax,postmaxmin,postmin,%
863        postmkcontbar,postmknormexpr,postmovie,postnewplot,%
864        postoldmaxminprops,postpd2pm,postplot,postplotconstants,%
865        postpm2pd,postprinc,postprincbnd,postprocgui,postproputil,%
866        postslice,postsurf,posttet,posttitle,print2file,pyramid2,%
867        pyramid3,rect1,rect2,restorefields,revolve,rmfield,rotate,%
868        rotmatrix,scale,serialize,set,setmesh,sh2str,sharg_2_5,shbub,%
869        shdisc,shdiv,shherm,shlag,shvec,simplecoerce,simreobj,slblocks,%
870        solassign,solid0,solid1,solid2,solid3,solidprim3,solproputil,%
871        solsize,solveraddcases,sphere2,sphere3,spiceimport,splineaux,%
872        split,splittoprim,square1,square2,stlread,submode,submodes,%
873        subsasgn,subsref,tangent,taucs,tetrahedron2,tetrahedron3,%
874        tobsplines,torus2,torus3,transform,update,updateassoc,%
875        updateassocinfo,updatefem,updateguistruct,updateobj,vrmlread,%
876        xmeshinfo,xmeshinit},%
877      sensitive=false,%
878      morecomment=[l]\%,%
879      morestring=[m]'%
880    }[keywords,comments,strings]
881 ⟨/lang3⟩
```

## 2.18   bash, csh, and sh

csh is from Kai Below, but he pointed out that some keywords are probably
missing.

```
882 ⟨*lang1⟩

883 %%
884 %% csh definition (c) 1998 Kai Below
```

```
885 %%
886 \lst@definelanguage{csh}
887   {morekeywords={alias,awk,cat,echo,else,end,endif,endsw,exec,exit,%
888       foreach,glob,goto,history,if,logout,nice,nohup,onintr,repeat,sed,%
889       set,setenv,shift,source,switch,then,time,while,umask,unalias,%
890       unset,wait,while,@,env,argv,child,home,ignoreeof,noclobber,%
891       noglob,nomatch,path,prompt,shell,status,verbose,print,printf,%
892       sqrt,BEGIN,END},%
893   morecomment=[l]\#,%
894   morestring=[d]"%
895   }[keywords,comments,strings]
```

Thanks to Riccardo Murri for the following two definitions. Scott Pakin pointed out some missing keywords (`elif`, `in` for `sh`, `caller`, `compopt`, `coproc`, `dirs`, `help`, `mapfile`, `readarray` for `bash`) to the current maintainer. The `sh` list of keywords was checkead against the "Manual of the Bourne Shell on Version 7", found at http://www.in-ulm.de/~mascheck/bourne/v7/, last visited on 2014/09/06. Ralf Schandl indicated the missing of an apostrophe as delimiter of strings.

```
896 %%
897 %% bash,sh definition (c) 2003 Riccardo Murri <riccardo.murri@gmx.it>
898 %%
899 \lst@definelanguage{bash}[][sh]%
900   {morekeywords={alias,bg,bind,builtin,caller,command,compgen,compopt,%
901       complete,coproc,declare,disown,dirs,enable,fc,fg,help,history,%
902       jobs,let,local,logout,mapfile,printf,pushd,popd,readarray,select,%
903       set,suspend,shopt,source,times,type,typeset,ulimit,unalias,wait},%
904   }%
905 \lst@definelanguage{sh}%
906   {morekeywords={awk,break,case,cat,cd,continue,do,done,echo,elif,else,%
907       env,esac,eval,exec,exit,export,expr,false,fi,for,function,getopts,%
908       hash,history,if,in,kill,login,newgrp,nice,nohup,ps,pwd,read,%
909       readonly,return,set,sed,shift,test,then,times,trap,true,type,%
910       ulimit,umask,unset,until,wait,while},%
911   morecomment=[l]\#,%
912   morestring=[d]",%
913   morestring=[d]'%
914   }[keywords,comments,strings]
915 ⟨/lang1⟩
```

Jobst Hoffmann copied the definition of a style for printing Fortran code to a style for printing shell programs:

```
916 ⟨∗bash-prf⟩

917 \usepackage[rgb, x11names]{xcolor}
918
919 % common settings
920 \lstset{%
921   frame=tlb,%       the frame is open on the right side
922   resetmargins=false,%
923   rulesepcolor=\color{black},%
```

```
924   numbers=left,%                    % left
925   numberstyle=\tiny,%
926   numbersep=5pt,%
927   firstnumber=1,%
928   stepnumber=5,%
929   columns=fixed,%                   % to prevent inserting spaces
930   fontadjust=true,%
931   keepspaces=true,%
932   basewidth=0.5em,%
933   captionpos=t,%
934   abovecaptionskip=\smallskipamount,% same amount as default
935   belowcaptionskip=\smallskipamount,% in caption package
936 }
937 % settings for colored printing
938 \lstdefinestyle{bash}{%
939   backgroundcolor=\color{yellow!10},%
940   basicstyle=\small\ttfamily,%
941   identifierstyle=\color{black},%
942   keywordstyle=\color{blue},%
943   keywordstyle={[2]\color{cyan}},%
944   keywordstyle={[3]\color{olive}},%
945   stringstyle=\color{teal},%
946   commentstyle=\itshape\color{orange},%
947 }%
948 % settings for back and white printing
949 \lstdefinestyle{bashbw}{%
950   backgroundcolor={},%
951   basicstyle=\small\ttfamily,%
952   identifierstyle={},%
953   keywordstyle=\bfseries,%
954   stringstyle=\itshape,%
955   commentstyle=\slshape,%
956   rulesepcolor=\color{black},%
957 }%
```

This code is provided in the file `listings-bash.prf`, see section 2.4.1 (Preferences) of the listings documentation.

958 ⟨/bash-prf⟩


## 2.19   Delphi

I took the data from Delphi 1.0 (?) online help. Christian Gudrian provided the 'double slash' comment.

959 ⟨∗lang2⟩

```
960 \lst@definelanguage{Delphi}%
961   {morekeywords={and,as,asm,array,begin,case,class,const,constructor,%
962       destructor,div,do,downto,else,end,except,exports,file,finally,%
963       for,function,goto,if,implementation,in,inherited,inline,%
964       initialization,interface,is,label,library,mod,nil,not,object,of,%
```

```
965        or,packed,procedure,program,property,raise,record,repeat,set,%
966        shl,shr,string,then,to,try,type,unit,until,uses,var,while,with,%
967        xor,%
968        absolute,abstract,assembler,at,cdecl,default,dynamic,export,%
969        external,far,forward,index,name,near,nodefault,on,override,%
970        private,protected,public,published,read,resident,storedDir,%
971        virtual,write},%
972     morendkeywords={Abs,AddExitProc,Addr,AllocMem,AnsiCompareStr,%
973        AnsiCompareText,AnsiLowerCase,AnsiUpperCase,Append,AppendStr,%
974        ArcTan,AssignCrt,Assigned,AssignFile,BlockRead,BlockWrite,Break,%
975        ChangeFileExt,ChDir,Chr,CloseFile,ClrEol,ClrScr,Concat,Continue,%
976        Copy,Cos,CSeg,CursorTo,Date,DateTimeToFileDate,DateTimeToStr,%
977        DateTimeToString,DateToStr,DayOfWeek,Dec,DecodeDate,DecodeTime,%
978        Delete,DeleteFile,DiskFree,DiskSize,Dispose,DisposeStr,%
979        DoneWinCrt,DSeg,EncodeDate,EncodeTime,Eof,Eoln,Erase,Exclude,%
980        Exit,Exp,ExpandFileName,ExtractFileExt,ExtractFileName,%
981        ExtractFilePath,FileAge,FileClose,FileDateToDateTime,FileExists,%
982        FileGetAttr,FileGetDate,FileOpen,FilePos,FileRead,FileSearch,%
983        FileSeek,FileSetAttr,FileSetDate,FileSize,FillChar,FindClose,%
984        FindFirst,FindNext,FloatToDecimal,FloatToStrF,FloatToStr,%
985        FloatToText,FloatToTextFmt,Flush,FmtLoadStr,FmtStr,Format,%
986        FormatBuf,FormatDateTime,FormatFloat,Frac,Free,FreeMem,GetDir,%
987        GetMem,GotoXY,Halt,Hi,High,Inc,Include,InitWinCrt,Insert,Int,%
988        IntToHex,IntToStr,IOResult,IsValidIdent,KeyPressed,Length,Ln,Lo,%
989        LoadStr,Low,LowerCase,MaxAvail,MemAvail,MkDir,Move,New,NewStr,%
990        Now,Odd,Ofs,Ord,ParamCount,ParamStr,Pi,Pos,Pred,Ptr,Random,%
991        Randomize,Read,ReadBuf,ReadKey,Readln,ReAllocMem,Rename,%
992        RenameFile,Reset,Rewrite,RmDir,Round,RunError,ScrollTo,Seek,%
993        SeekEof,SeekEoln,Seg,SetTextBuf,Sin,SizeOf,SPtr,Sqr,Sqrt,SSeg,%
994        Str,StrCat,StrComp,StrCopy,StrDispose,StrECopy,StrEnd,StrFmt,%
995        StrLCat,StrIComp,StrLComp,StrLCopy,StrLen,StrLFmt,StrLIComp,%
996        StrLower,StrMove,StrNew,StrPas,StrPCopy,StrPos,StrScan,StrRScan,%
997        StrToDate,StrToDateTime,StrToFloat,StrToInt,StrToIntDef,%
998        StrToTime,StrUpper,Succ,Swap,TextToFloat,Time,TimeToStr,%
999        TrackCursor,Trunc,Truncate,TypeOf,UpCase,UpperCase,Val,WhereX,%
1000       WhereY,Write,WriteBuf,WriteChar,Writeln},%
1001    sensitive=f,%
1002    morecomment=[s]{(*}{*)},%
1003    morecomment=[s]{\{}{\}},%
1004    morecomment=[l]{//},% 2001 Christian Gudrian
1005    morestring=[d]'%
1006   }[keywords,comments,strings]
1007 ⟨/lang2⟩
```

## 2.20   Eiffel

Data is from

- BERTRAND MEYER: **Eiffel: the language**; Prentice Hall International
  (UK) Ldt, 1992; ISBN 0-13-247925-7.

1008 ⟨∗lang2⟩

```
1009 \lst@definelanguage{Eiffel}%
1010   {morekeywords={alias,all,and,as,BIT,BOOLEAN,CHARACTER,check,class,%
1011       creation,Current,debug,deferred,do,DOUBLE,else,elseif,end,%
1012       ensure,expanded,export,external,false,feature,from,frozen,if,%
1013       implies,indexing,infix,inherit,inspect,INTEGER,invariant,is,%
1014       like,local,loop,NONE,not,obsolete,old,once,or,POINTER,prefix,%
1015       REAL,redefine,rename,require,rescue,Result,retry,select,%
1016       separate,STRING,strip,then,true,undefine,unique,until,variant,%
1017       when,xor},%
1018     sensitive,%
1019     morecomment=[l]--,%
1020     morestring=[d]",%
1021   }[keywords,comments,strings]
```

The key=value `stringtest=false` has been removed after a bug report from Xavier Crégut.

1022 ⟨/lang2⟩

## 2.21  Elan

The data come from

- LEO H. KLINGEN, JOCHEN LIEDTKE: **Programmieren mit ELAN**; B.G. Teubner, Stuttgart 1983; ISBN 3-519-02507-8.

1023 ⟨∗lang3⟩

```
1024 \lst@definelanguage{Elan}%
1025   {morekeywords={ABS,AND,BOOL,CAND,CASE,CAT,COLUMNS,CONCR,CONJ,CONST,%
1026       COR,DECR,DEFINES,DET,DIV,DOWNTO,ELIF,ELSE,END,ENDIF,ENDOP,%
1027       ENDPACKET,ENDPROC,ENDREP,ENDSELECT,FALSE,FI,FILE,FOR,FROM,IF,%
1028       INCR,INT,INV,LEAVE,LENGTH,LET,MOD,NOT,OF,OP,OR,OTHERWISE,PACKET,%
1029       PROC,REAL,REP,REPEAT,ROW,ROWS,SELECT,SIGN,STRUCT,SUB,TEXT,THEN,%
1030       TRANSP,TRUE,TYPE,UNTIL,UPTO,VAR,WHILE,WITH,XOR,%
1031       maxint,sign,abs,min,max,random,initializerandom,subtext,code,%
1032       replace,text,laenge,pos,compress,change,maxreal,smallreal,floor,%
1033       pi,e,ln,log2,log10,sqrt,exp,tan,tand,sin,sind,cos,cosd,arctan,%
1034       arctand,int,real,lastconversionok,put,putline,line,page,get,%
1035       getline,input,output,sequentialfile,maxlinelaenge,reset,eof,%
1036       close,complexzero,complexone,complexi,complex,realpart,imagpart,%
1037       dphi,phi,vector,norm,replace,matrix,idn,row,column,sub,%
1038       replacerow,replacecolumn,replaceelement,transp,errorsstop,stop},%
1039     sensitive,%
1040     morestring=[d]"%
1041   }[keywords,strings]
```

1042 ⟨/lang3⟩

## 2.22 Erlang

Thanks to Daniel Gazard.

1043 ⟨∗lang3⟩

```
1044 %%
1045 %% Erlang definition (c) 2003 Daniel Gazard
1046 %%
1047 \lst@definelanguage{erlang}%
1048   {morekeywords={abs,after,and,apply,atom,atom_to_list,band,binary,%
1049       binary_to_list,binary_to_term,bor,bsl,bsr,bxor,case,catch,%
1050       date,div,element,erase,end,exit,export,float,float_to_list,%
1051       get,halt,hash,hd,if,info,import,integer,integer_to_list,%
1052       length,link,list,list_to_atom,list_to_float,list_to_integer,%
1053       list_to_tuple,module,node,nodes,now,of,or,pid,port,ports,%
1054       processes,put,receive,reference,register,registered,rem,%
1055       round,self,setelement,size,spawn,throw,time,tl,trace,trunc,%
1056       tuple,tuple_to_list,unlink,unregister,whereis,error,false,%
1057       infinity,nil,ok,true,undefined,when},%
1058   otherkeywords={->,!,[,],\{,\}},%
1059   morecomment=[l]\%,%
1060   morestring=[b]",%
1061   morestring=[b]'%
1062   }[keywords,comments,strings]
```

1063 ⟨/lang3⟩

## 2.23 Euphoria

Detlef Reimers sent me the language definition.

1064 ⟨∗lang2⟩

```
1065 %%
1066 %% Euphoria definition (c) 1998 Detlef Reimers
1067 %%
1068 \lst@definelanguage{Euphoria}%
1069 % for Euphoria 2.0, Rapid Deployment Software, Kanada
1070   {morekeywords={abort,and,and_bits,append,arctan,atom,by,call,%
1071       call_proc,call_func,c_proc,c_func,clear_screen,close,%
1072       command_line,compare,constant,cos,do,date,else,elsif,end,exit,%
1073       find,floor,for,function,getc,getenv,get_key,gets,global,%
1074       get_pixel,if,include,integer,length,log,match,machine_func,%
1075       machine_proc,mem_copy,mem_set,not,not_bits,or,object,open,%
1076       or_bits,procedure,puts,position,prepend,print,printf,power,peek,%
1077       poke,pixel,poke4,peek4s,peek4u,return,rand,repeat,remainder,%
1078       routine_id,sequence,sqrt,sin,system,sprintf,then,type,to,time,%
1079       trace,tan,while,with,without,xor,xor_bits},%
1080   sensitive,%
1081   morecomment=[l]--,%
1082   morestring=[d]',%
1083   morestring=[d]"%
```

```
1084    }[keywords,comments,strings]
```

```
1085 ⟨/lang2⟩
```

## 2.24 Fortran

Took things from

- Karl Hans Müller: **Fortran 77: Programmierungsanleitung**; 3., völlig neu bearb. Aufl. – Mannheim; Wien; Zürich: Bibliographisches Institut, 1984; ISBN 3-411-05804-8

- Thomas Michel: **Fortran 90: Lehr– und Handbuch**; Mannheim; Leipzig; Wien; Zürich: BI-Wiss.-Verlag, 1994; ISBN 3-411-16861-7.

Another source for Fortran keywords is [http://fortranwiki.org/fortran/show/Keywords](http://fortranwiki.org/fortran/show/Keywords) where the keywords for Fortran 2003 and 2008 are taken from.

```
1086 ⟨*lang1⟩
```

The current version of Fortran (Fortran 2018) is defined by ISO/IEC 1539-1:2018, for a deeper insight have a look at [https://wg5-fortran.org/f2018.html](https://wg5-fortran.org/f2018.html). It contains ? new keywords, ? of them consisting of two words: `FAIL IMAGE`, so the list of keywords contains the single parts `FAIL` and `IMAGE`. So there is the following definition of Fortran 2018 keywords

```
1087 \lst@definelanguage[18]{Fortran}[08]{Fortran}{%
1088   morekeywords={FAIL, IMAGE, NON_RECURSIVE},%
```

and procedures:

```
1089   morekeywords=[3]{GET_TEAM, TEAM_NUMBER, IMAGE_TEAMS, NUM_IMAGES,
1090     THIS_IMAGE, FAILED_IMAGES, STOPPED_IMAGES, IMAGES_STATUS, CO_BROADCAST,
1091   CO_MAX, CO_MIN, CO_SUM, CO_REDUCE, ATOMIC_ADD, ATOMIC_AND, ATOMIC_OR,
1092   ATOMIC_XOR, ATOMIC_FETCH_ADD, ATOMIC_FETCH_AND, ATOMIC_FETCH_OR,
1093   ATOMIC_FETCH_XOR, ATOMIC_FETCH_CAS, IEEE_GET_MODES, IEEE_SET_MODES,
1094   IEEE_FMA, IEEE_SIGNBIT, IEEE_INT, IEEE_REM, IEEE_MAX_NUM,
1095   IEEE_MAX_NUM_MAG,
1096   IEEE_MIN_NUM, IEEE_MAX_NUM_MAG, IEEE_NEXT_DOWN, IEEE_NEXT_UP,
1097   IEEE_SUPPORT_DATATYPE, IEEE_QUIET_EQ, IEEE_QUIET_GE, IEEE_QUIET_GT,
1098   IEEE_QUIET_LE, IEEE_QUIET_LT, IEEE_QUIET_NE, IEEE_SIGNALING_EQ,
1099   IEEE_SIGNALING_GE, IEEE_SIGNALING_GT, IEEE_SIGNALING_LE,
1100   IEEE_SIGNALING_LT, IEEE_SIGNALING_NE}%
1101 }%
```

The Fortran 2008 version is defined by ISO/IEC 1539-1:2010. It contains nine new keywords, four of them consisting of two words: `ERROR STOP`, `SYNC ALL`, `SYNC IMAGES`, `SYNC MEMORY`, so the list of keywords contains the single parts `ALL`, `ERROR`, `IMAGES`, `MEMORY`, and `SYNC`.

```
1102 \lst@definelanguage[08]{Fortran}[03]{Fortran}{%
1103 morekeywords={ALL, BLOCK, CODIMENSION, CONCURRENT, CONTIGUOUS, CRITICAL,%
1104     ERROR, IMAGES, LOCK, MEMORY, SUBMODULE, SYNC, UNLOCK},%
```

New procedures in Fortran 2008:

```
1105  morekeywords=[3]{ACOSH, ASINH, ATANH, ATOMIC_DEFINE, ATOMIC_REF,%
1106      BESSEL_J0, BESSEL_J1, BESSEL_JN, BESSEL_Y0, BESSEL_Y1, BESSEL_YN,%
1107      BGE, BGT, BLE, BLT, C_SIZEOF, COMPILER_OPTIONS, COMPILER_VERSION,%
1108      DSHIFTL, DSHIFTR, ERF, ERFC, ERFC_SCALED, EXECUTE_COMMAND_LINE,%
1109      FINDLOC, GAMMA, HYPOT, IALL, IANY, IMAGE_INDEX, IPARITY, LCOBOUND,%
1110      LEADZ, LOG_GAMMA, MASKL, MASKR, MERGE_BITS, NORM2, NUM_IMAGES,%
1111      PARITY, POPCNT, POPPAR, SHIFTA, SHIFTL, SHIFTR, STORAGE_SIZE,%
1112      THIS_IMAGE, TRAILZ, UCOBOUND}%
1113 }%
```

Fortran 2003 introduces the following keywords:

```
1114 \lst@definelanguage[03]{Fortran}[95]{Fortran}{%
1115  morekeywords={ABSTRACT, ASSOCIATE, ASYNCHRONOUS, BIND, CLASS, DEFERRED,%
1116      ENUM, ENUMERATOR, EXTENDS, FINAL, FLUSH, GENERIC, IMPORT,%
1117      NON_OVERRIDABLE, NOPASS, PASS, PROTECTED, VALUE, VOLATILE, WAIT},%
```

These are new options/specifiers:

```
1118      morekeywords=[2]{DECIMAL, ENCODING, IOMSG, ROUND},%
```

And also some new procedures:

```
1119  morekeywords=[3]{C_ASSOCIATED, C_F_POINTER, C_F_PROCPOINTER, C_FUNLOC,%
1120      C_LOC, COMMAND_ARGUMENT_COUNT, EXTENDS_TYPE_OF, GET_COMMAND,%
1121      GET_COMMAND_ARGUMENT, GET_ENVIRONMENT_VARIABLE, IS_IOSTAT_END,%
1122      MOVE_ALLOC,NEW_LINE,SAME_TYPE_AS, SELECTED_CHAR_KIND}%
1123 }%
```

Denis Girou proposed to have Fortran 95 and Fortran 90 to be equivalent.

```
1124 \lst@definelanguage[90]{Fortran}[95]{Fortran}{}
```

There is no `morecomment=[f]` in Fortran 90 since otherwise `CONTAINS` could start a comment. This problem was reported by Magne Rudshaug. Moreover the keyword `INCLUDE` is due to him.

```
1125 \lst@definelanguage[95]{Fortran}[77]{Fortran}{%
1126  deletekeywords=SAVE,%
1127  morekeywords={ALLOCATABLE, ALLOCATE, ASSIGNMENT, CASE, CONTAINS, CYCLE,%
1128      DEALLOCATE, DEFAULT, EXIT, INCLUDE, IN, NONE, OUT, INTENT, INTERFACE,%
1129      MODULE, NAMELIST, NULLIFY, ONLY, OPERATOR, OPTIONAL, OUT, POINTER,%
1130      PRIVATE, PUBLIC, RECURSIVE, RESULT, SELECT, SEQUENCE, TARGET, TYPE,%
1131      USE, WHERE, WHILE, BLOCKDATA, DOUBLEPRECISION, ENDBLOCKDATA, ENDFILE,%
1132      ENDFUNCTION, ENDINTERFACE, ENDMODULE, ENDPROGRAM, ENDSELECT,%
1133      ENDSUBROUTINE, ENDTYPE, ENDWHERE, INOUT, SELECTCASE,%
```

Theses keys were missing from the 1.4 version of listings:

```
1134      ELEMENTAL, ELSEWHERE, FORALL, PURE,%
```

This is another key missing from the 1.4 version of listings:

```
1135      PROCEDURE},%
```

The list of option keywords/specifiers new in Fortran 90 and 95:

```
1136  morekeywords=[2]{ACTION, ADVANCE, DELIM, IOLENGTH, LEN, NAME, NML, PAD,%
1137      POSITION, READWRITE, SIZE, STAT},% corrected NML from NMT
```

and the list of intrinsic procedures new in Fortran 90 and 95:

```
1138   morekeywords=[3]{ACHAR, ADJUSTL, ADJUSTR, ALL, ALLOCATED, ANY, ASSOCIATED,%
1139     BIT_SIZE, BTEST, CEILING, COUNT, CPU_TIME, CSHIFT, DATE_AND_TIME, DIGITS,%
1140     DOT_PRODUCT, EOSHIFT, EPSILON, EXPONENT, FLOOR, FRACTION, HUGE, IACHAR,%
1141     IAND, IBCLR, IBITS, IBSET, ICHAR, IEOR, IOR, ISHFT, ISHFTC, KIND, LBOUND,%
1142     LEN_TRIM,% left out LOGICAL
1143     MATMUL, MAXEXPONENT, MAXLOC, MAXVAL, MERGE, MINEXPONENT, MINLOC, MINVAL,%
1144     MODULO, MVBITS, NEAREST, NOT, NULL, PACK, PRECISION, PRESENT, PRODUCT,%
1145     RADIX, RANDOM_NUMBER, RANDOM_SEED, RANGE, RANK, REPEAT, RESHAPE,%
1146     RRSPACING, SCALE, SCAN, SELECTED_INT_KIND, SELECTED_REAL_KIND,%
1147     SET_EXPONENT, SHAPE, SINH, SIZE, SPACING, SPREAD, SUM, SYSTEM_CLOCK,%
1148     TINY, TRANSFER, TRANSPOSE, TRIM, UBOUND, UNPACK, VERIFY},%
1149   deletecomment=[f],% no fixed comment line: 1998 Magne Rudshaug
1150 morecomment=[l]!%
1151 }%
```

As proposed by Jörn Wilms keywords are *not* case sensitive. Also, note that Fortran 77 (and fixed-format source in later versions) allows space in keywords; thus, this list contains some of the more common variants (e.g., 'GO TO' and 'GOTO').

```
1152 \lst@definelanguage[77]{Fortran}{%
```

Jobst Hoffmann divided the list of keywords into two lists. The first list contains the statement keywords, the second list contains the option keywords/specifiers and values. This makes the different meanings of the keywords distinguishable.

```
1153   morekeywords={ASSIGN, BACKSPACE, CALL, CHARACTER, %
1154     CLOSE, COMMON, COMPLEX, CONTINUE, DATA, DIMENSION, DO, DOUBLE, %
1155     ELSE, ELSEIF, END, ENDIF, ENDDO, ENTRY, EQUIVALENCE, EXTERNAL, %
1156     FILE, FORMAT, FUNCTION, GO, TO, GOTO, IF, IMPLICIT, %
1157     INQUIRE, INTEGER, INTRINSIC, LOGICAL, %
1158     OPEN, PARAMETER, PAUSE, PRECISION, PRINT, PROGRAM, READ, REAL, %
1159     RETURN, REWIND, SAVE, STOP, SUBROUTINE, THEN, %
1160     WRITE},%
1161   morekeywords=[2]{ACCESS, BLANK, BLOCK, DIRECT, EOF, ERR, EXIST,%
1162     FMT, FORM, FORMATTED, IOSTAT, NAMED, NEXTREC, NUMBER, OPENED,%
1163     REC, RECL, SEQUENTIAL, STATUS, TYPE, UNFORMATTED, UNIT},%
```

And here is another list: the list of intrinsic procedures (remember: all functions belong to the Fortran language specification!)

```
1164   morekeywords=[3]{INT, DBLE, CMPLX, ICHAR, CHAR, AINT, ANINT,% left out real
1165     NINT, ABS, MOD, SIGN, DIM, DPROD, MAX, MIN, AIMAG, CONJG, SQRT,%
1166     EXP, LOG, LOG10, SIN, COS, TAN, ASIN, ACOS, ATAN, ATAN2, SINH,%
1167     COSH, TANH, LGE, LGT, LLE, LLT, LEN, INDEX},%
```

And here is the last list: fortran operators:

```
1168   morekeywords=[4]{AND, EQ, EQV, FALSE, GE, GT, OR, LE, LT, NE, NEQV,%
1169     NOT, TRUE},%
1170   sensitive=f,%% not Fortran-77 standard, but allowed in Fortran-95 %%
1171   morecomment=[f]*,%
1172   morecomment=[f]C,%
1173   morecomment=[f]c,%
1174   morestring=[d]",%% not Fortran-77 standard, but allowed in Fortran-95 %%
```

```
1175    morestring=[d]'%
1176    }[keywords,comments,strings]
```

1177 ⟨/lang1⟩

Jobst Hoffmann supplied a definition of a style for printing Fortran code:

1178 ⟨∗fortran-prf⟩

```
1179 \usepackage[rgb, x11names]{xcolor}
1180
1181 % common settings
1182 \lstset{%
1183   frame=tlb,%       the frame is open on the right side
1184   resetmargins=false,%
1185   rulesepcolor=\color{black},%
1186   numbers=left,%                  % left
1187   numberstyle=\tiny,%
1188   numbersep=5pt,%
1189   firstnumber=1,%
1190   stepnumber=5,%
1191   columns=fixed,%                 % to prevent inserting spaces
1192   fontadjust=true,%
1193   keepspaces=true,%
1194   basewidth=0.5em,%
1195   captionpos=t,%
1196   abovecaptionskip=\smallskipamount,% same amount as default
1197   belowcaptionskip=\smallskipamount,% in caption package
1198 }
1199 % settings for colored printing
1200 \lstdefinestyle{fortran}{%
1201   backgroundcolor=\color{yellow!10},%
1202   basicstyle=\small\ttfamily,%
1203   identifierstyle=\color{black},%
1204   keywordstyle=\color{blue},%
1205   keywordstyle={[2]\color{cyan}},%
1206   keywordstyle={[3]\color{olive}},%
1207   stringstyle=\color{teal},%
1208   commentstyle=\itshape\color{orange},%
1209 }%
1210 % settings for back and white printing
1211 \lstdefinestyle{fortranbw}{%
1212   backgroundcolor={},%
1213   basicstyle=\small\ttfamily,%
1214   identifierstyle={},%
1215   keywordstyle=\bfseries,%
1216   stringstyle=\itshape,%
1217   commentstyle=\slshape,%
1218   rulesepcolor=\color{black},%
1219 }%
```

This code is provided in the file listings-fortran.prf, see section 2.4.1 (Preferences) of the listings documentation.

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1220 ⟨/fortran-prf⟩

## 2.25 GAP—Groups, Algorithms, Programming

GAP is a System for Computational Discrete Algebra, a description can be found at http://www.gap-system.org/. Heiko Oberdiek provided a language definition without knowing this language, so any error should be announced to the current maintainer of the listings package.

1221 ⟨*lang2⟩

```
1222 %%
1223 %% GAP definition
1224 %% (c) 2013 Heiko Oberdiek
1225 %%
1226 \lst@definelanguage{GAP}{%
1227   morekeywords={%
1228     Assert,Info,IsBound,QUIT,%
1229     TryNextMethod,Unbind,and,break,%
1230     continue,do,elif,%
1231     else,end,false,fi,for,%
1232     function,if,in,local,%
1233     mod,not,od,or,%
1234     quit,rec,repeat,return,%
1235     then,true,until,while%
1236   },%
1237   sensitive,%
1238   morecomment=[l]\#,%
1239   morestring=[b]",%
1240   morestring=[b]',%
1241 }[keywords,comments,strings]
```

1242 ⟨/lang2⟩

## 2.26 Go—Groups, Algorithms, Programming

From https://en.wikipedia.org/wiki/Go_(programming_language): Go (often referred to as Golang) is a programming language created by Google in 2009 by Robert Griesemer, Rob Pike, and Ken Thompson. Go is a statically typed, compiled language in the tradition of C, with memory safety, garbage collection, structural typing, and CSP-style concurrency. The compiler, tools, and source code are all free and open source.

Christian Maurer provided the following language definition.

1243 ⟨*lang3⟩

```
1244 %%
1245 %% Go definition
1246 %% (c) 2018 Christian Maurer
1247 %%
1248 \lst@definelanguage{Go}{%
1249   morekeywords={append,bool,break,byte,cap,case,chan,close,complex,%
```

34

```
1250     complex128,complex64,const,continue,copy,default,defer,delete,%
1251     else,error,fallthrough,false,float32,float64,for,func,go,goto,%
1252     if,imag,import,int,int16,int32,int64,int8,interface,iota,len,%
1253     make,map,new,nil,package,panic,print,println,range,real,%
1254     recover,return,rune,select,string,struct,switch,true,type,%
1255     uint,uint16,uint32,uint64,uint8,uintptr,var},%
1256   sensitive,%
1257   morecomment=[s]{/*}{*/},%
1258   morecomment=[l]//,%
1259   morestring=[b]',%
1260   morestring=[b]",%
1261   morestring=[s]{'}{'},%
1262 }[keywords,comments,strings]
```

1263 ⟨/lang3⟩

## 2.27   Guarded Command Language (GCL)

As you can read below, Mark van Eijk provided this language definition.

1264 ⟨∗lang2⟩

```
1265 %%
1266 %% Guarded Command Language (GCL)  definition
1267 %% (c) 2002 Mark van Eijk
1268 %%
1269 \lst@definelanguage{GCL}%
1270   {morekeywords={const,con,var,array,of,skip,if,fi,do,od,div,mod},%
1271    literate={|[}{\ensuremath{|\hskip -0.1em[}}2%
1272            {]|}{\ensuremath{]\hskip -0.1em|}}2%
1273     {[]}{\ensuremath{[\hskip -0.1em]}}2%
1274     {->}{\ensuremath{\rightarrow}~}2%
1275     {==}{\ensuremath{\equiv}~}2%
1276     {>=}{\ensuremath{\geq}~}2%
1277     {<=}{\ensuremath{\leq}~}2%
1278     {/\\}{\ensuremath{\land}~}2%
1279     {\\/}{\ensuremath{\lor}~}2%
1280     {!}{\ensuremath{\lnot}}1%
1281     {!=}{\ensuremath{\neq}~}2%
1282     {max}{\ensuremath{\uparrow}}1%
1283     {min}{\ensuremath{\downarrow}}1,%
1284    sensitive=f,%
1285    morecomment=[s]{\{}{\}},%
1286    morestring=[d]'%
1287   }[keywords,comments,strings]
```

1288 ⟨/lang2⟩

## 2.28   Gnuplot

Thanks to Dr. Christoph Giess for providing this definition.

```
1289 ⟨∗lang2⟩
1290 %%
1291 %% gnuplot definition (c) Christoph Giess
1292 %%
1293 \lst@definelanguage{Gnuplot}%
1294   {keywords={abs,acos,acosh,arg,asin,asinh,atan,atan2,atanh,besj0,%
1295         besj1,besy0,besy1,ceil,cos,cosh,erf,erfc,exp,floor,gamma,ibeta,%
1296         inverf,igamma,imag,invnorm,int,lgamma,log,log10,norm,rand,real,%
1297         sgn,sin,sinh,sqrt,tan,tanh,column,tm_hour,tm_mday,tm_min,tm_mon,%
1298         tm_sec,tm_wday,tm_yday,tm_year,valid,cd,call,clear,exit,fit,%
1299         help,if,load,pause,plot,print,pwd,quit,replot,reread,reset,save,%
1300         set,show,shell,splot,test,update,angles,arrow,autoscale,border,%
1301         boxwidth,clabel,clip,cntrparam,contour,data,dgrid3d,dummy,%
1302         format,function,functions,grid,hidden3d,isosamples,key,keytitle,%
1303         label,logscale,mapping,offsets,output,parametric,pointsize,%
1304         polar,rrange,samples,size,style,surface,terminal,tics,time,%
1305         timefmt,title,trange,urange,variables,view,vrange,xdata,xlabel,%
1306         xmargin,xrange,xtics,mxtics,mytics,xdtics,xmtics,xzeroaxis,%
1307         ydata,ylabel,yrange,ytics,ydtics,ymtics,yzeroaxis,zdata,zero,%
1308         zeroaxis,zlabel,zrange,ztics,zdtics,zmtics,timefm,using,title,%
1309         with,index,every,thru,smooth},%
1310     sensitive,%
1311     comment=[l]\#,%
1312     morestring=[b]",%
1313     morestring=[b]',%
1314   }[keywords,comments,strings]
1315 ⟨/lang2⟩
```

## 2.29   Hansl/Gretl

Thanks to Ignacio Díaz-Emparanza, Riccardo (Jack) Lucchetti, and Sven Schreiber for providing the definition of hansl. Hansl is the gretl scripting language (see http://gretl.sourceforge.net).

```
1316 ⟨∗lang2⟩

1317 \lst@definelanguage{hansl}{%
1318   showstringspaces = false, %
1319   morekeywords={ % hansl commands:
1320     add, adf, anova, append, ar, ar1, arbond, arch, arima, biprobit, break,%
1321     boxplot, chow, clear, coeffsum, coint, coint2, corr, corrgm, cusum,%
1322     data, dataset, delete, diff, difftest, discrete, dpanel, dummify,%
1323     duration, elif, else, end, endif, endloop, eqnprint, equation,%
1324     estimate, eval, fcast, flush, foreign, fractint, freq, function,%
1325     funcerr, garch, genr, gmm, gnuplot, graphpg, hausman, heckit, help,%
1326     hfplot, hsk, hurst, if, include, info, intreg, join, kpss, labels, lad,%
1327     lags, ldiff, leverage, levinlin, logistic, logit, logs, loop, mahal,%
1328     makepkg, markers, meantest, midasreg, mle, modeltab, modprint, modtest,%
1329     mpi, mpols, negbin, nls, normtest, nulldata, ols, omit, open, orthdev,%
1330     outfile, panel, pca, pergm, plot, poisson, print, printf, probit,%
1331     pvalue, quantreg, qlrtest, qqplot, quit, rename, reset, restrict,%
```

```
1332    rmplot, run, runs, scatters, sdiff, set, setinfo, setobs, setopt,%
1333    setmiss, smpl, spearman, square, store,%
1334    summary, system, tabprint, textplot, tobit, tsls, var, varlist,%
1335    vartest, vecm, vif, wls, xcorrgm, xtab, debug, return, catch, pkg,%
1336    arma, deriv, params, hessian, for, foreach, while, const},%
1337  morekeywords=[2]{ % accessors:
1338    \$nobs, \$nvars, \$pd, \$t1, \$t2, \$tmax, \$datatype, \$test,%
1339    \$pvalue, \$qlrbreak, \$rlnl, \$stopwatch, \$unit, \$obsmajor,%
1340    \$obsminor, \$obsmicro, \$obsdate, \$windows, \$version, \$error,%
1341    \$seed, \$huge, \$ess, \$T, \$rsq, \$sigma, \$df, \$ncoeff, \$lnl,%
1342    \$gmmcrit, \$aic, \$bic, \$hqc, \$trsq, \$dw, \$dwpval, \$Fstat,%
1343    \$chisq, \$diagtest, \$diagpval, \$pmanteau, \$uhat, \$yhat, \$llt,%
1344    \$ahat, \$sample, \$h, \$coeff, \$stderr, \$vcv, \$rho, \$compan,%
1345    \$xtxinv, \$vecGamma, \$vma, \$fevd, \$evals, \$jalpha, \$jbeta,%
1346    \$jvbeta, \$s00, \$s11, \$s01, \$ec, \$hausman, \$sargan, \$sysGamma,%
1347    \$sysA, \$sysB, \$fcast, \$fcse, \$coeff_ci, \$ehat, \$mnlprobs,%
1348    \$xlist, \$ylist, \$command, \$depvar, \$model, \$system, \$sysinfo},%
1349  morekeywords=[3]{ % functions
1350    BFGScmax, BFGSmax, GSSmax, I, NMmax, NRmax, abs, acos, acosh,%
1351    aggregate, argname, array, asin, asinh, atan, atanh, atof, bessel,%
1352    bkfilt, bootci, bootpval, boxcox, bread, bwfilt, bwrite, cdemean, cdf,%
1353    cdiv, cdummify, ceil, cholesky, chowlin, cmult, cnameget, cnameset,%
1354    cnorm, cnumber, cols, corr, corrgm, cos, cosh, cov, critical, cum,%
1355    curl, dayspan, defarray, defbundle, deflist, deseas, det, diag,%
1356    diagcat, diff, digamma, dnorm, dropcoll, dsort, dummify, easterday,%
1357    ecdf, eigengen, eigensym, eigsolve, epochday, errmsg, exists, exp,%
1358    fcstats, fdjac, feval, fevd, fft, ffti, filter, firstobs, fixname,%
1359    floor, fracdiff, fraclag, freq, gammafun, genseries, getenv, getinfo,%
1360    getkeys, getline, ghk, gini, ginv, grab, halton, hdprod, hfdiff,%
1361    hflags, hfldiff, hflist, hpfilt, imaxc, imaxr, imhof, iminc, iminr,%
1362    inbundle, infnorm, inlist, instring, int, inv, invcdf, invmills, invpd,%
1363    irf, irr, isconst, isdiscrete, isdummy, isnan, isoconv, isodate,%
1364    iwishart, jsonget, jsongetb, juldate, kdensity, kdsmooth, kfilter,%
1365    kmeier, kpsscrit, ksetup, ksimdata, ksimul, ksmooth, kurtosis, lags,%
1366    lastobs, ldet, ldiff, lincomb, linearize, ljungbox, lngamma, loess,%
1367    log, log10, log2, logistic, lower, lrcovar, lrvar, max, maxc, maxr,%
1368    mcorr, mcov, mcovg, mean, meanc, meanr, median, mexp, mgradient, min,%
1369    minc, minr, missing, misszero, mlag, mlincomb, mnormal, mols, monthlen,%
1370    movavg, mpiallred, mpibcast, mpirecv, mpireduce, mpiscatter, mpisend,%
1371    mpols, mrandgen, mread, mreverse, mrls, mshape, msortby, muniform,%
1372    mweights, mwrite, mxtab, naalen, nadarwat, nelem, ngetenv, nlines,%
1373    nobs, normal, normtest, npcorr, npv, nullspace, numhess, obslabel,%
1374    obsnum, ok, onenorm, ones, orthdev, pdf, pergm, pexpand, pmax, pmean,%
1375    pmin, pnobs, polroots, polyfit, princomp, printf, prodc, prodr, psd,%
1376    psdroot, pshrink, psum, pvalue, pxnobs, pxsum, qform, qlrpval, qnorm,%
1377    qrdecomp, quadtable, quantile, randgen, randgen1, randint, rank,%
1378    ranking, rcond, readfile, regsub, remove, replace, resample, rnameget,%
1379    rnameset, round, rows, sd, sdc, sdiff, seasonals, selifc, selifr, seq,%
1380    setnote, simann, sin, sinh, skewness, sleep, smplspan, sort, sortby,%
1381    sprintf, sqrt, square, sscanf, sst, stringify, strlen, strncmp,%
```

```
1382     strsplit, strstr, strstrip, strsub, strvals, substr, sum, sumall, sumc,%
1383     sumr, svd, svm, tan, tanh, toepsolv, tolower, toupper, tr, transp,%
1384     trimr, typeof, typestr, uniform, uniq, unvech, upper, urcpval, values,%
1385     var, varname, varnames, varnum, varsimul, vec, vech, weekday, wmean,%
1386     wsd, wvar, xmax, xmin, xmlget, zeromiss, zeros, NMmin, GSSmin,%
1387     BFGScmin, BFGSmin },%
1388   morekeywords=[4]{ % genr aliases:
1389     null, series, scalar, matrix, string, list, bundle, strings, matrices,%
1390     bundles, lists%
1391   },%
1392   sensitive=t,%
1393   morecomment=[l]{\#},%
1394   morecomment=[s]{/*}{*/},%
1395   morestring=[b]{"}%
1396 }%
1397 \lstalias{gretl}{hansl}
```

1398 ⟨/lang2⟩

The developers of the hansl support also supplied a definition of a style for printing hansl code:

1399 ⟨∗hansl-prf⟩

```
1400 \usepackage[rgb, x11names]{xcolor}
1401
1402 % settings for black and white
1403 \lstdefinestyle{hanslbw}{%
1404   keywordstyle = \bfseries,
1405   keywordstyle = [2]\bfseries,
1406   keywordstyle = [3]\itshape,
1407   keywordstyle = [4]\underbar,
1408   commentstyle = \ttfamily,
1409   stringstyle = \ttfamily
1410 }
1411 % settings for colored printing
1412 \lstdefinestyle{hanslcolor}{%
1413   basicstyle = \small\ttfamily,
1414   keywordstyle = \color{red},
1415   keywordstyle = [2]\color{green},
1416   keywordstyle = [3]\color{cyan},
1417   keywordstyle = [4]\color{olive},
1418   commentstyle = \color{blue}\rmfamily, %
1419   stringstyle = \color{magenta},
1420   moredelim = [l][\color{green}]{--}
1421 }%
```

This code is provided in the file `listings-hansl.prf`, see section 2.4.1 (Preferences) of the listings documentation.

1422 ⟨/hansl-prf⟩

## 2.30   Haskell

Thanks to Peter Bartke for providing the new definition.

1423 ⟨∗lang2⟩

```
1424 %%
1425 %% Haskell98 as implemented in Hugs98. See http://www.haskell.org
1426 %% All keywords from Prelude and Standard Libraries
1427 %% (c) 1999 Peter Bartke
1428 %%
1429 \lst@definelanguage{Haskell}%
1430   {otherkeywords={=>},%
1431   morekeywords={abstype,if,then,else,case,class,data,default,deriving,%
1432       hiding,if,in,infix,infixl,infixr,import,instance,let,module,%
1433       newtype,of,qualified,type,where,do,AbsoluteSeek,AppendMode,%
1434       Array,BlockBuffering,Bool,BufferMode,Char,Complex,Double,Either,%
1435       FilePath,Float,Int,Integer,IO,IOError,Ix,LineBuffering,Maybe,%
1436       Ordering,NoBuffering,ReadMode,ReadWriteMode,ReadS,RelativeSeek,%
1437       SeekFromEnd,SeekMode,ShowS,StdGen,String,Void,Bounded,Enum,Eq,%
1438       Eval,ExitCode,exitFailure,exitSuccess,Floating,Fractional,%
1439       Functor,Handle,HandlePosn,IOMode,Integral,List,Monad,MonadPlus,%
1440       MonadZero,Num,Numeric,Ord,Random,RandomGen,Ratio,Rational,Read,%
1441       Real,RealFloat,RealFrac,Show,System,Prelude,EQ,False,GT,Just,%
1442       Left,LT,Nothing,Right,WriteMode,True,abs,accum,accumArray,%
1443       accumulate,acos,acosh,all,and,any,ap,appendFile,applyM,%
1444       approxRational,array,asTypeOf,asin,asinh,assocs,atan,atan2,atanh,%
1445       bounds,bracket,bracket_,break,catch,catMaybes,ceiling,chr,cis,%
1446       compare,concat,concatMap,conjugate,const,cos,cosh,curry,cycle,%
1447       decodeFloat,delete,deleteBy,deleteFirstsBy,denominator,%
1448       digitToInt,div,divMod,drop,dropWhile,either,elem,elems,elemIndex,%
1449       elemIndices,encodeFloat,enumFrom,enumFromThen,enumFromThenTo,%
1450       enumFromTo,error,even,exitFailure,exitWith,exp,exponent,fail,%
1451       filter,filterM,find,findIndex,findIndices,flip,floatDigits,%
1452       floatRadix,floatRange,floatToDigits,floor,foldl,foldM,foldl1,%
1453       foldr,foldr1,fromDouble,fromEnum,fromInt,fromInteger,%
1454       fromIntegral,fromJust,fromMaybe,fromRat,fromRational,%
1455       fromRealFrac,fst,gcd,genericLength,genericTake,genericDrop,%
1456       genericSplitAt,genericIndex,genericReplicate,getArgs,getChar,%
1457       getContents,getEnv,getLine,getProgName,getStdGen,getStdRandom,%
1458       group,groupBy,guard,hClose,hFileSize,hFlush,hGetBuffering,%
1459       hGetChar,hGetContents,hGetLine,hGetPosn,hIsClosed,hIsEOF,hIsOpen,%
1460       hIsReadable,hIsSeekable,hIsWritable,hLookAhead,hPutChar,hPutStr,%
1461       hPutStrLn,hPrint,hReady,hSeek,hSetBuffering,hSetPosn,head,%
1462       hugsIsEOF,hugsHIsEOF,hugsIsSearchErr,hugsIsNameErr,%
1463       hugsIsWriteErr,id,ioError,imagPart,index,indices,init,inits,%
1464       inRange,insert,insertBy,interact,intersect,intersectBy,%
1465       intersperse,intToDigit,ioeGetErrorString,ioeGetFileName,%
1466       ioeGetHandle,isAlreadyExistsError,isAlreadyInUseError,isAlpha,%
1467       isAlphaNum,isAscii,isControl,isDenormalized,isDoesNotExistError,%
1468       isDigit,isEOF,isEOFError,isFullError,isHexDigit,isIEEE,%
```

```
1469        isIllegalOperation,isInfinite,isJust,isLower,isNaN,%
1470        isNegativeZero,isNothing,isOctDigit,isPermissionError,isPrefixOf,%
1471        isPrint,isSpace,isSuffixOf,isUpper,isUserError,iterate,ixmap,%
1472        join,last,lcm,length,lex,lexDigits,lexLitChar,liftM,liftM2,%
1473        liftM3,liftM4,liftM5,lines,listArray,listToMaybe,log,logBase,%
1474        lookup,magnitude,makePolar,map,mapAccumL,mapAccumR,mapAndUnzipM,%
1475        mapM,mapM_,mapMaybe,max,maxBound,maximum,maximumBy,maybe,%
1476        maybeToList,min,minBound,minimum,minimumBy,mkPolar,mkStdGen,%
1477        mplus,mod,msum,mzero,negate,next,newStdGen,not,notElem,nub,nubBy,%
1478        null,numerator,odd,openFile,or,ord,otherwise,partition,phase,pi,%
1479        polar,pred,print,product,properFraction,putChar,putStr,putStrLn,%
1480        quot,quotRem,random,randomIO,randomR,randomRIO,randomRs,randoms,%
1481        rangeSize,read,readDec,readFile,readFloat,readHex,readInt,readIO,%
1482        readList,readLitChar,readLn,readParen,readOct,readSigned,reads,%
1483        readsPrec,realPart,realToFrac,recip,rem,repeat,replicate,return,%
1484        reverse,round,scaleFloat,scanl,scanl1,scanr,scanr1,seq,sequence,%
1485        sequence_,setStdGen,show,showChar,showEFloat,showFFloat,%
1486        showFloat,showGFloat,showInt,showList,showLitChar,showParen,%
1487        showSigned,showString,shows,showsPrec,significand,signum,sin,%
1488        sinh,snd,sort,sortBy,span,split,splitAt,sqrt,stderr,stdin,stdout,%
1489        strict,subtract,succ,sum,system,tail,tails,take,takeWhile,tan,%
1490        tanh,toEnum,toInt,toInteger,toLower,toRational,toUpper,transpose,%
1491        truncate,try,uncurry,undefined,unfoldr,union,unionBy,unless,%
1492        unlines,until,unwords,unzip,unzip3,unzip4,unzip5,unzip6,unzip7,%
1493        userError,when,words,writeFile,zero,zip,zip3,zip4,zip5,zip6,zip7,%
1494        zipWith,zipWithM,zipWithM_,zipWith3,zipWith4,zipWith5,zipWith6,%
1495        zipWith7},%
1496     sensitive,%
1497     morecomment=[l]--,%
1498     morecomment=[n]{\{-}{-\}},%
1499     morestring=[b]"%
1500    }[keywords,comments,strings]
1501  ⟨/lang2⟩
```

## 2.31   HTML

I'm quite the opposite of a HTML wizard. In particular this is true for the defined keywords. Matthias Bethke helped me out and extended the list.

```
1502  ⟨*lang1⟩
```

```
1503  \lst@definelanguage{HTML}%
1504    {morekeywords={A,ABBR,ACRONYM,ADDRESS,APPLET,AREA,B,BASE,BASEFONT,%
1505        BDO,BIG,BLOCKQUOTE,BODY,BR,BUTTON,CAPTION,CENTER,CITE,CODE,COL,%
1506        COLGROUP,DD,DEL,DFN,DIR,DIV,DL,DOCTYPE,DT,EM,FIELDSET,FONT,FORM,%
1507        FRAME,FRAMESET,HEAD,HR,H1,H2,H3,H4,H5,H6,HTML,I,IFRAME,IMG,INPUT,%
1508        INS,ISINDEX,KBD,LABEL,LEGEND,LH,LI,LINK,LISTING,MAP,META,MENU,%
1509        NOFRAMES,NOSCRIPT,OBJECT,OPTGROUP,OPTION,P,PARAM,PLAINTEXT,PRE,%
1510        OL,Q,S,SAMP,SCRIPT,SELECT,SMALL,SPAN,STRIKE,STRING,STRONG,STYLE,%
1511        SUB,SUP,TABLE,TBODY,TD,TEXTAREA,TFOOT,TH,THEAD,TITLE,TR,TT,U,UL,%
```

```
1512        VAR,XMP,%
1513        accesskey,action,align,alink,alt,archive,axis,background,bgcolor,%
1514        border,cellpadding,cellspacing,charset,checked,cite,class,classid,%
1515        code,codebase,codetype,color,cols,colspan,content,coords,data,%
1516        datetime,defer,disabled,dir,event,error,for,frameborder,headers,%
1517        height,href,hreflang,hspace,http-equiv,id,ismap,label,lang,link,%
1518        longdesc,marginwidth,marginheight,maxlength,media,method,multiple,%
1519        name,nohref,noresize,noshade,nowrap,onblur,onchange,onclick,%
1520        ondblclick,onfocus,onkeydown,onkeypress,onkeyup,onload,onmousedown,%
1521        profile,readonly,onmousemove,onmouseout,onmouseover,onmouseup,%
1522        onselect,onunload,rel,rev,rows,rowspan,scheme,scope,scrolling,%
1523        selected,shape,size,src,standby,style,tabindex,text,title,type,%
1524        units,usemap,valign,value,valuetype,vlink,vspace,width,xmlns},%
1525    tag=**[s]<>,%
1526    sensitive=f,%
1527    morestring=[d]",% ??? doubled
```

Now we take care of comments. We don't enter comment mode if we aren't inside <>.

```
1528    MoreSelectCharTable=%
1529        \lst@CArgX--\relax\lst@DefDelimB{}{}%
1530            {\ifnum\lst@mode=\lst@tagmode\else
1531                \expandafter\@gobblethree
1532             \fi}%
1533            \lst@BeginComment\lst@commentmode{{\lst@commentstyle}}%
1534        \lst@CArgX--\relax\lst@DefDelimE{}{}{}%
1535            \lst@EndComment\lst@commentmode
1536    }[keywords,comments,strings,html]%
```

Peter Biechele reported a problem which was due to missing `\@empty` in value of `SelectCharTable`. And after receiving a bug report from Jochen Schneider I converted the version 0.21 contents of `MoreSelectCharTable` to version 1.0.

```
1537 ⟨/lang1⟩
```

## 2.32  IDL

The definition is from Jürgen Heim.

```
1538 ⟨*lang2⟩

1539 %%
1540 %% IDL definition (c) 1998 Juergen Heim
1541 %%
1542 \lst@definelanguage{IDL}%
1543   {morekeywords={and,begin,case,common,do,else,end,endcase,endelse,%
1544       endfor,endif,endrep,endwhile,eq,for,function,ge,goto,gt,if,le,lt,%
1545       mod,ne,not,of,on_ioerror,or,pro,repeat,return,then,until,while,%
1546       xor,on_error,openw,openr,openu,print,printf,printu,plot,read,%
1547       readf,readu,writeu,stop},%
1548   sensitive=f,%
1549   morecomment=[l];,%
```

```
1550    morestring=[d]'%
1551  }[keywords,comments,strings]
```

1552 ⟨/lang2⟩

## 2.33  Inform

Thanks to Jonathan Sauer for this language definition. Ulrike Fischer pointed out that `\lstdefinelanguage` should be `\lst@definelanguage`.

1553 ⟨∗lang2⟩

```
1554 %%
1555 %% Inform definition (c) 2003 Jonathan Sauer
1556 %%
1557 \lst@definelanguage{Inform}{%
1558   % Language keywords
1559   morekeywords={breakdo,else,false,for,has,hasnt,if,%
1560     in,indirect,jump,notin,nothing,NULL,objectloop,ofclass,%
1561     private,property,provides,return,rfalse,rtrue,self,string,%
1562     switch,to,true,until,while,with,%
1563     creature,held,multiexcept,multiheld,multiinside,noun,number,%
1564     scope,topic},%
1565   %
1566   % Inform functions
1567   morekeywords=[2]{box,child,children,font,give,inversion,metaclass,move,%
1568     new_line,parent,print,print_ret,read,remove,restore,sibling,%
1569     save,spaces,quit,style,bold,underline,reverse,roman remaining,%
1570     create,destroy,recreate,copy},%
1571   %
1572   % Inform definitions
1573   morekeywords=[3]{Attribute,Array,Class,Constant,Default,End,Endif,Extend,%
1574     Global,Ifdef,Iffalse,Ifndef,Ifnot,Iftrue,Include,Object,%
1575     Property,Verb,Release,Serial,Statusline},%
1576   %
1577   % Library attributes
1578   morekeywords=[4]{absent,animate,clothing,concealed,container,door,edible,%
1579     enterable,female,general,light,lockable locked,male,moved,%
1580     neuter,on,open,openable,pluralname,proper,scenery,scored,%
1581     static,supporter,switchable,talkable,transparent,visited,%
1582     workflag,worn},%
1583   %
1584   % Library properties
1585   morekeywords=[5]{n_to,s_to,e_to,w_to,ne_to,nw_to,se_to,sw_to,in_to,%
1586     out_to,u_to,d_to,add_to_scope,after,article,articles,before,%
1587     cant_go,capacity,daemon,describe,description,door_dir,door_to,%
1588     each_turn,found_in,grammar,initial,inside_description,invent,%
1589     life,list_together,name number,orders,parse_name,plural,%
1590     react_after,react_before,short_name,short_name_indef,time_left,%
1591     time_out,when_closed,when_open,when_on,when_off,%
1592     with_key},%
```

```
1593  %
1594  % Library routines
1595  morekeywords=[6]{Achieved,AfterRoutines,AllowPushDir,Banner,ChangePlayer,%
1596    CommonAncestor,DictionaryLookup,GetGNAOfObject,HasLightSource,%
1597    IndirectlyContains,IsSeeThrough,Locale,LoopOverScope,LTI_Insert,%
1598    MoveFloatingObjects,NextWord,NextWordStopped,NounDomain,%
1599    ObjectIsUntouchable OffersLight,ParseToken,PlaceInScope,PlayerTo,%
1600    PronounNotice,PronounValue,ScopeWithin,SetPronoun,SetTime,%
1601    StartDaemon,StartTimer,StopDaemon,StopTimer,TestScope,TryNumber,%
1602    UnsignedCompare,WordAddress,WordInProperty,WordLength,%
1603    WriteListFrom,YesOrNo},%
1604  %
1605  % Library,entry points
1606  morekeywords=[7]{AfterLife,AfterPrompt,Amusing,BeforeParsing,ChooseObjects,%
1607    DarkToDark,DeathMessage,GamePostRoutine GamePreRoutine,%
1608    Initialise,InScope,LookRoutine,NewRoom,ParseNoun,ParseNumber,%
1609    ParserError,PrintRank,PrintTaskName,PrintVerb,TimePasses,%
1610    UnknownVerb},%
1611  %
1612  % Library constants
1613  morekeywords=[8]{NEWLINE_BIT,INDENT_BIT,FULLINV_BIT,ENGLISH_BIT,%
1614    RECURSE_BIT,ALWAYS_BIT,TERSE_BIT,PARTINV_BIT,DEFART_BIT,%
1615    WORKFLAG_BIT,ISARE_BIT,CONCEAL_BIT},%
1616  %
1617  % Library,meta actions
1618  morekeywords=[9]{Pronouns,Quit,Restart,Restore,Save,Verify,ScriptOn,%
1619    ScriptOff,NotifyOn,NotifyOff,Places,Objects,Score,FullScore,Version,%
1620    LMode1,LMode2,LMode3},%
1621  %
1622  % Library,main actions
1623  morekeywords=[10]{Close,Disrobe,Drop,Eat,Empty,EmptyT,Enter,Examine,%
1624    Exit,GetOff,Give,Go,GoIn,Insert,Inv,InvTall,InvWide,Lock,Look,Open,%
1625    PutOn,Remove,Search,Show,SwitchOff,SwitchOn,Take,Transfer,%
1626    Unlock VagueGo, Wear},%
1627  %
1628  % Library,stub actions
1629  morekeywords=[11]{Answer,Ask,AskFor,Attack,Blow,Burn,Buy,Climb,%
1630    Consult,Cut,Dig,Drink,Fill,Jump,JumpOver,Kiss,Listen,LookUnder,%
1631    Mild,No,Pray,Pull,Push,PushDir,Rub,Set,SetTo,Sing,Sleep,Smell,%
1632    Sleep,Smell,Sorry,Squeeze,Strong,Swim,Swing,Taste,Tell,Think,%
1633    ThrowAt,Tie,Touch,Turn,
1634    Wait,Wake,WakeOther,Wave,WaveHands,Yes},%
1635  %
1636  otherkeywords={->,-->},%
1637  sensitive=false,%
1638  morestring=[d]{"},%
1639  morecomment=[l]{!}%
1640 }[keywords,comments,strings]

1641 ⟨/lang2⟩
```

## 2.34 Java and other JVM based languages

Robert Wenner sent in the first of the following two definitions.

1642 ⟨∗lang1⟩

1643 %%
1644 %% AspectJ definition (c) Robert Wenner
1645 %%
1646 \lst@definelanguage[AspectJ]{Java}[]{Java}%
1647   {morekeywords={%
1648       adviceexecution,after,args,around,aspect,aspectOf,before,%
1649       call,cflow,cflowbelow,%
1650 % declare error,declare parents,declare precedence,
1651 % declare soft,declare warning,
1652       execution,get,handler,if,initialization,issingleton,pointcut,%
1653       percflow,percflowbelow,perthis,pertarget,preinitialization,%
1654       privileged,proceed,returning,set,staticinitialization,strictfp,%
1655       target,this,thisEnclosingJoinPoint,thisJoinPoint,throwing,%
1656       within,withincode},%
1657   MoreSelectCharTable=%
1658     \lst@DefSaveDef{'.}\lst@umdot{\lst@umdot\global\let\lst@derefop\@empty}%
1659     \ifx\lst@derefinstalled\@empty\else
1660        \global\let\lst@derefinstalled\@empty
1661 \lst@AddToHook{Output}%
1662 {\lst@ifkeywords
1663     \ifx\lst@derefop\@empty
1664       \global\let\lst@derefop\relax
1665       \ifx\lst@thestyle\lst@gkeywords@sty
1666         \ifx\lst@currstyle\relax
1667           \let\lst@thestyle\lst@identifierstyle
1668         \else
1669           \let\lst@thestyle\lst@currstyle
1670         \fi
1671       \fi
1672     \fi
1673   \fi}
1674 \lst@AddToHook{BOL}{\global\let\lst@derefop\relax}%
1675 \lst@AddTo\lst@ProcessSpace{\global\let\lst@derefop\relax}%
1676       \fi
1677   }%

1678 ⟨/lang1⟩

Got data from http://java.sun.com.

1679 ⟨∗lang1⟩

1680 \lst@definelanguage{Java}%
1681   {morekeywords={abstract,boolean,break,byte,case,catch,char,class,%
1682       const,continue,default,do,double,else,extends,false,final,%
1683       finally,float,for,goto,if,implements,import,instanceof,int,%
1684       interface,label,long,native,new,null,package,private,protected,%
1685       public,return,short,static,super,switch,synchronized,this,throw,%

44

```
1686        throws,transient,true,try,void,volatile,while},%
1687    sensitive,%
1688    morecomment=[l]//,%
1689    morecomment=[s]{/*}{*/},%
1690    morestring=[b]",%
1691    morestring=[b]',%
1692    }[keywords,comments,strings]
```

Herbert Voss added the keyword `label`.

1693 ⟨/lang1⟩

### 2.34.1  JVMIS—The Java bytecode instructions

Martine Gautier made the following contribution.

1694 ⟨∗lang1⟩

```
1695 %%
1696 %% ByteCodeJava definition (c) 2004 Martine Gautier
1697 %%
1698 \lst@definelanguage{JVMIS}%
1699    {morekeywords={aaload,astore,aconst_null,aload,aload_0,aload_1,%
1700        aload_2,aload_3,anewarray,areturn,arraylength,astore,astore_0,%
1701        astore_1,astore_2,astore_3,athrow,baload,bastore,bipush,caload,%
1702        castore,checkcast,d2f,d2i,d2l,dadd,daload,dastore,dcmpg,dcmpl,%
1703        dconst_0,dconst_1,ddiv,dload,dload_0,dload_1,dload_2,dload_3,%
1704        dmul,dneg,drem,dreturn,dstore,dstore_0,dstore_1,dstore_2,%
1705        dstore_3,dsub,dup,dup_x1,dup_x2,dup2,dup2_x1,dup2_x2,f2d,%
1706        f2i,f2l,fadd,faload,fastore,fcmpg,fcmpl,fconst_0,fconst_1,%
1707        fconst_2,fdiv,fload,fload_0,fload_1,fload_2,fload_3,fmul,%
1708        fneg,frem,freturn,fstore,fstore_0,fstore_1,fstore_2,fstore_3,%
1709        fsub,getfield,getstatic,goto,goto_w,i2b,i2c,i2d,i2f,i2l,i2s,%
1710        iadd,iaload,iand,iastore,iconst_0,iconst_1,iconst_2,iconst_3,%
1711        iconst_4,iconst_5,idiv,if_acmpeq,if_acmpne,if_icmpeq,if_icmpne,%
1712        if_icmplt,if_cmpge,if_cmpgt,if_cmple,ifeq,ifne,iflt,ifge,ifgt,%
1713        ifle,ifnonnull,ifnull,iinc,iload,iload_0,iload_1,iload_2,%
1714        iload_3,imul,ineg,instanceof,invokeinterface,invokespecial,%
1715        invokestatic,invokevirtual,ior,irem,ireturn,ishl,ishr,istore,%
1716        istore_0,istore_1,istore_2,istore_3,isub,iushr,ixor,jsr,jsr_w,%
1717        l2d,l2f,l2i,ladd,laload,land,lastore,lcmp,lconst_0,lconst_1,%
1718        ldc,ldc_w,ldc2_w,ldiv,lload,lload_0,lload_1,lload_2,lload_3,%
1719        lmul,lneg,lookupswitch,lor,lrem,lreturn,lshl,lshr,lstore,%
1720        lstore_0,lstore_1,lstore_2,lstore_3,lsub,lushr,lxor,%
1721        monitorenter,monitorexit,multianewarray,new,newarray,nop,pop,%
1722        pop2,putfield,putstatic,ret,return,saload,sastore,sipush,swap,%
1723        tableswitch,wide,limit,locals,stack},%
1724    }[keywords]%
```

1725 ⟨/lang1⟩

### 2.34.2 Scala

Bastian Germann asked to include the Scala definition provided by Frank Teubler (2009). Here it is—the definition has got a small overhaul according to the Scala syntax published for version 2.13 (`https://scala-lang.org/files/archive/spec/2.13/spec.pdf`):

1726 ⟨∗lang3⟩

```
1727 \lst@definelanguage{Scala}{%
1728   morekeywords={abstract,case,catch,class,def,%
1729     do,else,extends,false,final,finally,%
1730     for,forSome,if,implicit,import,lazy,macro,match,%
1731     mixin,new,null,object,override,package,%
1732     private,protected,requires,return,sealed,%
1733     super,this,trait,true,try,%
1734     type,val,var,while,with,yield},%+
1735   otherkeywords={_, :, =, =>, <-, <\%, <:, >:, \#, @},%
1736   sensitive,%
1737   morecomment=[l]//,%
1738   morecomment=[n]{/*}{*/},%
1739   morestring=[b]",%
1740   morestring=[b]',%
1741   morestring=[b]""",%
1742 }[keywords,comments,strings]
```

Remark: This definition contains the keywords `mixin` and `requires`, which don't belong to the official Scala 2.13 language definition, the keywords `forSome`, `macro`, and `throw`, which were missing in listings prior than v1.10a, are added silently. The Unicode operators \u21D2 and \u2190, which have the ASCII equivalents `=>` and `<-`, are also reserved but cannot be used with PDFTEX.

Deloo asked for Scala 3.0 support. The following code according to `https://docs.scala-lang.org/scala3/reference/syntax.html` is a simple approach, listings cannot correctly support soft keywords, because they are context dependent.

```
1743 \lst@definelanguage[3.0]{Scala}[]{Scala}{%
1744   morekeywords={as, derives, end, enum, export, extension, given},
1745   morekeywords=[2]{infix, inline, opaque, open, transparent}
1746   otherkeywords={=>>, ?=>, =>}, % =>> isn't recognized, even after
1747                                 % the keyword => is deleted
1748   alsoletter={*, +, -, |},
1749   deletekeywords={<\%, _, forSome, macro, mixin, requires, this},
1750 }[keywords,comments,strings]
```

1751 ⟨/lang3⟩

## 2.35 ksh

Thanks to Jeffrey Ratcliffe for this language definition.

1752 ⟨∗lang3⟩

```
1753 \lst@definelanguage{ksh}
1754   {morekeywords={alias,awk,cat,echo,else,elif,fi,exec,exit,%
1755       for,in,do,done,select,case,esac,while,until,function,%
1756       time,export,cd,eval,fc,fg,kill,let,pwd,read,return,rm,%
1757       glob,goto,history,if,logout,nice,nohup,onintr,repeat,sed,%
1758       set,setenv,shift,source,switch,then,umask,unalias,%
1759       unset,wait,@,env,argv,child,home,ignoreeof,noclobber,%
1760       noglob,nomatch,path,prompt,shell,status,verbose,print,printf,%
1761       sqrt,BEGIN,END},%
1762   morecomment=[l]\#,%
1763   morestring=[d]",%
1764   morestring=[d]',%
1765   morestring=[d]'%
1766   }[keywords,comments,strings]
1767 ⟨/lang3⟩
```

Herbert Voss suggested to add the string delimiter '.

## 2.36  Lingo

Thanks to Mark Schade for this language definition.

```
1768 ⟨*lang3⟩
```

```
1769 \lst@definelanguage{Lingo}{%
1770   morekeywords={abort, after, and, before, do, down, halt, me, new, not,%
1771       of, on, or, otherwise, pass, put, result, return, set, tell, the, then,%
1772       to, with, repeat, while, case, if, else, true, false, global, property,%
1773       \_global, \_key, \_mouse, \_movie, \_player, \_sound, \_system, abbr,%
1774       abbrev, abbreviated, abs, actionsenabled, activateapplication,%
1775       activatewindow, active3drenderer, activecastlib, activewindow,%
1776       actorlist, add, addat, addbackdrop, addcamera, addchild, addmodifier,%
1777       addoverlay, addprop, addtoworld, addvertex, alert, alerthook,%
1778       alignment, allowcustomcaching, allowgraphicmenu, allowsavelocal,%
1779       allowtransportcontrol, allowvolumecontrol, allowzooming,%
1780       alphathreshold, ambient, ambientcolor, ancestor, angle, anglebetween,%
1781       animationenabled, antialias, antialiasthreshold, append,%
1782       applicationname, applicationpath, appminimize, atan, attenuation,%
1783       attributevalue, auto, autoblend, automask, autotab, axisangle, back,%
1784       backcolor, backdrop, backgroundcolor, backspace, beep, beepon,%
1785       beginrecording, beginsprite, beveldepth, beveltype, bgcolor, bias,%
1786       bitand, bitmap, bitmapsizes, bitnot, bitor, bitrate, bitspersample,%
1787       bitxor, blend, blendconstant, blendconstantlist, blendfactor,%
1788       blendfunction, blendfunctionlist, blendlevel, blendrange, blendsource,%
1789       blendsourcelist, blendtime, bone, bonesplayer, border, both, bottom,%
1790       bottomcap, bottomradius, bottomspacing, boundary, boundingsphere, box,%
1791       boxdropshadow, boxtype, breakconnection, breakloop, brightness,%
1792       broadcastprops, browsername, buffersize, build, buttonsenabled,%
1793       buttonstyle, buttontype, bytesstreamed, boolean, cachedocverify,%
1794       cachesize, call, callancestor, camera, cameracount, cameraposition,%
1795       camerarotation, cancelidleload, castlib, castlibnum, castmemberlist,%
```

47

```
1796    center, centerregpoint, centerstage, changearea, channelcount, char,%
1797    characterset, charpostoloc, chars, charspacing, chartonum,%
1798    checkboxaccess, checkboxtype, checkmark, checknetmessages, child,%
1799    chunksize, clearatrender, clearcache, clearerror, clearframe,%
1800    clearglobals, clearvalue, clickloc, clickmode, clickon, clone,%
1801    clonedeep, clonemodelfromcastmember, clonemotionfromcastmember, close,%
1802    closed, closewindow, closexlib, collision, collisiondata,%
1803    collisionnormal, color, world, colorbuffer, colorbufferdepth,%
1804    colordepth, colorlist, colorrange, colors, colorsteps, commanddown,%
1805    comments, compressed, connecttonetserver, constrainh, constraint,%
1806    constrainv, continue, controldown, controller, copypixels,%
1807    copyrightinfo, copyto, copytoclipboard, cos, count, cpuhogticks,%
1808    creaseangle, creases, [contains], createfolder, createmask,%
1809    creatematte, creationdate, creator, crop, cross, crossproduct,%
1810    cuepassed, cuepointnames, cuepointtimes, currentloopstate,%
1811    currentspritenum, currenttime, cursor, cursorsize, curve, cylinder,%
1812    ate, day, deactivateapplication, deactivatewindow, debug,%
1813    debugplaybackenabled, decaymode, defaultrect, defaultrectmode, delay,%
1814    delete, deleteall, deleteat, deletecamera, deletefolder, deleteframe,%
1815    deletegroup, deletelight, deletemodel, deletemodelresource,%
1816    deletemotion, deleteone, deleteprop, deleteshader, deletetexture,%
1817    deletevertex, density, depth, depthbufferdepth, desktoprectlist,%
1818    diffuse, diffusecolor, diffuselightmap, digitalvideotimescale,%
1819    digitalvideotype, direction, directionalcolor, directionalpreset,%
1820    directtostage, disableimagingtransformation, displayface, displaymode,%
1821    distanceto, distribution, dither, done, doneparsing, dot, dotproduct,%
1822    doubleclick, downloadnetthing, drag, draw, drawrect, dropshadow,%
1823    duplicate, duplicateframe, duration, editable, editshortcutsenabled,%
1824    elapsedtime, emissive, emitter, empty, emulatemultibuttonmouse,%
1825    enabled, enablehotspot, end, endangle, endcolor, endframe,%
1826    endrecording, endsprite, endtime, enter, enterframe, environment,%
1827    erase, error, eventpassmode, exchange, exists, exit, exitframe,%
1828    exitlock, exp, externalevent, externalparamcount, externalparamname,%
1829    externalparamvalue, extractalpha, extrude3d, face, fadein, fadeout,%
1830    fadeto, far, field, fieldofview, filename, fill, fillcolor, fillcycles,%
1831    filldirection, filled, fillmode, filloffset, fillscale, findempty,%
1832    findlabel, findpos, findposnear, finishidleload, firstindent,%
1833    fixedlinespace, fixedrate, fixstagesize, flashrect, flashtostage, flat,%
1834    fliph, flipv, float, floatp, floatprecision, flush, flushinputevents,%
1835    fog, folderchar, font, fontsize, fontstyle, forecolor, forget, frame,%
1836    framecount, framelabel, framepalette, framerate, frameready,%
1837    framescript, framesound1, framesound2, framestohms, frametempo,%
1838    frametransition, freeblock, freebytes, fromcastmember, fromimageobject,%
1839    front, frontwindow, generatenormals, getaprop, getat,%
1840    getbehaviordescription, getbehaviortooltip, getboneid, geterror,%
1841    geterrorstring, gethardwareinfo, gethotspotrect, getlast,%
1842    getlatestnetid, getnetaddresscookie, getneterrorstring, getnetmessage,%
1843    getnetoutgoingbytes, getnettext, getnormalized, getnthfilenameinfolder,%
1844    getnumberwaitingnetmessages, getone, getpeerconnectionlist, getpixel,%
1845    getplaylist, getpos, getpref, getprop, getpropat,%
```

```
1846    getpropertydescriptionlist, getrendererservices, getstreamstatus,%
1847    gettemppath, getworldtransform, globals, glossmap, go, gotoframe,%
1848    gotonetmovie, gotonetpage, gradienttype, gravity, group, handler,%
1849    handlers, height, heightvertices, high, highlightpercentage,%
1850    highlightstrength, hilite, hither, hittest, hmstoframes, hold, hotspot,%
1851    html, hyperlink, hyperlinkclicked, hyperlinkrange, hyperlinks,%
1852    hyperlinkstate, id3tags, identity, idle, idlehandlerperiod,%
1853    idleloaddone, idleloadmode, idleloadperiod, idleloadtag,%
1854    idlereadchunksize, ilk, image, imagecompression, imageenabled,%
1855    imagequality, immovable, importfileinto, inflate, ink, inker,%
1856    inlineimeenabled, insertbackdrop, insertframe, insertoverlay, inside,%
1857    installmenu, instance, integer, integerp, interface, interpolate,%
1858    interpolateto, intersect, index, interval, inverse, invert, invertmask,%
1859    isbusy, isinworld, isoktoattach, ispastcuepoint, item, itemdelimiter,%
1860    kerning, kerningthreshold, key, keyboardfocussprite, keycode, keydown,%
1861    keydownscript, keyframeplayer, keypressed, keyup, keyupscript, label,%
1862    labellist, last, lastchannel, lastclick, lastevent, lastframe, lastkey,%
1863    lastroll, left, leftindent, length, lengthvertices, level, lifetime,%
1864    light, line, linearlist, linecolor, linecount, linedirection,%
1865    lineheight, lineoffset, linepostolocv, linesize, linkas, linked, list,%
1866    listp, loaded, loadfile, loc, loch, locked, locktranslation,%
1867    loctocharpos, locv, locvtolinepos, locz, lod, log, long, loop,%
1868    loopcount, loopendtime, loopsremaining, loopstarttime, machinetype,%
1869    magnitude, map, mapImageToStage, mapmembertostage, mapstagetomember,%
1870    margin, marker, markerlist, mask, max, maxinteger, maxspeed, mci,%
1871    media, mediaready, member, membernum, members, memorysize, menu, mesh,%
1872    meshdeform, milliseconds, min, minspeed, modal, mode, model, modela,%
1873    modelb, modelresource, modelsunderloc, modelsunderray, modelunderloc,%
1874    modified, modifiedby, modifieddate, modifier, modifiers, month,%
1875    mostrecentcuepoint, motion, mousechar, mousedown, mousedownscript,%
1876    mouseenter, mouseh, mouseitem, mouseleave, mouselevel, mouseline,%
1877    mouseloc, mousemember, mouseoverbutton, mouseup, mouseupoutside,%
1878    mouseupscript, mousev, mousewithin, mouseword, move, moveablesprite,%
1879    movetoback, movetofront, movevertex, movevertexhandle, movewindow,%
1880    movie, movieaboutinfo, moviecopyrightinfo, moviefilefreesize,%
1881    moviefilesize, moviefileversion, movieimagecompression,%
1882    movieimagequality, moviename, moviepath, movierate, movietime,%
1883    moviextralist, mpeglayer, multiply, multisound, name, near,%
1884    nearfiltering, neighbor, netabort, netdone, neterror, netlastmoddate,%
1885    netmime, netpresent, netstatus, nettextresult, netthrottleticks,%
1886    newcamera, newcurve, newgroup, newlight, newmesh, newmodel,%
1887    newmodelresource, newmotion, newshader, newtexture, next, none,%
1888    normalize, normallist, normals, nothing, notify, nudge, number,%
1889    numchannels, numparticles, numsegments, numtochar, objectp, offset,%
1890    open, openresfile, openwindow, openxlib, optiondown, organizationname,%
1891    originalfont, originh, originmode, originpoint, originv, orthoheight,%
1892    overlay, pageheight, palette, palettemapping, paletteref, paletteindex,%
1893    pan, paragraph, param, paramcount, parent, parsestring, particle,%
1894    pasteclipboardinto, path, pathname, pathstrength, pattern, pause,%
1895    pausedatstart, pausestate, percentplayed, percentstreamed, period,%
```

```
1896    perpendicularto, persistent, pi, picture, picturep, plane, platform,%
1897    play, playbackmode, playfile, playing, playlist, playnext, playrate,%
1898    point, pointat, pointatorientation, pointinhyperlink, pointofcontact,%
1899    pointtochar, pointtoitem, pointtoline, pointtoparagraph, pointtoword,%
1900    position, positionreset, posterframe, postnettext, power,%
1901    preferred3drenderer, preload, preloadbuffer, preloadeventabort,%
1902    preloadmember, preloadmode, preloadmovie, preloadnetthing, preloadram,%
1903    preloadtime, premultiply, prepareframe, preparemovie, prerotate,%
1904    prescale, pretranslate, previous, primitives, printfrom,%
1905    productversion, projection, projectionangle, propList, proxyserver,%
1906    pttohotspotid, puppet, puppetpalette, puppetsound, puppetsprite,%
1907    puppettempo, puppettransition, purgepriority, qtregisteraccesskey,%
1908    qtunregisteraccesskey, quad, quality, queue, quit, quote, radius,%
1909    ramneeded, random, randomseed, randomvector, rateshift, rawnew, read,%
1910    readvalue, recordfont, rect, ref, reflectionmap, reflectivity, region,%
1911    registerforevent, registerscript, regpoint, regpointvertex,%
1912    removebackdrop, removefromworld, removelast, removemodifier,%
1913    removeoverlay, rename, renderer, rendererdevicelist, renderformat,%
1914    renderstyle, resetworld, resizewindow, resolution, resolve, resolvea,%
1915    resolveb, resource, restart, resume, reverttoworlddefaults, rewind,%
1916    rgb, rgba4444, rgba5550, rgba5551, rgba5650, rgba8880, rgba8888, right,%
1917    rightindent, rightmousedown, rightmouseup, rollover, romanlingo,%
1918    rootlock, rootnode, rotate, rotation, rotationreset, rtf, runmode,%
1919    runpropertydialog, safeplayer, samplecount, samplerate, samplesize,%
1920    save, savedlocal, savemovie, scale, scalemode, score, scorecolor,%
1921    scoreselection, script, scriptexecutionstyle, scriptinstancelist,%
1922    scriptlist, scriptnum, scriptsenabled, scripttext, scripttype,%
1923    scrollbyline, scrollbypage, scrolltop, sds, searchcurrentfolder,%
1924    searchpath, searchpaths, seconds, selectedtext, selection, selend,%
1925    selstart, sendallsprites, sendevent, sendnetmessage, sendsprite,%
1926    serialnumber, setalpha, setaprop, setat, setcollisioncallback,%
1927    setflashproperty, setnetbufferlimits, setnetmessagehandler, setpixel,%
1928    setplaylist, setpref, setprop, setscriptlist, settrackenabled,%
1929    setvariable, shader, shaderlist, shadowpercentage, shadowstrength,%
1930    shapetype, shiftdown, shininess, shockwave3d, short, showglobals,%
1931    showlocals, showprops, showresfile, showxlib, shutdown, silhouettes,%
1932    sin, size, sizerange, skew, sleep, smoothness, sort, sound, soundbusy,%
1933    soundchannel, sounddevice, sounddevicelist, soundenabled,%
1934    soundkeepdevice, soundlevel, soundmixmedia, source, sourcerect, space,%
1935    specular, specularcolor, specularlightmap, sphere, spotangle,%
1936    spotdecay, sprite, spritenum, spritespacetoworldspace, sqrt, stage,%
1937    stagebottom, stagecolor, stageleft, stageright, stagetoflash, stagetop,%
1938    standard, startangle, startframe, startmovie, starttime, starttimer,%
1939    state, static, status, stepframe, stilldown, stop, stopevent,%
1940    stopmovie, stoptime, stream, streammode, streamname, streamsize,%
1941    streamstatus, string, stringp, strokecolor, strokewidth, style,%
1942    subdivision, sweep, swing, switchcolordepth, symbol, symbolp,%
1943    systemdate, tab, tabcount, tabs, tan, target, tellstreamstatus,%
1944    tension, text, texture, texturecoordinatelist, texturecoordinates,%
1945    texturelayer, texturelist, texturemember, texturemode, texturemodelist,%
```

```
1946        texturerenderformat, texturerepeat, texturerepeatlist,%
1947        texturetransform, texturetransformlist, texturetype, thumbnail, ticks,%
1948        tilt, time, timeout, timeouthandler, timeoutkeydown, timeoutlapsed,%
1949        timeoutlength, timeoutlist, timeoutmouse, timeoutplay, timeoutscript,%
1950        timer, timescale, title, titlevisible, toon, top, topcap, topradius,%
1951        topspacing, trace, traceload, tracelogfile, trackcount, trackenabled,%
1952        tracknextkeytime, tracknextsampletime, trackpreviouskeytime,%
1953        trackprevioussampletime, trackstarttime, trackstoptime, tracktext,%
1954        tracktype, trails, transform, transitiontype, translate,%
1955        triggercallback, trimwhitespace, tunneldepth, tweened, tweenmode, type,%
1956        [transparent], union, unload, unloadmember, unloadmovie,%
1957        unregisterallevents, update, updateframe, updatelock,%
1958        updatemovieenabled, updatestage, url, usealpha, usediffusewithtexture,%
1959        usefastquads, usehypertextstyles, uselineoffset, userdata, username,%
1960        value, vector, version, vertex, vertexlist, vertices, video,%
1961        videoforwindowspresent, viewh, viewpoint, viewscale, viewv, visibility,%
1962        visible, void, voidp, volume, volumeinfo, wait, waitfornetconnection,%
1963        warpmode, width, widthvertices, wind, window, windowlist,%
1964        windowpresent, windowtype, word, wordwrap, world, worldposition,%
1965        worldspacetospritespace, worldtransform, wraptransform,%
1966        wraptransformlist, write, writevalue, xaxis, xtra, xtralist, xtras,%
1967        yaxis, year, yon, zaxis, zoombox, zoomwindow, repeat, Conditional,%
1968        Boolean, TypeDef, Statement, Operator, String, Comment, Identifier,%
1969        Special, x, y, z},%
1970    sensitive=false,%
1971    morecomment=[l]{--},%
1972    morestring=[b]",%
1973 }[keywords,comments,strings]
1974 %      \begin{macrocode}
1975 ⟨/lang3⟩
```

## 2.37 Lisp, AutoLisp and Emacs Lisp (elisp)

Most data are from

- GUY STEELE: **Common Lisp**; Copyright 1990 by Digital Equipment Corporation; ISBN 1-55558-042-4.

Thanks to Aslak Raanes for the 'single comment' delimiters. The keywords are the 'one-word' functions and macros of Common Lisp, i.e. words not containing a minus. But I left out the caaaar, ... functions. If anyone types them in, I'd like to get them. Hilmar Preuße informed about an issue mentioned at https://bugs.debian.org/499422, the issue got corrected.

```
1976 ⟨*lang2⟩

1977 \lst@definelanguage{Lisp}%
1978    {morekeywords={abort,abs,acons,acos,acosh,adjoin,alphanumericp,alter,%
1979        append,apply,apropos,aref,arrayp,ash,asin,asinh,assoc,atan,atanh,%
1980        atom,bit,boole,boundp,break,butlast,byte,catenate,ceiling,cerror,%
1981        char,character,characterp,choose,chunk,cis,close,clrhash,coerce,%
```

```
1982        collect,commonp,compile,complement,complex,complexp,concatenate,%
1983        conjugate,cons,consp,constantp,continue,cos,cosh,cotruncate,%
1984        count,delete,denominator,describe,directory,disassemble,%
1985        documentation,dpb,dribble,ed,eighth,elt,enclose,endp,eq,eql,%
1986        equal,equalp,error,eval,evalhook,evenp,every,exp,expand,export,%
1987        expt,fboundp,fceiling,fdefinition,ffloor,fifth,fill,find,first,%
1988        float,floatp,floor,fmakunbound,format,fourth,fround,ftruncate,%
1989        funcall,functionp,gatherer,gcd,generator,gensym,gentemp,get,getf,%
1990        gethash,identity,imagpart,import,inspect,integerp,intern,%
1991        intersection,tively,isqrt,keywordp,last,latch,lcm,ldb,ldiff,%
1992        length,list,listen,listp,load,log,logand,logbitp,logcount,logeqv,%
1993        logior,lognand,lognor,lognot,logtest,logxor,macroexpand,%
1994        makunbound,map,mapc,mapcan,mapcar,mapcon,maphash,mapl,maplist,%
1995        mask,max,member,merge,min,mingle,minusp,mismatch,mod,namestring,%
1996        nbutlast,nconc,nintersection,ninth,not,notany,notevery,nreconc,%
1997        nreverse,nsublis,nsubst,nth,nthcdr,null,numberp,numerator,nunion,%
1998        oddp,open,packagep,pairlis,pathname,pathnamep,phase,plusp,%
1999        position,positions,pprint,previous,princ,print,proclaim,provide,%
2000        random,rassoc,rational,rationalize,rationalp,read,readtablep,%
2001        realp,realpart,reduce,rem,remhash,remove,remprop,replace,require,%
2002        rest,revappend,reverse,room,round,rplaca,rplacd,sbit,scan,schar,%
2003        search,second,series,set,seventh,shadow,signal,signum,sin,sinh,%
2004        sixth,sleep,some,sort,split,sqrt,streamp,string,stringp,sublis,%
2005        subseq,subseries,subsetp,subst,substitute,subtypep,svref,sxhash,%
2006        symbolp,tailp,tan,tanh,tenth,terpri,third,truename,truncate,%
2007        typep,unexport,unintern,union,until,values,vector,vectorp,warn,%
2008        write,zerop,and,assert,case,ccase,cond,ctypecase,decf,declaim,%
2009        defclass,defconstant,defgeneric,defmacro,defmethod,defpackage,%
2010        defparameter,defsetf,defstruct,deftype,defun,defvar,do,dolist,%
2011        dotimes,ecase,encapsulated,etypecase,flet,formatter,gathering,%
2012        incf,iterate,labels,let,locally,loop,macrolet,mapping,or,pop,%
2013        producing,prog,psetf,psetq,push,pushnew,remf,return,rotatef,%
2014        setf,shiftf,step,time,trace,typecase,unless,untrace,when},%
2015    sensitive=false,% ???
2016    alsodigit=-,%
2017    morecomment=[l];,%
2018    morecomment=[s]{\#|}{|\#},% 1997 Aslak Raanes
2019    morestring=[b]"%
2020    }[keywords,comments,strings]
```

2021 ⟨/lang2⟩

2022 ⟨∗lang2⟩

Stefan Lagotzki warned me to define this as a lisp dialect . . .

```
2023 %%
2024 %% AutoLISP/VisualLISP - Stefan Lagotzki, info@lagotzki.de
2025 %%
2026 \lst@definelanguage[Auto]{Lisp}%
2027   {morekeywords={abs,acad_colordlg,acad_helpdlg,acad_strlsort,%
2028        action_tile,add_list,alert,alloc,and,angle,angtof,angtos,append,%
```

```
2029        apply,arx,arxload,arxunload,ascii,assoc,atan,atof,atoi,atom,%
2030        atoms-family,autoarxload,autoload,Boole,boundp,caddr,cadr,car,%
2031        cdr,chr,client_data_tile,close,command,cond,cons,cos,cvunit,%
2032        defun,defun-q,defun-q-list-ref,defun-q-list-set,dictadd,dictnext,%
2033        dictremove,dictrename,dictsearch,dimx_tile,dimy_tile,distance,%
2034        distof,done_dialog,end_image,end_list,entdel,entget,entlast,%
2035        entmake,entmakex,entmod,entnext,entsel,entupd,eq,equal,*error*,%
2036        eval,exit,exp,expand,expt,fill_image,findfile,fix,float,foreach,%
2037        function,gc,gcd,get_attr,get_tile,getangle,getcfg,getcname,%
2038        getcorner,getdist,getenv,getfiled,getint,getkword,getorient,%
2039        getpoint,getreal,getstring,getvar,graphscr,grclear,grdraw,grread,%
2040        grtext,grvecs,handent,help,if,initdia,initget,inters,itoa,lambda,%
2041        last,layoutlist,length,list,listp,load,load_dialog,log,logand,%
2042        logior,lsh,mapcar,max,mem,member,menucmd,menugroup,min,minusp,%
2043        mode_tile,namedobjdict,nentsel,nentselp,new_dialog,not,nth,%
2044        null,numberp,open,or,osnap,polar,prin1,princ,print,progn,prompt,%
2045        quit,quote,read,read-char,read-line,redraw,regapp,rem,repeat,%
2046        reverse,rtos,set,set_tile,setcfg,setenv,setfunhelp,setq,%
2047        setvar,setview,sin,slide_image,snvalid,sqrt,ssadd,ssdel,ssget,%
2048        ssgetfirst,sslength,ssmemb,ssname,ssnamex,sssetfirst,startapp,%
2049        start_dialog,start_image,start_list,strcase,strcat,strlen,subst,%
2050        substr,tablet,tblnext,tblobjname,tblsearch,term_dialog,terpri,%
2051        textbox,textpage,textscr,trace,trans,type,unload_dialog,untrace,%
2052        vector_image,ver,vl-acad-defun,vl-acad-undefun,vl-arx-import,%
2053        vl-bb-ref,vl-bb-set,vl-catch-all-apply,%
2054        vl-catch-all-error-message,vl-catch-all-error-p,vl-cmdf,vl-consp,%
2055        vl-directory-files,vl-doc-export,vl-doc-import,vl-doc-ref,%
2056        vl-doc-set,vl-every,vl-exit-with-error,vl-exit-with-value,%
2057        vl-file-copy,vl-file-delete,vl-file-directory-p,vl-file-rename,%
2058        vl-file-size,vl-file-systime,vl-filename-base,%
2059        vl-filename-directory,vl-filename-extension,vl-filename-mktemp,%
2060        vl-get-resource,vl-list*,vl-list->string,%
2061        vl-list-exported-functions,vl-list-length,vl-list-loaded-vlx,%
2062        vl-load-all,vl-load-com,vl-load-reactors,vl-member-if,%
2063        vl-member-if-not,vl-position,vl-prin1-to-string,%
2064        vl-princ-to-string,vl-propagate,vl-registry-delete,%
2065        vl-registry-descendents,vl-registry-read,vl-registry-write,%
2066        vl-remove,vl-remove-if,vl-remove-if-not,vl-some,vl-sort,%
2067        vl-sort-i,vl-string->list,vl-string-elt,vl-string-left-trim,%
2068        vl-string-mismatch,vl-string-position,vl-string-right-trim,%
2069        vl-string-search,vl-string-subst,vl-string-translate,%
2070        vl-string-trim,vl-symbol-name,vl-symbol-value,vl-symbolp,%
2071        vl-unload-vlx,vl-vbaload,vl-vbarun,vl-vlx-loaded-p,vlax-3D-point,%
2072        vlax-add-cmd,vlax-create-object,vlax-curve-getArea,%
2073        vlax-curve-getDistAtParam,vlax-curve-getDistAtPoint,%
2074        vlax-curve-getEndParam,vlax-curve-getEndPoint,%
2075        vlax-curve-getParamAtDist,vlax-curve-getParamAtPoint,%
2076        vlax-curve-getPointAtDist,vlax-curve-getPointAtParam,%
2077        vlax-curve-getStartParam,vlax-curve-getStartPoint,%
2078        vlax-curve-isClosed,vlax-curve-isPeriodic,vlax-curve-isPlanar,%
```

```
2079        vlax-curve-getClosestPointTo,%
2080        vlax-curve-getClosestPointToProjection,vlax-curve-getFirstDeriv,%
2081        vlax-curve-getSecondDeriv,vlax-dump-object,%
2082        vlax-ename->vla-object,vlax-erased-p,vlax-for,%
2083        vlax-get-acad-object,vlax-get-object,vlax-get-or-create-object,%
2084        vlax-get-property,vlax-import-type-library,vlax-invoke-method,%
2085        vlax-ldata-delete,vlax-ldata-get,vlax-ldata-list,vlax-ldata-put,%
2086        vlax-ldata-test,vlax-make-safearray,vlax-make-variant,%
2087        vlax-map-collection,vlax-method-applicable-p,%
2088        vlax-object-released-p,vlax-product-key,%
2089        vlax-property-available-p,vlax-put-property,vlax-read-enabled-p,%
2090        vlax-release-object,vlax-remove-cmd,vlax-safearray-fill,%
2091        vlax-safearray-get-dim,vlax-safearray-get-element,%
2092        vlax-safearray-get-l-bound,vlax-safearray-get-u-bound,%
2093        vlax-safearray-put-element,vlax-safearray-type,%
2094        vlax-safearray->list,vlax-tmatrix,vlax-typeinfo-available-p,%
2095        vlax-variant-change-type,vlax-variant-type,vlax-variant-value,%
2096        vlax-vla-object->ename,vlax-write-enabled-p,vlisp-compile,%
2097        vlr-acdb-reactor,vlr-add,vlr-added-p,vlr-beep-reaction,%
2098        vlr-command-reactor,vlr-current-reaction-name,vlr-data,%
2099        vlr-data-set,vlr-deepclone-reactor,vlr-docmanager-reactor,%
2100        vlr-dwg-reactor,vlr-dxf-reactor,vlr-editor-reactor,%
2101        vlr-insert-reactor,vlr-linker-reactor,vlr-lisp-reactor,%
2102        vlr-miscellaneous-reactor,vlr-mouse-reactor,vlr-notification,%
2103        vlr-object-reactor,vlr-owner-add,vlr-owner-remove,vlr-owners,%
2104        vlr-pers,vlr-pers-list,vlr-pers-p,vlr-pers-release,%
2105        vlr-reaction-names,vlr-reaction-set,vlr-reactions,vlr-reactors,%
2106        vlr-remove,vlr-remove-all,vlr-set-notification,%
2107        vlr-sysvar-reactor,vlr-toolbar-reactor,vlr-trace-reaction,%
2108        vlr-type,vlr-types,vlr-undo-reactor,vlr-wblock-reactor,%
2109        vlr-window-reactor,vlr-xref-reactor,vports,wcmatch,while,%
2110        write-char,write-line,xdroom,xdsize,zerop},%
2111     alsodigit=->,%
2112     otherkeywords={1+,1-},%
2113     sensitive=false,%
2114     morecomment=[l];,%
2115     morecomment=[l];;,%
2116     morestring=[b]"%
2117    }[keywords,comments,strings]

2118 ⟨/lang2⟩

2119 ⟨*lang2⟩
```

A first approch to elisp by one of the maintainers (Jobst Hoffmann), it is far away from completeness, the list of keywords is defined according the to the needs of the maintainer...

```
2120 \lst@definelanguage{elisp}[]{Lisp}{%
2121   morekeywords={begin, car, cdr, cons, define, display, drop, filter,%
2122     hash-ref, hash-set, if, load-file, lambda, length, map, message,%
2123     progn, quote, require, setq, string-append, take, vector,%
```

```
2124    },%
2125    sensitive,%
2126    alsodigit=->,%
2127    otherkeywords={1+,1-},%
2128    sensitive=true,%
2129    morecomment=[l];,%
2130    morecomment=[l];;,%
2131    morestring=[b]"%
2132 }[keywords,comments,strings]

2133 ⟨/lang2⟩
```

## 2.38  LLVM

LLVM provides a collection of modular and reusable compiler and toolchain technologies, all further information can be found at its home page http://llvm.org/. Scott Pakin provided a language definition for the LLVM intermediate presentation according to http://llvm.org/docs/.[2] The language provides

```
2134 ⟨*lang3⟩

2135 \lst@definelanguage{LLVM}{%
2136    morekeywords={%
```

- Instructions

```
2137          ret,br,switch,indirectbr,invoke,resume,unreachable,%
2138          add,fadd,sub,fsub,mul,fmul,udiv,sdiv,fdiv,urem,srem,frem,%
2139          shl,lshr,ashr,and,or,xor,%
2140          extractelement,insertelement,shufflevector,%
2141          extractvalue,insertvalue,%
2142          alloca,load,store,fence,cmpxchg,atomicrmw,getelementptr,%
2143          trunc,zext,sext,fptrunc,fpext,fptoui,fptosi,uitofp,sitofp,ptrtoint,%
2144          inttoptr,bitcast,to,%
2145          icmp,fcmp,phi,select,call,va_arg,landingpad,%
```

- Atomic operations – some duplication with the above

```
2146          xchg,add,sub,and,nand,or,xor,max,min,umax,umin,%
```

- Comparisons

```
2147          eq,ne,ugt,uge,ult,ule,sgt,sge,slt,sle,%
2148          false,oeq,ogt,oge,olt,ole,one,ord,ueq,ugt,uge,ult,ule,une,uno,true,%
```

- Linkage types

```
2149          private,linker_private,linker_private_weak,linker_private_weak_def_auto,%
2150          internal,available_externally,linkonce,common,weak,appending,extern_weak,%
2151          linkonce_odr,weak_odr,external,dllimport,dllexport,%
```

---

[2]In this section 'I' is Scott Pakin.

- Function headers

```
2152        define,declare,%
```

- Parameter attributes

```
2153        zeroext,signext,inreg,byval,sret,noalias,nocapture,next,%
```

- Garbage collector names

```
2154        gc,%
```

- Function attributes

```
2155        address_safety,alignstack,alwaysinline,nonlazybind,inlinehint,naked,%
2156        noimplicitfloat,noinline,noredzone,noreturn,nounwind,optsize,readnone,%
2157        readonly,returns_twice,ssp,sspreq,uwtable,%
```

- Module-level inline assembly

```
2158        module,asm,%
```

- Data layout

```
2159        target,datalayout,%
```

- Inline assembler expressions

```
2160        sideeffect,alignstack,%
```

- Other keywords – I'm probably missing some here.

```
2161        nuw,nsw,exact,inbounds,unnamed_addr},%
2162     morekeywords=[2]{%
```

- Types

```
2163        i1,i2,i4,i8,i16,i32,i64,i128,i256,i512,i1024,% <-- Most common integers
2164        half,float,double,x86_fp80,fp128,ppc_fp128,x86mmx,%
2165        void,label,metadata},%
2166     alsoletter=.,%
2167     sensitive=false,%
2168     morecomment=[l];,%
2169     morestring=[b]"%
2170   }
```

```
2171 ⟨/lang3⟩
```

## 2.39 Logo

I don't know where the keywords are from and what kind of Logo it is. Help me!

2172 ⟨∗lang3⟩

2173 `\lst@definelanguage{Logo}%`
2174 `% ??? {end,unix} also keywords`
2175 `  {morekeywords={and,atan,arctan,both,break,bf,bl,butfirst,butlast,%`
2176 `      cbreak, close,co,continue,cos,count,clearscreen,cs,debquit,%`
2177 `      describe,diff,difference,ed,edit,either,emptyp,equalp,er,erase,%`
2178 `      errpause,errquit,fifp,filefprint,fifty,fileftype,fip,fileprint,%`
2179 `      fird,fileread,fity,filetype,fiwd,fileword,f,first,or,fp,fprint,%`
2180 `      fput,fty,ftype,full,fullscreen,go,bye,goodbye,gprop,greaterp,%`
2181 `      help,if,iff,iffalse,ift,iftrue,nth,item,keyp,llast,lessp,list,%`
2182 `      local,lput,make,max,maximum,memberp,memtrace,min,minimum,namep,%`
2183 `      not,numberp,oflush,openr,openread,openw,openwrite,op,output,%`
2184 `      pause,plist,pots,pow,pprop,pps,pr,print,product,quotient,random,%`
2185 `      rc,readchar,rl,readlist,remprop,repcount,repeat,request,rnd,run,%`
2186 `      se,sentence,sentencep,setc,setcolor,setipause,setqpause,po,show,%`
2187 `      sin,split,splitscreen,sqrt,stop,sum,test,text,textscreen,thing,%`
2188 `      to,tone,top,toplevel,type,untrace,wait,word,wordp,yaccdebug,is,%`
2189 `      mod,remainder,trace,zerop,back,bk,bto,btouch,fd,forward,fto,%`
2190 `      ftouch,getpen,heading,hit,hitoot,ht,hideturtle,loff,lampoff,lon,%`
2191 `      lampon,lt,left,lot,lotoot,lto,ltouch,penc,pencolor,pd,pendown,pe,%`
2192 `      penerase,penmode,pu,penup,px,penreverse,rt,right,rto,rtouch,%`
2193 `      scrunch,seth,setheading,setscrun,setscrunch,setxy,shownp,st,%`
2194 `      showturtle,towardsxy,clean,wipeclean,xcor,ycor,tur,turtle,%`
2195 `      display,dpy},%`
2196 `    sensitive=f% ???`
2197 `  }[keywords]%`

2198 ⟨/lang3⟩

## 2.40 Lua

Stephan Hennig contributed the Lua keywords.

2199 ⟨∗lang2⟩

We begin with the keywords for Lua 5.0:

2200 `%%`
2201 `%% Lua definitions (c) 2013 Stephan Hennig`
2202 `%%`
2203 `\lst@definelanguage[5.0]{Lua}{%`

To enable highlighting of library keywords, the dot needs to be a letter.

2204 `  alsoletter={.},%`

The language definition knows

- language keywords

2205 `      morekeywords=[1]{%`
2206 `        and, break, do, else, elseif, end, false, for, function, if, in,%`

```
2207          local, nil, not, or, repeat, return, then, true, until, while,%
2208        },%
```

- the standard library identifiers

```
2209        morekeywords=[2]{%
```

  – coming from the base library

```
2210            _G, _LOADED, _REQUIREDNAME, _VERSION, LUA_PATH,%
2211            assert, collectgarbage, dofile, error, gcinfo, getfenv,%
2212            getmetatable, ipairs, loadfile, loadlib, loadstring, newproxy,%
2213            next, pairs, pcall, print, rawequal, rawget, rawset, require,%
2214            setfenv, setmetatable, tonumber, tostring, type, unpack, xpcall,%
```

  – coming from the coroutine library

```
2215            coroutine, coroutine.create, coroutine.resume,%
2216            coroutine.status, coroutine.wrap, coroutine.yield,%
```

  – the debug library

```
2217            _TRACEBACK, debug, debug.debug, debug.gethook, debug.getinfo,%
2218            debug.getlocal, debug.getupvalue, debug.sethook, debug.setlocal,%
2219            debug.setupvalue,debug.traceback,%
```

  – the io library

```
2220            io, io.close, io.flush, io.input, io.lines, io.open, io.output,%
2221            io.popen, io.read, io.stderr, io.stdin, io.stdout, io.tmpfile,%
2222            io.type, io.write,%
```

  – the mathematical library

```
2223            __pow, math, math.abs, math.acos, math.asin, math.atan, math.atan2,%
2224            math.ceil, math.cos, math.deg, math.exp, math.floor, math.frexp,%
2225            math.ldexp, math.log, math.log10, math.max, math.min, math.mod,%
2226            math.pi, math.pow, math.rad, math.random, math.randomseed, math.sin,%
2227            math.sqrt, math.tan,%
```

  – the os library

```
2228            os, os.clock, os.date, os.difftime, os.execute, os.exit, os.getenv,%
2229            os.remove, os.rename, os.setlocale, os.time, os.tmpname,%
```

  – the string library

```
2230            string, string.byte, string.char, string.dump, string.find,%
2231            string.format, string.gfind, string.gsub, string.len, string.lower,%
2232            string.rep, string.sub, string.upper,%
```

  – the table library

```
2233            table, table.concat, table.foreach, table.foreachi, table.getn,%
2234            table.insert, table.remove, table.setn, table.sort,%
2235        },%
```

and some additional identifiers

```
2236   morekeywords=[2]{%
2237     _PROMPT, _PROMPT2, arg,%
2238   },%
```

These are the common language settings

```
2239   sensitive=true,%
2240   % single line comments
2241   morecomment=[l]{--},%
2242   % multi line comments
2243   morecomment=[s]{--[[}{]]},%
2244   % backslash escaped strings
2245   morestring=[b]",%
2246   morestring=[b]',%
2247   % multi line strings
2248   morestring=[s]{[[}{]]},%
2249 }[keywords,comments,strings]
```

And here are the new definitions for Lua 5.1:

```
2250 \lst@definelanguage[5.1]{Lua}[5.0]{Lua}{%
```

There are some deletions

```
2251   deletekeywords=[2]{%
```

concerning

- the base library

```
2252       _LOADED, _REQUIREDNAME, LUA_PATH, gcinfo, loadlib,%
```

- the debug library

```
2253       _TRACEBACK,%
```

- the mathematical library

```
2254       __pow, math.mod,%
```

- the string library

```
2255       string.gfind,%
```

- the table library

```
2256       table.foreach, table.foreachi, table.getn, table.setn,%
2257     },%
```

and some new identifiers in standard libraries like

```
2258   morekeywords=[2]{%
```

- the base library

```
2259       load, select,%
```

- coroutine library

```
2260          coroutine.running,%
```

- debug library

```
2261          debug.getfenv, debug.getmetatable, debug.getregistry, debug.setfenv,%
2262          debug.setmetatable,%
```

- the mathematical library

```
2263          math.cosh, math.fmod, math.huge, math.modf, math.sinh, math.tanh,%
```

- the package library which itself is new in Lua 5.1

```
2264          module, package, package.config, package.cpath, package.loaded,%
2265          package.loaders, package.loadlib, package.path, package.preload,%
2266          package.seeall,%
```

- the string library and

```
2267          string.gmatch, string.match, string.reverse,%
```

- the table library

```
2268          table.maxn,%
2269       },%
```

In Lua 5.1 long bracket comments were introduced also

```
2270   morecomment=[s]{--[=[}{]=]},%
2271   morecomment=[s]{--[==[}{]==]},%
2272   morecomment=[s]{--[===[}{]===]},%
2273   morecomment=[s]{--[====[}{]====]},%
2274   morecomment=[s]{--[=====[}{]=====]},%
2275   morecomment=[s]{--[======[}{]======]},%
2276   morecomment=[s]{--[=======[}{]=======]},%
2277   morecomment=[s]{--[========[}{]========]},%
2278   morecomment=[s]{--[=========[}{]=========]},%
2279   morecomment=[s]{--[==========[}{]==========]},%
```

as well as long bracket strings

```
2280   morestring=[s]{[=[}{]=]},%
2281   morestring=[s]{[==[}{]==]},%
2282   morestring=[s]{[===[}{]===]},%
2283   morestring=[s]{[====[}{]====]},%
2284   morestring=[s]{[=====[}{]=====]},%
2285   morestring=[s]{[======[}{]======]},%
2286   morestring=[s]{[=======[}{]=======]},%
2287   morestring=[s]{[========[}{]========]},%
2288   morestring=[s]{[=========[}{]=========]},%
2289   morestring=[s]{[==========[}{]==========]},%
2290 }[keywords,comments,strings]
```

Lua 5.2 again has some changed features. These are

```
2291 \lst@definelanguage[5.2]{Lua}[5.1]{Lua}{%
```

- new language keywords

```
2292        morekeywords=[1]{%
2293          goto,%
2294        },%
```

- deleted identifiers from the standard libraries like

```
2295        deletekeywords=[2]{%
```

  - the base library

```
2296            getfenv, loadstring, module, newproxy, setfenv, unpack,%
```

  - the debug library

```
2297            debug.getfenv, debug.setfenv,%
```

  - the mathematical library

```
2298            math.log10,%
```

  - the package library and

```
2299            package.loaders, package.seeall,%
```

  - the table library

```
2300            table.maxn,%
2301          },%
```

Again there are some new identifiers in the standard libraries

```
2302    morekeywords=[2]{%
```

like

- the base library

```
2303        rawlen,%
```

- the bit library

```
2304        bit32, bit32.arshift, bit32.band, bit32.bnot, bit32.bor,%
2305        bit32.btest, bit32.bxor, bit32.extract, bit32.lrotate,%
2306        bit32.lshift, bit32.replace, bit32.rrotate, bit32.rshift,%
```

- the debug library

```
2307        debug.getuservalue, debug.setuservalue, debug.upvalueid,%
2308        debug.upvaluejoin,%
```

- the package library

```
2309        package.searchers, package.searchpath,%
```

61

- the table library

```
2310          table.pack, table.unpack,%
2311        },%
```

There is a new additional identifier

```
2312   morekeywords=[2]{%
2313     _ENV,%
2314   },%
```

and labels are also new in Lua 5.2

```
2315   moredelim=[s][keywordstyle3]{::}{::},%
2316 }[keywords,comments,strings]
```

In January 2015 Lua 5.3 was released, Stephan Hennig again contributed the Lua keywords.

```
2317 \lst@definelanguage[5.3]{Lua}[5.2]{Lua}{%
```

- some libraries are deprecated, so the following identifiers are deleted

```
2318        deletekeywords=[2]{%
```

  - the `bit32` library

```
2319            bit32, bit32.arshift, bit32.band, bit32.bnot, bit32.bor,%
2320            bit32.btest, bit32.bxor, bit32.extract, bit32.lrotate,%
2321            bit32.lshift, bit32.replace, bit32.rrotate, bit32.rshift,%
```

  - the mathematical library

```
2322            math.atan2, math.cosh, math.frexp, math.ldexp, math.pow,%
2323            math.sinh, math.tanh,%
2324          },%
```

Again there are some new identifiers in the standard libraries

```
2325   morekeywords=[2]{%
```

like

- the coroutine library

```
2326        coroutine.isyieldable,%
```

- the mathematical library

```
2327        math.maxinteger, math.mininteger, math.tointeger, math.type,%
2328        math.ult,%
```

- the string library

```
2329        string.pack, string.packsize, string.unpack,%
```

- the table library

```
2330        table.move,%
```

- the utf-8 library

```
2331          utf8, utf8.char, utf8.charpattern, utf8.codepoint, utf8.codes,%
2332          utf8.len, utf8.offset,%
2333        },%
2334      }[keywords,comments,strings]
```

```
2335      ⟨/lang2⟩
```

Stephan Hennig also supplied a definition of a style for printing Lua code:

```
2336 ⟨*lua-prf⟩
```

```
2337 \usepackage[rgb, x11names]{xcolor}
2338 \lstdefinestyle{Lua}{%
2339   language=[5.2]Lua,
2340   basicstyle=\ttfamily,
2341   columns=spaceflexible,
2342   keywordstyle=\bfseries\color{Blue4},% language keywords
2343   keywordstyle=[2]\bfseries\color{RoyalBlue3},% std. library identifiers
2344   keywordstyle=[3]\bfseries\color{Purple3},% labels
2345   stringstyle=\bfseries\color{Coral4},% strings
2346   commentstyle=\itshape\color{Green4},% comments
2347 }
```

This code is provided in the file `listings-lua.prf`, see section 2.4.1 (Preferences) of the listings documentation.

```
2348 ⟨/lua-prf⟩
```

## 2.41   Make

Rolf Niepraschk sent me the new definitions. Markus Pahlow found a missing comma and added some keywords, which improve the highlighting with `makemacrouse=true` (but I haven't tested this).

```
2349 ⟨*lang2⟩
```

```
2350 %%
2351 %% Make definitions (c) 2000 Rolf Niepraschk
2352 %%
2353 \lst@definelanguage[gnu]{make}%
2354   {morekeywords={SHELL,MAKE,MAKEFLAGS,$@,$\%,$<,$?,$^,$+,$*,%
2355       @,^,<,\%,+,?,*,% Markus Pahlow
2356       export,unexport,include,override,define,ifdef,ifneq,ifeq,else,%
2357       endif,vpath,subst,patsubst,strip,findstring,filter,filter-out,%
2358       sort,dir,notdir,suffix,basename,addsuffix,addprefix,join,word,%
2359       words,firstword,wildcard,shell,origin,foreach,%
2360       @D,@F,*D,*F,\%D,\%F,<D,<F,^D,^F,+D,+F,?D,?F,%
2361       AR,AS,CC,CXX,CO,CPP,FC,GET,LEX,PC,YACC,YACCR,MAKEINFO,TEXI2DVI,%
2362       WEAVE,CWEAVE,TANGLE,CTANGLE,RM,M2C,LINT,COMPILE,LINK,PREPROCESS,%
2363       CHECKOUT,%
2364       ARFLAGS,ASFLAGS,CFLAGS,CXXFLAGS,COFLAGS,CPPFLAGS,FFLAGS,GFLAGS,%
2365       LDFLAGS,LOADLIBES,LFLAGS,PFLAGS,RFLAGS,YFLAGS,M2FLAGS,MODFLAGS,%
```

63

```
2366        LINTFLAGS,MAKEINFO_FLAGS,TEXI2DVI_FLAGS,COFLAGS,GFLAGS,%
2367        OUTPUT_OPTION,SCCS_OUTPUT_OPTION,% missing comma: Markus Pahlow
2368        .PHONY,.SUFFIXES,.DEFAULT,.PRECIOUS,.INTERMEDIATE,.SECONDARY,%
2369        .IGNORE,.SILENT,.EXPORT_ALL_VARIABLES,MAKEFILES,VPATH,MAKESHELL,%
2370        MAKELEVEL,MAKECMDGOALS,SUFFIXES},%
2371     sensitive=true,
2372     morecomment=[l]\#,%
2373     morestring=[b]"%
2374    }[keywords,comments,strings,make]%

2375 \lst@definelanguage{make}
2376    {morekeywords={SHELL,MAKE,MAKEFLAGS,$@,$\%,$<,$?,$^,$+,$*},%
2377     sensitive=true,%
2378     morecomment=[l]\#,%
2379     morestring=[b]"%
2380    }[keywords,comments,strings,make]%
```

The two [b]-arguments have been added after a bug report by Dr. Jobst Hoffmann

2381 ⟨/lang2⟩

## 2.42  Matlab

I (C. H.?) took the keywords from http://www.utexas.edu/math/Matlab/Manual, but I removed the keywords i, j and tmp—the change was proposed by Kai Below.

2382 ⟨∗lang1⟩

From the revision history one can conclude that "Matlab´´ means "Matlab 5.1´´ which was released in 1997

```
2383 \lst@definelanguage[5.1]{Matlab}[]{Matlab}{}

2384 \lst@definelanguage{Matlab}%
2385    {morekeywords={gt,lt,gt,lt,amp,abs,acos,acosh,acot,acoth,acsc,acsch,%
2386        all,angle,ans,any,asec,asech,asin,asinh,atan,atan2,atanh,auread,%
2387        auwrite,axes,axis,balance,bar,bessel,besselk,bessely,beta,%
2388        betainc,betaln,blanks,bone,break,brighten,capture,cart2pol,%
2389        cart2sph,caxis,cd,cdf2rdf,cedit,ceil,chol,cla,clabel,clc,clear,%
2390        clf,clock,close,colmmd,Colon,colorbar,colormap,ColorSpec,colperm,%
2391        comet,comet3,compan,compass,computer,cond,condest,conj,contour,%
2392        contour3,contourc,contrast,conv,conv2,cool,copper,corrcoef,cos,%
2393        cosh,cot,coth,cov,cplxpair,cputime,cross,csc,csch,csvread,%
2394        csvwrite,cumprod,cumsum,cylinder,date,dbclear,dbcont,dbdown,%
2395        dbquit,dbstack,dbstatus,dbstep,dbstop,dbtype,dbup,ddeadv,ddeexec,%
2396        ddeinit,ddepoke,ddereq,ddeterm,ddeunadv,deblank,dec2hex,deconv,%
2397        del2,delete,demo,det,diag,diary,diff,diffuse,dir,disp,dlmread,%
2398        dlmwrite,dmperm,dot,drawnow,echo,eig,ellipj,ellipke,else,elseif,%
2399        end,engClose,engEvalString,engGetFull,engGetMatrix,engOpen,%
2400        engOutputBuffer,engPutFull,engPutMatrix,engSetEvalCallback,%
2401        engSetEvalTimeout,engWinInit,eps,erf,erfc,erfcx,erfinv,error,%
2402        errorbar,etime,etree,eval,exist,exp,expint,expm,expo,eye,fclose,%
2403        feather,feof,ferror,feval,fft,fft2,fftshift,fgetl,fgets,figure,%
2404        fill,fill3,filter,filter2,find,findstr,finite,fix,flag,fliplr,%
```

```
2405        flipud,floor,flops,fmin,fmins,fopen,for,format,fplot,fprintf,%
2406        fread,frewind,fscanf,fseek,ftell,full,function,funm,fwrite,fzero,%
2407        gallery,gamma,gammainc,gammaln,gca,gcd,gcf,gco,get,getenv,%
2408        getframe,ginput,global,gplot,gradient,gray,graymon,grid,griddata,%
2409        gtext,hadamard,hankel,help,hess,hex2dec,hex2num,hidden,hilb,hist,%
2410        hold,home,hostid,hot,hsv,hsv2rgb,if,ifft,ifft2,imag,image,%
2411        imagesc,Inf,info,input,int2str,interp1,interp2,interpft,inv,%
2412        invhilb,isempty,isglobal,ishold,isieee,isinf,isletter,isnan,%
2413        isreal,isspace,issparse,isstr,jet,keyboard,kron,lasterr,lcm,%
2414        legend,legendre,length,lin2mu,line,linspace,load,log,log10,log2,%
2415        loglog,logm,logspace,lookfor,lower,ls,lscov,lu,magic,matClose,%
2416        matDeleteMatrix,matGetDir,matGetFp,matGetFull,matGetMatrix,%
2417        matGetNextMatrix,matGetString,matlabrc,matlabroot,matOpen,%
2418        matPutFull,matPutMatrix,matPutString,max,mean,median,menu,mesh,%
2419        meshc,meshgrid,meshz,mexAtExit,mexCallMATLAB,mexdebug,%
2420        mexErrMsgTxt,mexEvalString,mexFunction,mexGetFull,mexGetMatrix,%
2421        mexGetMatrixPtr,mexPrintf,mexPutFull,mexPutMatrix,mexSetTrapFlag,%
2422        min,more,movie,moviein,mu2lin,mxCalloc,mxCopyCharacterToPtr,%
2423        mxCopyComplex16ToPtr,mxCopyInteger4ToPtr,mxCopyPtrToCharacter,%
2424        mxCopyPtrToComplex16,mxCopyPtrToInteger4,mxCopyPtrToReal8,%
2425        mxCopyReal8ToPtr,mxCreateFull,mxCreateSparse,mxCreateString,%
2426        mxFree,mxFreeMatrix,mxGetIr,mxGetJc,mxGetM,mxGetN,mxGetName,%
2427        mxGetNzmax,mxGetPi,mxGetPr,mxGetScalar,mxGetString,mxIsComplex,%
2428        mxIsFull,mxIsNumeric,mxIsSparse,mxIsString,mxIsTypeDouble,%
2429        mxSetIr,mxSetJc,mxSetM,mxSetN,mxSetName,mxSetNzmax,mxSetPi,%
2430        mxSetPr,NaN,nargchk,nargin,nargout,newplot,nextpow2,nnls,nnz,%
2431        nonzeros,norm,normest,null,num2str,nzmax,ode23,ode45,orient,orth,%
2432        pack,pascal,patch,path,pause,pcolor,pi,pink,pinv,plot,plot3,%
2433        pol2cart,polar,poly,polyder,polyeig,polyfit,polyval,polyvalm,%
2434        pow2,print,printopt,prism,prod,pwd,qr,qrdelete,qrinsert,quad,%
2435        quad8,quit,quiver,qz,rand,randn,randperm,rank,rat,rats,rbbox,%
2436        rcond,real,realmax,realmin,refresh,rem,reset,reshape,residue,%
2437        return,rgb2hsv,rgbplot,rootobject,roots,rose,rosser,rot90,rotate,%
2438        round,rref,rrefmovie,rsf2csf,save,saxis,schur,sec,sech,semilogx,%
2439        semilogy,set,setstr,shading,sign,sin,sinh,size,slice,sort,sound,%
2440        spalloc,sparse,spaugment,spconvert,spdiags,specular,speye,spfun,%
2441        sph2cart,sphere,spinmap,spline,spones,spparms,sprandn,sprandsym,%
2442        sprank,sprintf,spy,sqrt,sqrtm,sscanf,stairs,startup,std,stem,%
2443        str2mat,str2num,strcmp,strings,strrep,strtok,subplot,subscribe,%
2444        subspace,sum,surf,surface,surfc,surfl,surfnorm,svd,symbfact,%
2445        symmmd,symrcm,tan,tanh,tempdir,tempname,terminal,text,tic,title,%
2446        toc,toeplitz,trace,trapz,tril,triu,type,uicontrol,uigetfile,%
2447        uimenu,uiputfile,unix,unwrap,upper,vander,ver,version,view,%
2448        viewmtx,waitforbuttonpress,waterfall,wavread,wavwrite,what,%
2449        whatsnew,which,while,white,whitebg,who,whos,wilkinson,wk1read,%
2450        wk1write,xlabel,xor,ylabel,zeros,zlabel,zoom},%
2451    sensitive,%
2452    morecomment=[l]\%,%
2453    morestring=[m]'%
2454  }[keywords,comments,strings]
```

2455 ⟨/lang1⟩

## 2.43   Mathematica

Michael Wiese typed in all the keywords for the 1.0 and 3.0 versions. Oliver Ruebenkoenig wrote a script to generate the lists for the 5.2 version. Simon Pearce provided the list of keywords for Mathematica 11.0.

2456 ⟨∗lang1⟩

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2457 \lst@definelanguage[11.0]{Mathematica}[5.2]{Mathematica}{%
2458   morekeywords={
2459     "AASTriangle", "AbelianGroup", "Abort", "AbortKernels",%
2460     "AbortProtect", "AbortScheduledTask", "Above", "Abs", "AbsArg",%
2461     "Absolute", "AbsoluteCorrelation", "AbsoluteCorrelationFunction",%
2462     "AbsoluteCurrentValue", "AbsoluteDashing", "AbsoluteFileName",%
2463     "AbsoluteOptions", "AbsolutePointSize", "AbsoluteThickness",%
2464     "AbsoluteTime", "AbsoluteTiming", "AccountingForm", "Accumulate",%
2465     "Accuracy", "AccuracyGoal", "ActionDelay", "ActionMenu",%
2466     "ActionMenuBox", "ActionMenuBoxOptions", "Activate", "Active",%
2467     "ActiveItem", "ActiveStyle", "AcyclicGraphQ", "AddOnHelpPath",%
2468     "AddTo", "AddUsers", "AdjacencyGraph", "AdjacencyList",%
2469     "AdjacencyMatrix", "AdjustmentBox", "AdjustmentBoxOptions",%
2470     "AdjustTimeSeriesForecast", "AdministrativeDivisionData",%
2471     "AffineHalfSpace", "AffineSpace", "AffineStateSpaceModel",%
2472     "AffineTransform", "After", "AircraftData", "AirportData",%
2473     "AirPressureData", "AirTemperatureData", "AiryAi", "AiryAiPrime",%
2474     "AiryAiZero", "AiryBi", "AiryBiPrime", "AiryBiZero",%
2475     "AlgebraicIntegerQ", "AlgebraicNumber", "AlgebraicNumberDenominator",%
2476     "AlgebraicNumberNorm", "AlgebraicNumberPolynomial",%
2477     "AlgebraicNumberTrace", "AlgebraicRules", "AlgebraicRulesData",%
2478     "Algebraics", "AlgebraicUnitQ", "Alignment", "AlignmentMarker",%
2479     "AlignmentPoint", "All", "AllowedDimensions", "AllowedHeads",%
2480     "AllowGroupClose", "AllowIncomplete", "AllowInlineCells",%
2481     "AllowKernelInitialization", "AllowLooseGrammar",%
2482     "AllowReverseGroupClose", "AllowScriptLevelChange", "AllTrue",%
2483     "Alphabet", "AlphabeticOrder", "AlphabeticSort", "AlphaChannel",%
2484     "AlternateImage", "AlternatingFactorial", "AlternatingGroup",%
2485     "AlternativeHypothesis", "Alternatives", "AltitudeMethod",%
2486     "AmbientLight", "AmbiguityFunction", "AmbiguityList", "Analytic",%
2487     "AnatomyData", "AnatomyForm", "AnatomyPlot3D", "AnchoredSearch",%
2488     "And", "AndersonDarlingTest", "AngerJ", "AngleBracket", "AnglePath",%
2489     "AngleVector", "AngularGauge", "Animate", "AnimationCycleOffset",%
2490     "AnimationCycleRepetitions", "AnimationDirection",%
2491     "AnimationDisplayTime", "AnimationRate", "AnimationRepetitions",%
2492     "AnimationRunning", "AnimationRunTime", "AnimationTimeIndex",%
2493     "Animator", "AnimatorBox", "AnimatorBoxOptions", "AnimatorElements",%
2494     "Annotation", "Annuity", "AnnuityDue", "Annulus", "Anonymous",%
2495     "Antialiasing", "AntihermitianMatrixQ", "Antisymmetric",%
2496     "AntisymmetricMatrixQ", "AnyOrder", "AnySubset", "AnyTrue", "Apart",%
2497     "ApartSquareFree", "APIFunction", "Appearance", "AppearanceElements",%
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2498    "AppearanceRules", "AppellF1", "Append", "AppendTo", "Apply",%
2499    "ArcCos", "ArcCosh", "ArcCot", "ArcCoth", "ArcCsc", "ArcCsch",%
2500    "ArcCurvature", "ARCHProcess", "ArcLength", "ArcSec", "ArcSech",%
2501    "ArcSin", "ArcSinDistribution", "ArcSinh", "ArcTan", "ArcTanh",%
2502    "Area", "Arg", "ArgMax", "ArgMin", "ArgumentCountQ", "ARIMAProcess",%
2503    "ArithmeticGeometricMean", "ARMAProcess", "ARProcess", "Array",%
2504    "ArrayComponents", "ArrayDepth", "ArrayFilter", "ArrayFlatten",%
2505    "ArrayMesh", "ArrayPad", "ArrayPlot", "ArrayQ", "ArrayResample",%
2506    "ArrayReshape", "ArrayRules", "Arrays", "Arrow", "Arrow3DBox",%
2507    "ArrowBox", "Arrowheads", "ASATriangle", "Ask", "AskAppend",%
2508    "AskConfirm", "AskDisplay", "AskedQ", "AskedValue", "AskFunction",%
2509    "AskTemplateDisplay", "AspectRatio", "AspectRatioFixed", "Assert",%
2510    "AssociateTo", "Association", "AssociationFormat", "AssociationMap",%
2511    "AssociationQ", "AssociationThread", "AssumeDeterministic",%
2512    "Assuming", "Assumptions", "AstronomicalData",%
2513    "AsymptoticOutputTracker", "Asynchronous", "AsynchronousTaskObject",%
2514    "AsynchronousTasks", "AtomQ", "Attributes", "Audio", "AudioAmplify",%
2515    "AudioBlockMap", "AudioChannelCombine", "AudioChannelMix",%
2516    "AudioChannels", "AudioChannelSeparate", "AudioData", "AudioDelay",%
2517    "AudioDelete", "AudioDevice", "AudioFade", "AudioFrequencyShift",%
2518    "AudioGenerator", "AudioIntervals", "AudioJoin", "AudioLabel",%
2519    "AudioLength", "AudioLocalMeasurements", "AudioMeasurements",%
2520    "AudioNormalize", "AudioOverlay", "AudioPad", "AudioPan",%
2521    "AudioPartition", "AudioPitchShift", "AudioPlot", "AudioQ",%
2522    "AudioResample", "AudioReverb", "AudioSampleRate", "AudioSplit",%
2523    "AudioTimeStretch", "AudioTrim", "AudioType",%
2524    "AugmentedSymmetricPolynomial", "Authentication", "AutoAction",%
2525    "Autocomplete", "AutocompletionFunction", "AutoCopy",%
2526    "AutocorrelationTest", "AutoDelete", "AutoEvaluateEvents",%
2527    "AutoGeneratedPackage", "AutoIndent", "AutoIndentSpacings",%
2528    "AutoItalicWords", "AutoloadPath", "AutoMatch", "Automatic",%
2529    "AutomaticImageSize", "AutoMultiplicationSymbol",%
2530    "AutoNumberFormatting", "AutoOpenNotebooks", "AutoOpenPalettes",%
2531    "AutoRefreshed", "AutoRemove", "AutorunSequencing", "AutoScaling",%
2532    "AutoScroll", "AutoSpacing", "AutoStyleOptions", "AutoStyleWords",%
2533    "AutoSubmitting", "Axes", "AxesEdge", "AxesLabel", "AxesOrigin",%
2534    "AxesStyle", "Axis", "BabyMonsterGroupB", "Back", "Background",%
2535    "BackgroundTasksSettings", "Backslash", "Backsubstitution",%
2536    "Backward", "Ball", "Band", "BandpassFilter", "BandstopFilter",%
2537    "BarabasiAlbertGraphDistribution", "BarChart", "BarChart3D",%
2538    "BarcodeImage", "BarcodeRecognize", "BaringhausHenzeTest",%
2539    "BarLegend", "BarlowProschanImportance", "BarnesG", "BarOrigin",%
2540    "BarSpacing", "BartlettHannWindow", "BartlettWindow", "BaseForm",%
2541    "Baseline", "BaselinePosition", "BaseStyle",%
2542    "BatchNormalizationLayer", "BatchSize", "BatesDistribution",%
2543    "BattleLemarieWavelet", "BayesianMaximization",%
2544    "BayesianMaximizationObject", "BayesianMinimization",%
2545    "BayesianMinimizationObject", "Because", "BeckmannDistribution",%
2546    "Beep", "Before", "Begin", "BeginDialogPacket",%
2547    "BeginFrontEndInteractionPacket", "BeginPackage", "BellB", "BellY",%
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2548      "Below", "BenfordDistribution", "BeniniDistribution",%
2549      "BenktanderGibratDistribution", "BenktanderWeibullDistribution",%
2550      "BernoulliB", "BernoulliDistribution", "BernoulliGraphDistribution",%
2551      "BernoulliProcess", "BernsteinBasis", "BesselFilterModel", "BesselI",%
2552      "BesselJ", "BesselJZero", "BesselK", "BesselY", "BesselYZero",%
2553      "Beta", "BetaBinomialDistribution", "BetaDistribution",%
2554      "BetaNegativeBinomialDistribution", "BetaPrimeDistribution",%
2555      "BetaRegularized", "Between", "BetweennessCentrality", "BezierCurve",%
2556      "BezierCurve3DBox", "BezierCurve3DBoxOptions", "BezierCurveBox",%
2557      "BezierCurveBoxOptions", "BezierFunction", "BilateralFilter",%
2558      "Binarize", "BinaryDistance", "BinaryFormat", "BinaryImageQ",%
2559      "BinaryRead", "BinaryReadList", "BinaryWrite", "BinCounts",%
2560      "BinLists", "Binomial", "BinomialDistribution", "BinomialProcess",%
2561      "BinormalDistribution", "BiorthogonalSplineWavelet",%
2562      "BipartiteGraphQ", "BiquadraticFilterModel", "BirnbaumImportance",%
2563      "BirnbaumSaundersDistribution", "BitAnd", "BitClear", "BitGet",%
2564      "BitLength", "BitNot", "BitOr", "BitSet", "BitShiftLeft",%
2565      "BitShiftRight", "BitXor", "Black", "BlackmanHarrisWindow",%
2566      "BlackmanNuttallWindow", "BlackmanWindow", "Blank", "BlankForm",%
2567      "BlankNullSequence", "BlankSequence", "Blend", "Block", "BlockMap",%
2568      "BlockRandom", "BlomqvistBeta", "BlomqvistBetaTest", "Blue", "Blur",%
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2572      "BooleanMaxterms", "BooleanMinimize", "BooleanMinterms", "BooleanQ",%
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2574      "BooleanVariables", "BorderDimensions", "BorelTannerDistribution",%
2575      "Bottom", "BottomHatTransform", "BoundaryDiscretizeGraphics",%
2576      "BoundaryDiscretizeRegion", "BoundaryMesh", "BoundaryMeshRegion",%
2577      "BoundaryMeshRegionQ", "BoundaryStyle", "BoundedRegionQ",%
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2579      "BoxDimensions", "Boxed", "Boxes", "BoxForm", "BoxFormFormatTypes",%
2580      "BoxFrame", "BoxID", "BoxMargins", "BoxMatrix", "BoxObject",%
2581      "BoxRatios", "BoxRotation", "BoxRotationPoint", "BoxStyle",%
2582      "BoxWhiskerChart", "Bra", "BracketingBar", "BraKet",%
2583      "BrayCurtisDistance", "BreadthFirstScan", "Break", "BridgeData",%
2584      "BroadcastStationData", "Brown", "BrownForsytheTest",%
2585      "BrownianBridgeProcess", "BrowserCategory", "BSplineBasis",%
2586      "BSplineCurve", "BSplineCurve3DBox", "BSplineCurve3DBoxOptions",%
2587      "BSplineCurveBox", "BSplineCurveBoxOptions", "BSplineFunction",%
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2589      "BSplineSurface3DBoxOptions", "BubbleChart", "BubbleChart3D",%
2590      "BubbleScale", "BubbleSizes", "BuildingData", "BulletGauge",%
2591      "BusinessDayQ", "ButterflyGraph", "ButterworthFilterModel", "Button",%
2592      "ButtonBar", "ButtonBox", "ButtonBoxOptions", "ButtonCell",%
2593      "ButtonContents", "ButtonData", "ButtonEvaluator",%
2594      "ButtonExpandable", "ButtonFrame", "ButtonFunction", "ButtonMargins",%
2595      "ButtonMinHeight", "ButtonNote", "ButtonNotebook", "ButtonSource",%
2596      "ButtonStyle", "ButtonStyleMenuListing", "Byte", "ByteArray",%
2597      "ByteArrayQ", "ByteCount", "ByteOrdering", "C", "CachedValue",%
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2599        "CalendarData", "CalendarType", "Callout", "CalloutMarker",%
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2601        "CancelButton", "CandlestickChart", "CanonicalGraph",%
2602        "CanonicalName", "CanonicalWarpingCorrespondence",%
2603        "CanonicalWarpingDistance", "CantorStaircase", "Cap", "CapForm",%
2604        "CapitalDifferentialD", "Capitalize", "CapsuleShape",%
2605        "CardinalBSplineBasis", "CarlemanLinearize", "CarmichaelLambda",%
2606        "CaseOrdering", "Cases", "CaseSensitive", "Cashflow", "Casoratian",%
2607        "Catalan", "CatalanNumber", "Catch", "Catenate", "CatenateLayer",%
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2609        "CDFDeploy", "CDFInformation", "CDFWavelet", "Ceiling",%
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2624        "CenterDot", "CentralMoment", "CentralMomentGeneratingFunction",%
2625        "CForm", "ChampernowneNumber", "ChangeOptions", "ChannelBase",%
2626        "ChannelDatabin", "ChannelHistoryLength", "ChannelListen",%
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2628        "ChannelObject", "ChannelPreSendFunction", "ChannelSend",%
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2633        "ChartElementData", "ChartElementDataFunction",%
2634        "ChartElementFunction", "ChartElements", "ChartLabels",%
2635        "ChartLayout", "ChartLegends", "ChartStyle", "Chebyshev1FilterModel",%
2636        "Chebyshev2FilterModel", "ChebyshevDistance", "ChebyshevT",%
2637        "ChebyshevU", "Check", "CheckAbort", "CheckAll", "Checkbox",%
2638        "CheckboxBar", "CheckboxBox", "CheckboxBoxOptions", "ChemicalData",%
2639        "ChessboardDistance", "ChiDistribution", "ChineseRemainder",%
2640        "ChiSquareDistribution", "ChoiceButtons", "ChoiceDialog",%
2641        "CholeskyDecomposition", "Chop", "ChromaticityPlot",%
2642        "ChromaticityPlot3D", "ChromaticPolynomial", "Circle", "CircleBox",%
2643        "CircleDot", "CircleMinus", "CirclePlus", "CirclePoints",%
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2646        "CircularQuaternionMatrixDistribution",%
2647        "CircularRealMatrixDistribution",%
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2653        "ClearCookies", "ClearPermissions", "ClearSystemCache",%
2654        "ClebschGordan", "ClickPane", "Clip", "ClipboardNotebook",%
2655        "ClipFill", "ClippingStyle", "ClipPlanes", "ClipPlanesStyle",%
2656        "ClipRange", "Clock", "ClockGauge", "ClockwiseContourIntegral",%
2657        "Close", "Closed", "CloseKernels", "ClosenessCentrality", "Closing",%
2658        "ClosingAutoSave", "ClosingEvent", "CloudAccountData", "CloudBase",%
2659        "CloudConnect", "CloudDeploy", "CloudDirectory", "CloudDisconnect",%
2660        "CloudEvaluate", "CloudExport", "CloudExpression",%
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2662        "CloudLoggingData", "CloudObject", "CloudObjectInformation",%
2663        "CloudObjectInformationData", "CloudObjects", "CloudPublish",%
2664        "CloudPut", "CloudSave", "CloudShare", "CloudSubmit", "CloudSymbol",%
2665        "ClusterClassify", "ClusterDissimilarityFunction",%
2666        "ClusteringComponents", "ClusteringTree", "CMYKColor", "Coarse",%
2667        "CodeAssistOptions", "Coefficient", "CoefficientArrays",%
2668        "CoefficientDomain", "CoefficientList", "CoefficientRules",%
2669        "CoifletWavelet", "Collect", "Colon", "ColonForm", "ColorBalance",%
2670        "ColorCombine", "ColorConvert", "ColorCoverage", "ColorData",%
2671        "ColorDataFunction", "ColorDistance", "ColorFunction",%
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2676        "ColorSlider", "ColorSpace", "ColorToneMapping", "Column",%
2677        "ColumnAlignments", "ColumnBackgrounds", "ColumnForm", "ColumnLines",%
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2679        "CometData", "CommonDefaultFormatTypes", "Commonest",%
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2681        "CommunityBoundaryStyle", "CommunityGraphPlot", "CommunityLabels",%
2682        "CommunityRegionStyle", "CompanyData", "CompatibleUnitQ",%
2683        "CompilationOptions", "CompilationTarget", "Compile", "Compiled",%
2684        "CompiledFunction", "Complement", "CompleteGraph", "CompleteGraphQ",%
2685        "CompleteKaryTree", "CompletionsListPacket", "Complex", "Complexes",%
2686        "ComplexExpand", "ComplexInfinity", "ComplexityFunction",%
2687        "ComponentMeasurements", "ComponentwiseContextMenu", "Compose",%
2688        "ComposeList", "ComposeSeries", "CompositeQ", "Composition",%
2689        "CompoundElement", "CompoundExpression",%
2690        "CompoundPoissonDistribution", "CompoundPoissonProcess",%
2691        "CompoundRenewalProcess", "Compress", "CompressedData", "Condition",%
2692        "ConditionalExpression", "Conditioned", "Cone", "ConeBox",%
2693        "ConfidenceLevel", "ConfidenceRange", "ConfidenceTransform",%
2694        "ConfigurationPath", "ConformationRules", "ConformAudio",%
2695        "ConformImages", "Congruent", "ConicHullRegion",%
2696        "ConicHullRegion3DBox", "ConicHullRegionBox", "Conjugate",%
2697        "ConjugateTranspose", "Conjunction", "Connect",%
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2698    "ConnectedComponents", "ConnectedGraphComponents", "ConnectedGraphQ",%
2699    "ConnectedMeshComponents", "ConnectLibraryCallbackFunction",%
2700    "ConnesWindow", "ConoverTest", "ConsoleMessage",%
2701    "ConsoleMessagePacket", "ConsolePrint", "Constant", "ConstantArray",%
2702    "ConstantImage", "ConstantRegionQ", "Constants", "ConstellationData",%
2703    "ConstrainedMax", "ConstrainedMin", "Containing", "ContainsAll",%
2704    "ContainsAny", "ContainsExactly", "ContainsNone", "ContainsOnly",%
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2706    "ContentPadding", "ContentsBoundingBox", "ContentSelectable",%
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2708    "ContextToFileName", "Continuation", "Continue", "ContinuedFraction",%
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4066    morendkeywords={%
4067    "$Aborted", "$ActivationGroupID", "$ActivationKey",%
4068    "$ActivationUserRegistered", "$AddOnsDirectory",%
4069    "$AllowExternalChannelFunctions", "$AssertFunction", "$Assumptions",%
4070    "$AsynchronousTask", "$AudioOutputDevices", "$BaseDirectory",%
4071    "$BatchInput", "$BatchOutput", "$BoxForms", "$ByteOrdering",%
4072    "$CacheBaseDirectory", "$Canceled", "$ChannelBase",%
4073    "$CharacterEncoding", "$CharacterEncodings", "$CloudBase",%
4074    "$CloudConnected", "$CloudCreditsAvailable", "$CloudEvaluation",%
4075    "$CloudExpressionBase", "$CloudRootDirectory", "$CloudSymbolBase",%
4076    "$CloudVersion", "$CloudVersionNumber", "$CommandLine",%
4077    "$CompilationTarget", "$ConditionHold", "$ConfiguredKernels",%
4078    "$Context", "$ContextPath", "$ControlActiveSetting", "$Cookies",%
4079    "$CookieStore", "$CreationDate", "$CurrentLink", "$DateStringFormat",%
4080    "$DefaultAudioOutputDevice", "$DefaultFont", "$DefaultFrontEnd",%
4081    "$DefaultImagingDevice", "$DefaultLocalBase", "$DefaultPath",%
4082    "$Display", "$DisplayFunction", "$DistributedContexts",%
4083    "$DynamicEvaluation", "$Echo", "$EmbedCodeEnvironments",%
4084    "$EmbeddableServices", "$EntityStores", "$Epilog",%
4085    "$EvaluationCloudObject", "$EvaluationEnvironment", "$ExportFormats",%
4086    "$Failed", "$FinancialDataSource", "$FontFamilies", "$FormatType",%
4087    "$FrontEnd", "$FrontEndSession", "$GeoEntityTypes", "$GeoLocation",%
4088    "$GeoLocationCity", "$GeoLocationCountry", "$GeoLocationPrecision",%
4089    "$GeoLocationSource", "$HistoryLength", "$HomeDirectory",%
4090    "$HTMLExportRules", "$HTTPCookies", "$HTTPRequest", "$IgnoreEOF",%
4091    "$ImageFormattingWidth", "$ImagingDevice", "$ImagingDevices",%
4092    "$ImportFormats", "$InitialDirectory", "$Input", "$InputFileName",%
4093    "$InputStreamMethods", "$Inspector", "$InstallationDate",%
4094    "$InstallationDirectory", "$InterfaceEnvironment",%
4095    "$InterpreterTypes", "$IterationLimit", "$KernelCount", "$KernelID",%
4096    "$Language", "$LaunchDirectory", "$LibraryPath",%
4097    "$LicenseExpirationDate", "$LicenseID", "$LicenseProcesses",%
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4099      "$Linked", "$LinkSupported", "$LoadedFiles", "$LocalBase",%
4100      "$LocalSymbolBase", "$MachineAddresses", "$MachineDomain",%
4101      "$MachineDomains", "$MachineEpsilon", "$MachineID", "$MachineName",%
4102      "$MachinePrecision", "$MachineType", "$MaxExtraPrecision",%
4103      "$MaxLicenseProcesses", "$MaxLicenseSubprocesses",%
4104      "$MaxMachineNumber", "$MaxNumber", "$MaxPiecewiseCases",%
4105      "$MaxPrecision", "$MaxRootDegree", "$MessageGroups", "$MessageList",%
4106      "$MessagePrePrint", "$Messages", "$MinMachineNumber", "$MinNumber",%
4107      "$MinorReleaseNumber", "$MinPrecision", "$ModuleNumber",%
4108      "$NetworkLicense", "$NewMessage", "$NewSymbol", "$Notebooks",%
4109      "$NumberMarks", "$Off", "$OperatingSystem", "$Output",%
4110      "$OutputForms", "$OutputSizeLimit", "$OutputStreamMethods",%
4111      "$Packages", "$ParentLink", "$ParentProcessID", "$PasswordFile",%
4112      "$PatchLevelID", "$Path", "$PathnameSeparator", "$PerformanceGoal",%
4113      "$Permissions", "$PermissionsGroupBase", "$PhoneNumber",%
4114      "$PipeSupported", "$PlotTheme", "$Post", "$Pre",%
4115      "$PreferencesDirectory", "$PrePrint", "$PreRead", "$PrintForms",%
4116      "$PrintLiteral", "$Printout3DPreviewer", "$ProcessID",%
4117      "$ProcessorCount", "$ProcessorType", "$ProductInformation",%
4118      "$ProgramName", "$RandomState", "$RecursionLimit",%
4119      "$RegisteredDeviceClasses", "$RegisteredUserName", "$ReleaseNumber",%
4120      "$RequesterAddress", "$RequesterWolframID", "$RequesterWolframUUID",%
4121      "$RootDirectory", "$ScheduledTask", "$ScriptCommandLine",%
4122      "$ScriptInputString", "$Services", "$SessionID", "$SetParentLink",%
4123      "$SharedFunctions", "$SharedVariables", "$SMSDestination",%
4124      "$SoundDisplay", "$SoundDisplayFunction", "$SourceLink",%
4125      "$SuppressInputFormHeads", "$SynchronousEvaluation",%
4126      "$SyntaxHandler", "$System", "$SystemCharacterEncoding", "$SystemID",%
4127      "$SystemMemory", "$SystemShell", "$SystemTimeZone",%
4128      "$SystemWordLength", "$TemplatePath", "$TemporaryDirectory",%
4129      "$TemporaryPrefix", "$TextStyle", "$TimedOut", "$TimeUnit",%
4130      "$TimeZone", "$TimeZoneEntity", "$TopDirectory", "$TraceOff",%
4131      "$TraceOn", "$TracePattern", "$TracePostAction", "$TracePreAction",%
4132      "$UnitSystem", "$Urgent", "$UserAddOnsDirectory",%
4133      "$UserAgentLanguages", "$UserAgentMachine", "$UserAgentName",%
4134      "$UserAgentOperatingSystem", "$UserAgentString", "$UserAgentVersion",%
4135      "$UserBaseDirectory", "$UserDocumentsDirectory", "$UserName",%
4136      "$Version", "$VersionNumber", "$WolframID", "$WolframUUID"%
4137   }%
4138 }

4139 \lst@definelanguage[5.2]{Mathematica}[3.0]{Mathematica}{%
4140   morekeywords={Above, AbsoluteOptions, AbsoluteTiming, AccountingForm,%
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4142      AdjustmentBoxOptions, After, AiryAiPrime, AlgebraicRulesData,%
4143      Algebraics, Alias, AlignmentMarker, AllowInlineCells,%
4144      AllowScriptLevelChange, Analytic, AnimationCycleOffset,%
4145      AnimationCycleRepetitions, AnimationDirection, AnimationDisplayTime,%
4146      ApartSquareFree, AppellF1, ArgumentCountQ, ArrayDepth, ArrayPlot,%
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4147    ArrayQ, ArrayRules, AspectRatioFixed, Assuming, Assumptions,%
4148    AutoDelete, AutoEvaluateEvents, AutoGeneratedPackage, AutoIndent,%
4149    AutoIndentSpacings, AutoItalicWords, AutoloadPath, AutoOpenNotebooks,%
4150    AutoOpenPalettes, AutoScroll, AutoSpacing, AutoStyleOptions, Axis,%
4151    BackgroundTasksSettings, Backsubstitution, Backward, Baseline, Before,%
4152    BeginDialogPacket, BeginFrontEndInteractionPacket, Below, BezoutMatrix,%
4153    BinaryFormat, BinaryGet, BinaryRead, BinaryReadList, BinaryWrite,%
4154    BitAnd, BitNot, BitOr, BitXor, Black, BlankForm, Blue, Boole, Booleans,%
4155    Bottom, Bounds, Box, BoxBaselineShift, BoxData, BoxDimensions,%
4156    BoxFormFormatTypes, BoxFrame, BoxMargins, BoxRegion, Brown, Buchberger,%
4157    Button, ButtonBox, ButtonBoxOptions, ButtonCell, ButtonContents,%
4158    ButtonData, ButtonEvaluator, ButtonExpandable, ButtonFrame,%
4159    ButtonFunction, ButtonMargins, ButtonMinHeight, ButtonNote,%
4160    ButtonNotebook, ButtonSource, ButtonStyle, ButtonStyleMenuListing,%
4161    ByteOrdering, CallPacket, CarmichaelLambda, Cell, CellAutoOverwrite,%
4162    CellBaseline, CellBoundingBox, CellBracketOptions, CellContents,%
4163    CellDingbat, CellEditDuplicate, CellElementsBoundingBox,%
4164    CellElementSpacings, CellEvaluationDuplicate, CellFrame,%
4165    CellFrameColor, CellFrameLabelMargins, CellFrameLabels,%
4166    CellFrameMargins, CellGroup, CellGroupData, CellGrouping,%
4167    CellGroupingRules, CellHorizontalScrolling, CellLabel,%
4168    CellLabelAutoDelete, CellLabelMargins, CellLabelPositioning,%
4169    CellMargins, CellObject, CellOpen, CellPasswords, CellPrint, CellSize,%
4170    CellStyle, CellTags, CellularAutomaton, Center, CharacterEncoding,%
4171    CharacterEncodingsPath, CharacteristicPolynomial, CharacterRange,%
4172    CheckAll, CholeskyDecomposition, Clip, ClipboardNotebook, Closed,%
4173    ClosingAutoSave, CoefficientArrays, CoefficientDomain,%
4174    CofactorExpansion, ColonForm, ColorFunctionScaling, ColorRules,%
4175    ColorSelectorSettings, Column, ColumnAlignments, ColumnLines,%
4176    ColumnsEqual, ColumnSpacings, ColumnWidths, CommonDefaultFormatTypes,%
4177    CompileOptimizations, CompletionsListPacket, Complexes,%
4178    ComplexityFunction, Compose, ComposeSeries, ConfigurationPath,%
4179    ConjugateTranspose, Connect, ConsoleMessage, ConsoleMessagePacket,%
4180    ConsolePrint, ContentsBoundingBox, ContextToFileName,%
4181    ContinuedFraction, ConversionOptions, ConversionRules,%
4182    ConvertToBitmapPacket, ConvertToPostScript, ConvertToPostScriptPacket,%
4183    Copyable, CoshIntegral, CounterAssignments, CounterBox,%
4184    CounterBoxOptions, CounterEvaluator, CounterFunction,%
4185    CounterIncrements, CounterStyle, CounterStyleMenuListing,%
4186    CreatePalettePacket, Cross, CurrentlySpeakingPacket, Cyan,%
4187    CylindricalDecomposition, DampingFactor, DataRange, Debug, DebugTag,%
4188    Decimal, DedekindEta, DefaultDuplicateCellStyle, DefaultFontProperties,%
4189    DefaultFormatType, DefaultFormatTypeForStyle, DefaultInlineFormatType,%
4190    DefaultInputFormatType, DefaultNaturalLanguage, DefaultNewCellStyle,%
4191    DefaultNewInlineCellStyle, DefaultNotebook, DefaultOutputFormatType,%
4192    DefaultStyleDefinitions, DefaultTextFormatType,%
4193    DefaultTextInlineFormatType, DefaultValues, DefineExternal,%
4194    DegreeLexicographic, DegreeReverseLexicographic, Deletable,%
4195    DeleteContents, DeletionWarning, DelimiterFlashTime, DelimiterMatching,%
4196    Delimiters, DependentVariables, DiacriticalPositioning, DialogLevel,%
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4197    DifferenceOrder, DigitCharacter, DigitCount, DiracDelta, Direction,%
4198    DirectoryName, DisableConsolePrintPacket, DiscreteDelta,%
4199    DisplayAnimation, DisplayEndPacket, DisplayFlushImagePacket,%
4200    DisplayForm, DisplayPacket, DisplayRules, DisplaySetSizePacket,%
4201    DisplayString, DivisionFreeRowReduction, DOSTextFormat,%
4202    DoubleExponential, DoublyInfinite, Down, DragAndDrop, DrawHighlighted,%
4203    DualLinearProgramming, DumpGet, DumpSave, Edit, Editable,%
4204    EditButtonSettings, EditCellTagsSettings, EditDefinition, EditIn,%
4205    Element, EliminationOrder, EllipticExpPrime, EllipticNomeQ,%
4206    EllipticReducedHalfPeriods, EllipticThetaPrime, Empty,%
4207    EnableConsolePrintPacket, Encoding, EndAdd, EndDialogPacket,%
4208    EndFrontEndInteractionPacket, EndOfLine, EndOfString, Enter,%
4209    EnterExpressionPacket, EnterTextPacket, EqualColumns, EqualRows,%
4210    EquatedTo, Erfi, ErrorBox, ErrorBoxOptions, ErrorNorm, ErrorPacket,%
4211    ErrorsDialogSettings, Evaluatable, EvaluatePacket, EvaluationCell,%
4212    EvaluationCompletionAction, EvaluationMonitor, EvaluationNotebook,%
4213    Evaluator, EvaluatorNames, EventEvaluator, ExactNumberQ,%
4214    ExactRootIsolation, Except, ExcludedForms, Exists, ExitDialog,%
4215    ExponentPosition, ExponentStep, Export, ExportAutoReplacements,%
4216    ExportPacket, ExportString, ExpressionPacket, ExpToTrig, Extension,%
4217    ExternalCall, ExternalDataCharacterEncoding, Extract, Fail,%
4218    FEDisableConsolePrintPacket, FEEnableConsolePrintPacket, Fibonacci,%
4219    File, FileFormat, FileInformation, FileName, FileNameDialogSettings,%
4220    FindFit, FindInstance, FindMaximum, FindSettings, FitAll,%
4221    FlushPrintOutputPacket, Font, FontColor, FontFamily, FontName,%
4222    FontPostScriptName, FontProperties, FontReencoding, FontSize,%
4223    FontSlant, FontSubstitutions, FontTracking, FontVariations, FontWeight,%
4224    ForAll, FormatRules, FormatTypeAutoConvert, FormatValues, FormBox,%
4225    FormBoxOptions, Forward, ForwardBackward, FourierCosTransform,%
4226    FourierParameters, FourierSinTransform, FourierTransform,%
4227    FractionalPart, FractionBox, FractionBoxOptions, FractionLine,%
4228    FrameBox, FrameBoxOptions, FresnelC, FresnelS, FromContinuedFraction,%
4229    FromDigits, FrontEndExecute, FrontEndObject, FrontEndStackSize,%
4230    FrontEndToken, FrontEndTokenExecute, FrontEndVersion, Full, FullAxes,%
4231    FullSimplify, FunctionExpand, FunctionInterpolation, GaussKronrod,%
4232    GaussPoints, GenerateBitmapCaches, GenerateConditions, GeneratedCell,%
4233    GeneratedParameters, Generic, GetBoundingBoxSizePacket, GetContext,%
4234    GetFileName, GetFrontEndOptionsDataPacket,%
4235    GetLinebreakInformationPacket, GetMenusPacket,%
4236    GetPageBreakInformationPacket, Glaisher, GlobalPreferences,%
4237    GlobalSession, Gradient, GraphicsData, GraphicsGrouping, Gray, Green,%
4238    Grid, GridBaseline, GridBox, GridBoxOptions, GridCreationSettings,%
4239    GridDefaultElement, GridFrame, GridFrameMargins, GroupPageBreakWithin,%
4240    HarmonicNumber, Hash, HashTable, HeadCompose, HelpBrowserLookup,%
4241    HelpBrowserNotebook, HelpBrowserSettings, HessenbergDecomposition,%
4242    Hessian, HoldAllComplete, HoldComplete, HoldPattern, Horizontal,%
4243    HorizontalForm, HorizontalScrollPosition, HTMLSave,%
4244    Hypergeometric0F1Regularized, Hypergeometric1F1Regularized,%
4245    Hypergeometric2F1Regularized, HypergeometricPFQ,%
4246    HypergeometricPFQRegularized, HyperlinkCreationSettings, Hyphenation,%
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4247    HyphenationOptions, IgnoreCase, ImageCache, ImageCacheValid,%
4248    ImageMargins, ImageOffset, ImageRangeCache, ImageRegion,%
4249    ImageResolution, ImageRotated, ImageSize, Import,%
4250    ImportAutoReplacements, ImportString, IncludeFileExtension,%
4251    IncludeSingularTerm, IndentingNewlineSpacings, IndentMaxFraction,%
4252    IndexCreationOptions, Inequality, InexactNumberQ, InexactNumbers,%
4253    Inherited, InitializationCell, InitializationCellEvaluation,%
4254    InitializationCellWarning, InlineCounterAssignments,%
4255    InlineCounterIncrements, InlineRules, InputAliases, InputAutoFormat,%
4256    InputAutoReplacements, InputGrouping, InputNamePacket, InputNotebook,%
4257    InputPacket, InputSettings, InputStringPacket, InputToBoxFormPacket,%
4258    InputToInputForm, InputToStandardForm, InsertionPointObject,%
4259    IntegerExponent, IntegerPart, Integers, Interactive, Interlaced,%
4260    InterpolationOrder, InterpolationPoints, InterpolationPrecision,%
4261    InterpretationBox, InterpretationBoxOptions, InterpretTemplate,%
4262    InterruptSettings, Interval, IntervalIntersection, IntervalMemberQ,%
4263    IntervalUnion, InverseBetaRegularized, InverseEllipticNomeQ,%
4264    InverseErf, InverseErfc, InverseFourierCosTransform,%
4265    InverseFourierSinTransform, InverseFourierTransform,%
4266    InverseGammaRegularized, InverseJacobiCD, InverseJacobiCN,%
4267    InverseJacobiCS, InverseJacobiDC, InverseJacobiDN, InverseJacobiDS,%
4268    InverseJacobiNC, InverseJacobiND, InverseJacobiNS, InverseJacobiSC,%
4269    InverseJacobiSD, InverseLaplaceTransform, InverseWeierstrassP,%
4270    InverseZTransform, Jacobian, JacobiCD, JacobiCN, JacobiCS, JacobiDC,%
4271    JacobiDN, JacobiDS, JacobiNC, JacobiND, JacobiNS, JacobiSC, JacobiSD,%
4272    JordanDecomposition, K, Khinchin, KleinInvariantJ, KroneckerDelta,%
4273    Language, LanguageCategory, LaplaceTransform, Larger, Launch,%
4274    LayoutInformation, Left, LetterCharacter, Lexicographic, LicenseID,%
4275    LimitsPositioning, LimitsPositioningTokens, LinearSolveFunction,%
4276    LinebreakAdjustments, LineBreakWithin, LineForm, LineIndent,%
4277    LineSpacing, LineWrapParts, LinkActivate, LinkClose, LinkConnect,%
4278    LinkConnectedQ, LinkCreate, LinkError, LinkFlush, LinkHost,%
4279    LinkInterrupt, LinkLaunch, LinkMode, LinkObject, LinkOpen, LinkOptions,%
4280    LinkPatterns, LinkProtocol, LinkRead, LinkReadHeld, LinkReadyQ, Links,%
4281    LinkWrite, LinkWriteHeld, ListConvolve, ListCorrelate, Listen,%
4282    ListInterpolation, ListQ, LiteralSearch, LongestMatch, LongForm,%
4283    Loopback, LUBackSubstitution, LUDecomposition, MachineID, MachineName,%
4284    MachinePrecision, MacintoshSystemPageSetup, Magenta, Magnification,%
4285    MakeBoxes, MakeExpression, MakeRules, Manual, MatchLocalNameQ,%
4286    MathematicaNotation, MathieuC, MathieuCharacteristicA,%
4287    MathieuCharacteristicB, MathieuCharacteristicExponent, MathieuCPrime,%
4288    MathieuS, MathieuSPrime, MathMLForm, MathMLText, MatrixRank, Maximize,%
4289    MaxIterations, MaxPlotPoints, MaxPoints, MaxRecursion, MaxStepFraction,%
4290    MaxSteps, MaxStepSize, Mean, Median, MeijerG, MenuPacket,%
4291    MessageOptions, MessagePacket, MessagesNotebook, MetaCharacters,%
4292    Method, MethodOptions, Minimize, MinRecursion, MinSize, Mode,%
4293    ModularLambda, MonomialOrder, MonteCarlo, Most, MousePointerNote,%
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4296    NeedCurrentFrontEndPackagePacket, NeedCurrentFrontEndSymbolsPacket,%
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4297     NestedScriptRules, NestWhile, NestWhileList, NevilleThetaC,%
4298     NevilleThetaD, NevilleThetaN, NevilleThetaS, Newton, Next, NHoldAll,%
4299     NHoldFirst, NHoldRest, NMaximize, NMinimize, NonAssociative,%
4300     NonPositive, Nor, Norm, NormalGrouping, NormalSelection, NormFunction,%
4301     Notebook, NotebookApply, NotebookAutoSave, NotebookClose,%
4302     NotebookConvert, NotebookConvertSettings, NotebookCreate,%
4303     NotebookCreateReturnObject, NotebookDefault, NotebookDelete,%
4304     NotebookDirectory, NotebookFind, NotebookFindReturnObject, NotebookGet,%
4305     NotebookGetLayoutInformationPacket, NotebookGetMisspellingsPacket,%
4306     NotebookInformation, NotebookLocate, NotebookObject, NotebookOpen,%
4307     NotebookOpenReturnObject, NotebookPath, NotebookPrint, NotebookPut,%
4308     NotebookPutReturnObject, NotebookRead, NotebookResetGeneratedCells,%
4309     Notebooks, NotebookSave, NotebookSaveAs, NotebookSelection,%
4310     NotebookSetupLayoutInformationPacket, NotebooksMenu, NotebookWrite,%
4311     NotElement, NProductExtraFactors, NProductFactors, NRoots,%
4312     NSumExtraTerms, NSumTerms, NumberMarks, NumberMultiplier, NumberString,%
4313     NumericFunction, NumericQ, NValues, Offset, OLEData,%
4314     OneStepRowReduction, Open, OpenFunctionInspectorPacket,%
4315     OpenSpecialOptions, OptimizationLevel, OptionInspectorSettings,%
4316     OptionQ, OptionsPacket, OptionValueBox, OptionValueBoxOptions, Orange,%
4317     Ordering, Oscillatory, OutputAutoOverwrite, OutputFormData,%
4318     OutputGrouping, OutputMathEditExpression, OutputNamePacket,%
4319     OutputToOutputForm, OutputToStandardForm, Over, Overflow, Overlaps,%
4320     Overscript, OverscriptBox, OverscriptBoxOptions, OwnValues, PadLeft,%
4321     PadRight, PageBreakAbove, PageBreakBelow, PageBreakWithin,%
4322     PageFooterLines, PageFooters, PageHeaderLines, PageHeaders,%
4323     PalettePath, PaperWidth, ParagraphIndent, ParagraphSpacing,%
4324     ParameterVariables, ParentConnect, ParentForm, Parenthesize,%
4325     PasteBoxFormInlineCells, Path, PatternTest, PeriodicInterpolation,%
4326     Pick, Piecewise, PiecewiseExpand, Pink, Pivoting, PixelConstrained,%
4327     Placeholder, Plain, Plot3Matrix, PointForm, PolynomialForm,%
4328     PolynomialReduce, Polynomials, PowerModList, Precedence,%
4329     PreferencesPath, PreserveStyleSheet, Previous, PrimaryPlaceholder,%
4330     Primes, PrincipalValue, PrintAction, PrintingCopies, PrintingOptions,%
4331     PrintingPageRange, PrintingStartingPageNumber,%
4332     PrintingStyleEnvironment, PrintPrecision, PrivateCellOptions,%
4333     PrivateEvaluationOptions, PrivateFontOptions, PrivateNotebookOptions,%
4334     PrivatePaths, ProductLog, PromptForm, Purple, Quantile,%
4335     QuasiMonteCarlo, QuasiNewton, RadicalBox, RadicalBoxOptions,%
4336     RandomSeed, RationalFunctions, Rationals, RawData, RawMedium,%
4337     RealBlockForm, Reals, Reap, Red, Refine, Refresh, RegularExpression,%
4338     Reinstall, Release, Removed, RenderingOptions, RepeatedString,%
4339     ReplaceList, Rescale, ResetMenusPacket, Resolve, ResumePacket,%
4340     ReturnExpressionPacket, ReturnInputFormPacket, ReturnPacket,%
4341     ReturnTextPacket, Right, Root, RootReduce, RootSum, Row, RowAlignments,%
4342     RowBox, RowLines, RowMinHeight, RowsEqual, RowSpacings, RSolve,%
4343     RuleCondition, RuleForm, RulerUnits, Saveable, SaveAutoDelete,%
4344     ScreenRectangle, ScreenStyleEnvironment, ScriptBaselineShifts,%
4345     ScriptLevel, ScriptMinSize, ScriptRules, ScriptSizeMultipliers,%
4346     ScrollingOptions, ScrollPosition, Second, SectionGrouping, Selectable,%
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4347    SelectedNotebook, Selection, SelectionAnimate, SelectionCell,%
4348    SelectionCellCreateCell, SelectionCellDefaultStyle,%
4349    SelectionCellParentStyle, SelectionCreateCell, SelectionDuplicateCell,%
4350    SelectionEvaluate, SelectionEvaluateCreateCell, SelectionMove,%
4351    SelectionSetStyle, SelectionStrategy, SendFontInformationToKernel,%
4352    SequenceHold, SequenceLimit, SeriesCoefficient, SetBoxFormNamesPacket,%
4353    SetEvaluationNotebook, SetFileLoadingContext, SetNotebookStatusLine,%
4354    SetOptionsPacket, SetSelectedNotebook, SetSpeechParametersPacket,%
4355    SetValue, ShortestMatch, ShowAutoStyles, ShowCellBracket,%
4356    ShowCellLabel, ShowCellTags, ShowClosedCellArea, ShowContents,%
4357    ShowCursorTracker, ShowGroupOpenCloseIcon, ShowPageBreaks,%
4358    ShowSelection, ShowShortBoxForm, ShowSpecialCharacters,%
4359    ShowStringCharacters, ShrinkWrapBoundingBox, SingleLetterItalics,%
4360    SingularityDepth, SingularValueDecomposition, SingularValueList,%
4361    SinhIntegral, Smaller, Socket, SolveDelayed, SoundAndGraphics, Sow,%
4362    Space, SpaceForm, SpanAdjustments, SpanCharacterRounding,%
4363    SpanLineThickness, SpanMaxSize, SpanMinSize, SpanningCharacters,%
4364    SpanSymmetric, Sparse, SparseArray, SpeakTextPacket,%
4365    SpellingDictionaries, SpellingDictionariesPath, SpellingOptions,%
4366    SpellingSuggestionsPacket, Spherical, Split, SqrtBox, SqrtBoxOptions,%
4367    StandardDeviation, StandardForm, StartingStepSize, StartOfLine,%
4368    StartOfString, StartupSound, StepMonitor, StieltjesGamma, StoppingTest,%
4369    StringCases, StringCount, StringExpression, StringFreeQ, StringQ,%
4370    StringReplaceList, StringReplacePart, StringSplit, StripBoxes,%
4371    StripWrapperBoxes, StructuredSelection, StruveH, StruveL, StyleBox,%
4372    StyleBoxAutoDelete, StyleBoxOptions, StyleData, StyleDefinitions,%
4373    StyleForm, StyleMenuListing, StyleNameDialogSettings, StylePrint,%
4374    StyleSheetPath, Subresultants, SubscriptBox, SubscriptBoxOptions,%
4375    Subsets, Subsuperscript, SubsuperscriptBox, SubsuperscriptBoxOptions,%
4376    SubtractFrom, SubValues, SugarCube, SuperscriptBox,%
4377    SuperscriptBoxOptions, SuspendPacket, SylvesterMatrix, SymbolName,%
4378    Syntax, SyntaxForm, SyntaxPacket, SystemException, SystemHelpPath,%
4379    SystemStub, Tab, TabFilling, TabSpacings, TagBox, TagBoxOptions,%
4380    TaggingRules, TagStyle, TargetFunctions, TemporaryVariable, TensorQ,%
4381    TeXSave, TextAlignment, TextBoundingBox, TextData, TextJustification,%
4382    TextLine, TextPacket, TextParagraph, TextRendering, TextStyle,%
4383    ThisLink, TimeConstraint, TimeVariable, TitleGrouping, ToBoxes,%
4384    ToColor, ToFileName, Toggle, ToggleFalse, Tolerance, TooBig, Top,%
4385    ToRadicals, Total, Tr, TraceAction, TraceInternal, TraceLevel,%
4386    TraditionalForm, TraditionalFunctionNotation, TraditionalNotation,%
4387    TraditionalOrder, TransformationFunctions, TransparentColor,%
4388    Trapezoidal, TrigExpand, TrigFactor, TrigFactorList, TrigReduce,%
4389    TrigToExp, Tuples, UnAlias, Underflow, Underoverscript,%
4390    UnderoverscriptBox, UnderoverscriptBoxOptions, Underscript,%
4391    UnderscriptBox, UnderscriptBoxOptions, UndocumentedTestFEParserPacket,%
4392    UndocumentedTestGetSelectionPacket, UnitStep, Up, URL, Using, V2Get,%
4393    Value, ValueBox, ValueBoxOptions, ValueForm, Variance, Verbatim,%
4394    Verbose, VerboseConvertToPostScriptPacket, VerifyConvergence,%
4395    VerifySolutions, Version, VersionNumber, Vertical, VerticalForm,%
4396    ViewPointSelectorSettings, Visible, VisibleCell,%
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4397      WeierstrassHalfPeriods, WeierstrassInvariants, WeierstrassSigma,%
4398      WeierstrassZeta, White, Whitespace, WhitespaceCharacter,%
4399      WindowClickSelect, WindowElements, WindowFloating, WindowFrame,%
4400      WindowFrameElements, WindowMargins, WindowMovable, WindowSize,%
4401      WindowTitle, WindowToolbars, WindowWidth, WordBoundary, WordCharacter,%
4402      WynnDegree, XMLElement},%
4403    morendkeywords={$,$AddOnsDirectory,$AnimationDisplayFunction,%
4404      $AnimationFunction,%
4405      $Assumptions,$BaseDirectory,$BoxForms,$ByteOrdering,%
4406      $CharacterEncoding,$ConditionHold,$CurrentLink,$DefaultPath,%
4407      $ExportEncodings,$ExportFormats,$FormatType,$FrontEnd,%
4408      $HistoryLength,$HomeDirectory,$ImportEncodings,$ImportFormats,%
4409      $InitialDirectory,$InstallationDate,$InstallationDirectory,%
4410      $InterfaceEnvironment,%
4411      $LaunchDirectory,$LicenseExpirationDate,$LicenseID,$LicenseProcesses,%
4412      $LicenseServer,$MachineDomain,$MaxExtraPrecision,$MaxLicenseProcesses,%
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4414      $MinNumber,$MinPrecision,$NetworkLicense,$NumberMarks,%
4415      $Off,$OutputForms,$ParentLink,$ParentProcessID,%
4416      $PasswordFile,$PathnameSeparator,$PreferencesDirectory,$PrintForms,%
4417      $PrintLiteral,$ProcessID,$ProcessorType,$ProductInformation,%
4418      $ProgramName,$PSDirectDisplay,$RandomState,$RasterFunction,%
4419      $RootDirectory,$SetParentLink,$SoundDisplay,$SuppressInputFormHeads,%
4420      $SystemCharacterEncoding,$SystemID,$TemporaryPrefix,$TextStyle,%
4421      $TopDirectory,$TraceOff,$TraceOn,$TracePattern,%
4422      $TracePostAction,$TracePreAction,$UserAddOnsDirectory,$UserBaseDirectory,%
4423      $UserName,Constant,Flat,HoldAll,%
4424      HoldAllComplete,HoldFirst,HoldRest,Listable,%
4425      Locked,NHoldAll,NHoldFirst,NHoldRest,%
4426      NumericFunction,OneIdentity,Orderless,Protected,%
4427      ReadProtected,SequenceHold},%
4428  }%

4429  %%
4430  %% Mathematica definitions (c) 1999 Michael Wiese
4431  %%
4432  \lst@definelanguage[3.0]{Mathematica}[1.0]{Mathematica}%
4433    {morekeywords={Abort,AbortProtect,AbsoluteDashing,AbsolutePointSize,%
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4435        AiryBiPrime,Alternatives,AnchoredSearch,AxesEdge,AxesOrigin,%
4436        AxesStyle,Background,BetaRegularized,BoxStyle,C,CheckAbort,%
4437        Circle,ClebschGordan,CMYKColor,ColorFunction,ColorOutput,Compile,%
4438        Compiled,CompiledFunction,ComplexExpand,ComposeList,Composition,%
4439        ConstrainedMax,ConstrainedMin,Contexts,ContextToFilename,%
4440        ContourLines,Contours,ContourShading,ContourSmoothing,%
4441        ContourStyle,CopyDirectory,CopyFile,CosIntegral,CreateDirectory,%
4442        Cuboid,Date,DeclarePackage,DefaultColor,DefaultFont,Delete,%
4443        DeleteCases,DeleteDirectory,DeleteFile,Dialog,DialogIndent,%
4444        DialogProlog,DialogSymbols,DigitQ,Directory,DirectoryStack,Disk,%
4445        Dispatch,DownValues,DSolve,Encode,Epilog,Erfc,Evaluate,%
```

```
4446      ExponentFunction,FaceGrids,FileByteCount,FileDate,FileNames,%
4447      FileType,Find,FindList,FixedPointList,FlattenAt,Fold,FoldList,%
4448      Frame,FrameLabel,FrameStyle,FrameTicks,FromCharacterCode,%
4449      FromDate,FullGraphics,FullOptions,GammaRegularized,%
4450      GaussianIntegers,GraphicsArray,GraphicsSpacing,GridLines,%
4451      GroebnerBasis,Heads,HeldPart,HomeDirectory,Hue,IgnoreCases,%
4452      InputStream,Install,InString,IntegerDigits,InterpolatingFunction,%
4453      InterpolatingPolynomial,Interpolation,Interrupt,InverseFunction,%
4454      InverseFunctions,JacobiZeta,LetterQ,LinearProgramming,ListPlay,%
4455      LogGamma,LowerCaseQ,MachineNumberQ,MantissaExponent,MapIndexed,%
4456      MapThread,MatchLocalNames,MatrixExp,MatrixPower,MeshRange,%
4457      MeshStyle,MessageList,Module,NDSolve,NSolve,NullRecords,%
4458      NullWords,NumberFormat,NumberPadding,NumberSigns,OutputStream,%
4459      PaddedForm,ParentDirectory,Pause,Play,PlayRange,PlotRegion,%
4460      PolygonIntersections,PolynomialGCD,PolynomialLCM,PolynomialMod,%
4461      PostScript,PowerExpand,PrecisionGoal,PrimePi,Prolog,%
4462      QRDecomposition,Raster,RasterArray,RealDigits,Record,RecordLists,%
4463      RecordSeparators,ReleaseHold,RenameDirectory,RenameFile,%
4464      ReplaceHeldPart,ReplacePart,ResetDirectory,Residue,%
4465      RiemannSiegelTheta,RiemannSiegelZ,RotateLabel,SameTest,%
4466      SampleDepth,SampledSoundFunction,SampledSoundList,SampleRate,%
4467      SchurDecomposition,SessionTime,SetAccuracy,SetDirectory,%
4468      SetFileDate,SetPrecision,SetStreamPosition,Shallow,SignPadding,%
4469      SinIntegral,SixJSymbol,Skip,Sound,SpellingCorrection,%
4470      SphericalRegion,Stack,StackBegin,StackComplete,StackInhibit,%
4471      StreamPosition,Streams,StringByteCount,StringConversion,%
4472      StringDrop,StringInsert,StringPosition,StringReplace,%
4473      StringReverse,StringTake,StringToStream,SurfaceColor,%
4474      SyntaxLength,SyntaxQ,TableAlignments,TableDepth,%
4475      TableDirections,TableHeadings,TableSpacing,ThreeJSymbol,TimeUsed,%
4476      TimeZone,ToCharacterCode,ToDate,ToHeldExpression,TokenWords,%
4477      ToLowerCase,ToUpperCase,Trace,TraceAbove,TraceBackward,%
4478      TraceDepth,TraceDialog,TraceForward,TraceOff,TraceOn,%
4479      TraceOriginal,TracePrint,TraceScan,Trig,Unevaluated,Uninstall,%
4480      UnsameQ,UpperCaseQ,UpValues,ViewCenter,ViewVertical,With,Word,%
4481      WordSearch,WordSeparators},%
4482    morendkeywords={Stub,Temporary,$Aborted,$BatchInput,$BatchOutput,%
4483      $CreationDate,$DefaultFont,$DumpDates,$DumpSupported,$Failed,%
4484      $Input,$Inspector,$IterationLimit,$Language,$Letters,$Linked,%
4485      $LinkSupported,$MachineEpsilon,$MachineID,$MachineName,%
4486      $MachinePrecision,$MachineType,$MaxMachineNumber,$MessageList,%
4487      $MessagePrePrint,$MinMachineNumber,$ModuleNumber,$NewMessage,%
4488      $NewSymbol,$Notebooks,$OperatingSystem,$Packages,$PipeSupported,%
4489      $PreRead,$ReleaseNumber,$SessionID,$SoundDisplayFunction,%
4490      $StringConversion,$StringOrder,$SyntaxHandler,$TimeUnit,%
4491      $VersionNumber}%
4492  }%

4493 \lst@definelanguage[1.0]{Mathematica}%
4494  {morekeywords={Abs,Accuracy,AccurayGoal,AddTo,AiryAi,AlgebraicRules,%
```

```
4495    AmbientLight,And,Apart,Append,AppendTo,Apply,ArcCos,ArcCosh,%
4496    ArcCot,ArcCoth,ArcCsc,ArcCsch,ArcSec,ArcSech,ArcSin,ArcSinh,%
4497    ArcTan,ArcTanh,Arg,ArithmeticGeometricMean,Array,AspectRatio,%
4498    AtomQ,Attributes,Axes,AxesLabel,BaseForm,Begin,BeginPackage,%
4499    BernoulliB,BesselI,BesselJ,BesselK,BesselY,Beta,Binomial,Blank,%
4500    BlankNullSequence,BlankSequence,Block,Boxed,BoxRatios,Break,Byte,%
4501    ByteCount,Cancel,Cases,Catch,Ceiling,CForm,Character,Characters,%
4502    ChebyshevT,ChebyshevU,Check,Chop,Clear,ClearAll,ClearAttributes,%
4503    ClipFill,Close,Coefficient,CoefficientList,Collect,ColumnForm,%
4504    Complement,Complex,CompoundExpression,Condition,Conjugate,%
4505    Constants,Context,Continuation,Continue,ContourGraphics,%
4506    ContourPlot,Cos,Cosh,Cot,Coth,Count,Csc,Csch,Cubics,Cyclotomic,%
4507    D,Dashing,Decompose,Decrement,Default,Definition,Denominator,%
4508    DensityGraphics,DensityPlot,Depth,Derivative,Det,DiagonalMatrix,%
4509    DigitBlock,Dimensions,DirectedInfinity,Display,DisplayFunction,%
4510    Distribute,Divide,DivideBy,Divisors,DivisorSigma,Do,Dot,Drop,Dt,%
4511    Dump,EdgeForm,Eigensystem,Eigenvalues,Eigenvectors,Eliminate,%
4512    EllipticE,EllipticExp,EllipticF,EllipticK,EllipticLog,EllipticPi,%
4513    EllipticTheta,End,EndPackage,EngineeringForm,Environment,Equal,%
4514    Erf,EulerE,EulerPhi,EvenQ,Exit,Exp,Expand,ExpandAll,%
4515    ExpandDenominator,ExpandNumerator,ExpIntegralE,ExpIntegralEi,%
4516    Exponent,Expression,ExtendedGCD,FaceForm,Factor,FactorComplete,%
4517    Factorial,Factorial2,FactorInteger,FactorList,FactorSquareFree,%
4518    FactorSquareFreeList,FactorTerms,FactorTermsList,FindMinimum,%
4519    FindRoot,First,Fit,FixedPoint,Flatten,Floor,FontForm,For,Format,%
4520    FormatType,FortranForm,Fourier,FreeQ,FullDefinition,FullForm,%
4521    Function,Gamma,GCD,GegenbauerC,General,Get,Goto,Graphics,%
4522    Graphics3D,GrayLevel,Greater,GreaterEqual,Head,HermiteH,%
4523    HiddenSurface,Hold,HoldForm,Hypergeometric0F1,Hypergeometric1F1,%
4524    Hypergeometric2F1,HypergeometricU,Identity,IdentityMatrix,If,Im,%
4525    Implies,In,Increment,Indent,Infix,Information,Inner,Input,%
4526    InputForm,InputString,Insert,Integer,IntegerQ,Integrate,%
4527    Intersection,Inverse,InverseFourier,InverseJacobiSN,%
4528    InverseSeries,JacobiAmplitude,JacobiP,JacobiSN,JacobiSymbol,Join,%
4529    Label,LaguerreL,Last,LatticeReduce,LCM,LeafCount,LegendreP,%
4530    LegendreQ,LegendreType,Length,LerchPhi,Less,LessEqual,Level,%
4531    Lighting,LightSources,Limit,Line,LinearSolve,LineBreak,List,%
4532    ListContourPlot,ListDensityPlot,ListPlot,ListPlot3D,Literal,Log,%
4533    LogicalExpand,LogIntegral,MainSolve,Map,MapAll,MapAt,MatchQ,%
4534    MatrixForm,MatrixQ,Max,MaxBend,MaxMemoryUsed,MemberQ,%
4535    MemoryConstrained,MemoryInUse,Mesh,Message,MessageName,Messages,%
4536    Min,Minors,Minus,Mod,Modulus,MoebiusMu,Multinomial,N,NameQ,Names,%
4537    NBernoulliB,Needs,Negative,Nest,NestList,NIntegrate,%
4538    NonCommutativeMultiply,NonConstants,NonNegative,Normal,Not,%
4539    NProduct,NSum,NullSpace,Number,NumberForm,NumberPoint,NumberQ,%
4540    NumberSeparator,Numerator,O,OddQ,Off,On,OpenAppend,OpenRead,%
4541    OpenTemporary,OpenWrite,Operate,Optional,Options,Or,Order,%
4542    OrderedQ,Out,Outer,OutputForm,PageHeight,PageWidth,%
4543    ParametricPlot,ParametricPlot3D,Part,Partition,PartitionsP,%
4544    PartitionsQ,Pattern,Permutations,Plot,Plot3D,PlotDivision,%
```

```
4545        PlotJoined,PlotLabel,PlotPoints,PlotRange,PlotStyle,Pochhammer,%
4546        Plus,Point,PointSize,PolyGamma,Polygon,PolyLog,PolynomialQ,%
4547        PolynomialQuotient,PolynomialRemainder,Position,Positive,Postfix,%
4548        Power,PowerMod,PrecedenceForm,Precision,PreDecrement,Prefix,%
4549        PreIncrement,Prepend,PrependTo,Prime,PrimeQ,Print,PrintForm,%
4550        Product,Protect,PseudoInverse,Put,PutAppend,Quartics,Quit,%
4551        Quotient,Random,Range,Rational,Rationalize,Raw,Re,Read,ReadList,%
4552        Real,Rectangle,Reduce,Remove,RenderAll,Repeated,RepeatedNull,%
4553        Replace,ReplaceAll,ReplaceRepeated,Rest,Resultant,Return,Reverse,%
4554        RGBColor,Roots,RotateLeft,RotateRight,Round,RowReduce,Rule,%
4555        RuleDelayed,Run,RunThrough,SameQ,Save,Scaled,Scan,ScientificForm,%
4556        Sec,Sech,SeedRandom,Select,Sequence,SequenceForm,Series,%
4557        SeriesData,Set,SetAttributes,SetDelayed,SetOptions,Shading,Share,%
4558        Short,Show,Sign,Signature,Simplify,Sin,SingularValues,Sinh,%
4559        Skeleton,Slot,SlotSequence,Solve,SolveAlways,Sort,%
4560        SphericalHarmonicY,Splice,Sqrt,StirlingS1,StirlingS2,String,%
4561        StringBreak,StringForm,StringJoin,StringLength,StringMatchQ,%
4562        StringSkeleton,Subscript,Subscripted,Subtract,SubtractForm,Sum,%
4563        Superscript,SurfaceGraphics,Switch,Symbol,Table,TableForm,TagSet,%
4564        TagSetDelayed,TagUnset,Take,Tan,Tanh,ToString,TensorRank,TeXForm,%
4565        Text,TextForm,Thickness,Thread,Through,Throw,Ticks,%
4566        TimeConstrained,Times,TimesBy,Timing,ToExpression,Together,%
4567        ToRules,ToString,TotalHeight,TotalWidth,Transpose,TreeForm,TrueQ,%
4568        Unequal,Union,Unique,Unprotect,Unset,Update,UpSet,UpSetDelayed,%
4569        ValueQ,Variables,VectorQ,ViewPoint,WeierstrassP,%
4570        WeierstrassPPrime,Which,While,WorkingPrecision,Write,WriteString,%
4571        Xor,ZeroTest,Zeta},%
4572     morendkeywords={All,Automatic,Catalan,ComplexInfinity,Constant,%
4573        Degree,E,EndOfFile,EulerGamma,False,Flat,GoldenRatio,HoldAll,%
4574        HoldFirst,HoldRest,I,Indeterminate,Infinity,Listable,Locked,%
4575        Modular,None,Null,OneIdentity,Orderless,Pi,Protected,%
4576        ReadProtected,True,$CommandLine,$Context,$ContextPath,$Display,%
4577        $DisplayFunction,$Echo,$Epilog,$IgnoreEOF,$Line,$Messages,%
4578        $Output,$Path,$Post,$Pre,$PrePrint,$RecursionLimit,$System,%
4579        $Urgent,$Version},%
4580     sensitive,%
4581     morecomment=[s]{(*}{*)},%
4582     morestring=[d]"%
4583   }[keywords,comments,strings]
```

4584 ⟨/lang1⟩

## 2.44  Mercury

Dominique de Waleffe mailed me the data and Ralph Becket extended the definition.

4585 ⟨∗lang2⟩

```
4586 %%
4587 %% Mercury definition (c) 1997 Dominique de Waleffe
```

```
4588 %% Extended (c) 2001 Ralph Becket
4589 %%
4590 \lst@definelanguage{Mercury}%
4591   {otherkeywords={::,->,-->,--->,:-,==,=>,<=,<=>},%
4592    morekeywords={module,include_module,import_module,interface,%
4593        end_module,implementation,mode,is,failure,semidet,nondet,det,%
4594        multi,erroneous,inst,in,out,di,uo,ui,type,typeclass,instance,%
4595        where,with_type,pred,func,lambda,impure,semipure,if,then,else,%
4596        some,all,not,true,fail,pragma,memo,no_inline,inline,loop_check,%
4597        minimal_model,fact_table,type_spec,terminates,does_not_terminate,%
4598        check_termination,promise_only_solution,unsafe_promise_unique,%
4599        source_file,obsolete,import,export,c_header_code,c_code,%
4600        foreign_code,foreign_proc,may_call_mercury,will_not_call_mercury,%
4601        thread_safe,not_thread_safe},%
4602    sensitive=t,%
4603    morecomment=[l]\%,%
4604    morecomment=[s]{/*}{*/},%
4605    morestring=[bd]",%
4606    morestring=[bd]'%
4607   }[keywords,comments,strings]

4608 ⟨/lang2⟩
```

## 2.45 MetaPost

Uwe Siart provided the keywords for a previous version. The current language definition comes from Brooks Moses.

```
4609 ⟨*lang3⟩

4610 %%
4611 %% MetaPost definition (c) 2004 Brooks Moses
4612 %%   This definition is based on the language specifications
4613 %%   contained in the _User's Manual for Metapost_, with the core
4614 %%   language enhancements that are described in the _Drawing
4615 %%   Graphs with MetaPost_ documentation.
4616 %%
4617 \lst@definelanguage{MetaPost}%
4618   {% keywords[1] = MetaPost primitives (not found in following tables)
4619    morekeywords={end,begingroup,endgroup,beginfig,endfig,def,vardef,%
4620        primary,secondary,tertiary,primarydef,secondarydef,tertiarydef,%
4621        expr,suffix,text,enddef,if,fi,else,elseif,for,forsuffixes,%
4622        forever,endfor,upto,downto,stop,until,tension,controls,on,off,%
4623        btex,etex,within,input},
4624    % keywords[2] = Operators (Tables 6-9 in MetaPost User's manual)
4625    morekeywords=[2]{abs,and,angle,arclength,arctime,ASCII,bbox,bluepart,%
4626        boolean,bot,ceiling,center,char,color,cosd,cutafter,cutbefore,%
4627        cycle,decimal,dir,direction,directionpoint,directiontime,div,%
4628        dotprod,floor,fontsize,greenpart,hex,infont,intersectionpoint,%
4629        intersectiontimes,inverse,known,length,lft,llcorner,lrcorner,%
4630        makepath,makepen,mexp,mlog,mod,normaldeviate,not,numeric,oct,%
```

109

```
4631        odd,or,pair,path,pen,penoffset,picture,point,postcontrol,%
4632        precontrol,redpart,reverse,rotated,round,rt,scaled,shifted,%
4633        sind,slanted,sqrt,str,string,subpath,substring,top,transform,%
4634        transformed,ulcorner,uniformdeviate,unitvector,unknown,%
4635        urcorner,whatever,xpart,xscaled,xxpart,xypart,ypart,yscaled,%
4636        yxpart,yypart,zscaled,of,reflectedabout,rotatedaround,ulft,urt,%
4637        llft,lrt,readfrom,write,stroked,filled,textual,clipped,bounded,%
4638        pathpart,penpart,dashpart,textpart,fontpart},%
4639     % keywords[3] = Commands (Table 10)
4640     morekeywords=[3]{addto,clip,cutdraw,draw,drawarrow,drawdblarrow,%
4641        fill,filldraw,interim,let,loggingall,newinternal,pickup,%
4642        save,setbounds,shipout,show,showdependencies,showtoken,%
4643        showvariable,special,tracingall,tracingnone,undraw,unfill,%
4644        unfilldraw,to,also,contour,doublepath,withcolor,withpen,%
4645        dashed,randomseed},%
4646     % keywords[4] = Function-Like Macros (Table 11)
4647     morekeywords=[4]{boxit,boxjoin,bpath,buildcycle,circleit,dashpattern,%
4648        decr,dotlabel,dotlabels,drawboxed,drawboxes,drawoptions,%
4649        drawunboxed,fixpos,fixsize,incr,interpath,label,labels,max,min,pic,%
4650        thelabel,z,image},%
4651     % keywords[5] = Internal and Predefined Variables (Tables 3, 4)
4652     morekeywords=[5]{ahangle,ahlength,bboxmargin,charcode,circmargin,%
4653        day,defaultdx,defaultdy,defaultpen,defaultscale,labeloffset,%
4654        linecap,linejoin,miterlimit,month,pausing,prologues,showstopping,%
4655        time,tracingcapsules,tracingchoices,tracingcommands,%
4656        tracingequations,tracinglostchars,tracingmacros,tracingonline,%
4657        tracingoutput,tracingrestores,tracingspecs,tracingstats,%
4658        tracingtitles,truecorners,warningcheck,year},
4659     morekeywords=[5]{background,currentpen,currentpicture,cuttings,%
4660        defaultfont},%
4661     % keywords[6] = Predefined Constants (Table 5)
4662     morekeywords=[6]{beveled,black,blue,bp,butt,cc,cm,dd,ditto,down,%
4663        epsilon,evenly,false,fullcircle,green,halfcircle,identity,%
4664        in,infinity,left,mitered,mm,nullpicture,origin,pc,pencircle,%
4665        pt,quartercircle,red,right,rounded,squared,true,unitsquare,%
4666        up,white,withdots},
4667     sensitive=false,%
4668     alsoother={0123456789$},%
4669     morecomment=[l]\%,%
4670     morestring=[mf]{input\ },%
4671     morestring=[b]"%
4672   }[keywords,comments,strings,mf]%

4673 ⟨/lang3⟩
```

## 2.46   Miranda

Thanks to Peter Bartke for providing the definition.

```
4674 ⟨*lang2⟩
```

```
4675 %%
4676 %% Miranda definition (c) 1998 Peter Bartke
4677 %%
4678 %% Miranda: pure lazy functional language with polymorphic type system,
4679 %%          garbage collection and functions as first class citizens
4680 %%
4681 \lst@definelanguage{Miranda}%
4682   {morekeywords={abstype,div,if,mod,otherwise,readvals,show,type,where,%
4683     with,bool,char,num,sys_message,False,True,Appendfile,Closefile,%
4684     Exit,Stderr,Stdout,System,Tofile,\%include,\%export,\%free,%
4685     \%insert,abs,and,arctan,cjustify,code,concat,const,converse,cos,%
4686     decode,digit,drop,dropwhile,entier,error,exp,filemode,filter,%
4687     foldl,foldl1,foldr,foldr1,force,fst,getenv,hd,hugenum,id,index,%
4688     init,integer,iterate,last,lay,layn,letter,limit,lines,ljustify,%
4689     log,log10,map,map2,max,max2,member,merge,min,min2,mkset,neg,%
4690     numval,or,pi,postfix,product,read,rep,repeat,reverse,rjustify,%
4691     scan,seq,showfloat,shownum,showscaled,sin,snd,sort,spaces,sqrt,%
4692     subtract,sum,system,take,takewhile,tinynum,tl,transpose,undef,%
4693     until,zip2,zip3,zip4,zip5,zip6,zip},%
4694   sensitive,%
4695   morecomment=[l]||,%
4696   morestring=[b]"%
4697   }[keywords,comments,strings]

4698 ⟨/lang2⟩
```

## 2.47  Mizar

As you can read below, Adam Grabowski provided this language definition.

```
4699 ⟨*lang3⟩

4700 %%
4701 %% Mizar definition (c) 2003 Adam Grabowski
4702 %%
4703 %% Mizar is freely available at URL www.mizar.org for the Linux x86,
4704 %% Solaris x86, and Windows operating systems.
4705 %%
4706 \lst@definelanguage{Mizar}%
4707   {otherkeywords={->,(\#,\#),.=),\&},%
4708   morekeywords={vocabulary,constructors,$1,$1,$2,$3,$4,$5,$6,$7,$8,%
4709     @proof,according,aggregate,and,antonym,as,associativity,assume,%
4710     asymmetry,attr,be,begin,being,by,canceled,case,cases,cluster,%
4711     clusters,coherence,commutativity,compatibility,connectedness,%
4712     consider,consistency,constructors,contradiction,correctness,def,%
4713     deffunc,define,definition,definitions,defpred,end,environ,equals,%
4714     ex,exactly,existence,for,from,func,given,hence,hereby,holds,%
4715     idempotence,if,iff,implies,involutiveness,irreflexivity,is,it,%
4716     let,means,mode,non,not,notation,now,of,or,otherwise,over,per,%
4717     pred,prefix,projectivity,proof,provided,qua,reconsider,redefine,%
4718     reflexivity,requirements,reserve,scheme,schemes,section,selector,%
```

```
4719        set,st,struct,such,suppose,symmetry,synonym,take,that,the,then,%
4720        theorem,theorems,thesis,thus,to,transitivity,uniqueness,%
4721        vocabulary,where},%
4722     sensitive=t,%
4723     morecomment=[l]::%
4724   }[keywords,comments]%
4725 ⟨/lang3⟩
```

## 2.48   ML

Thanks to Torben Hoffmann for providing the definition.

```
4726 ⟨*lang2⟩

4727 %%
4728 %% ML definition (c) 1999 Torben Hoffmann
4729 %%
4730 \lst@definelanguage{ML}%
4731   {morekeywords={abstype,and,andalso,as,case,do,datatype,else,end,%
4732        eqtype,exception,fn,fun,functor,handle,if,in,include,infix,%
4733        infixr,let,local,nonfix,of,op,open,orelse,raise,rec,sharing,sig,%
4734        signature,struct,structure,then,type,val,with,withtype,while},%
4735     sensitive,%
4736     morecomment=[n]{(*}{*)},%
4737     morestring=[d]"%
4738   }[keywords,comments,strings]

4739 ⟨/lang2⟩
```

## 2.49   Modula-2

Took data from

- NIKLAUS WIRTH: **Programmieren in Modula-2**, Übers. Guido Pfeiffer; 2.
  Auflage – Berlin; Heidelberg; New York; London; Paris; Tokyo; Hong Kong:
  Springer, 1991; ISBN 3-540-51689-1.

```
4740 ⟨*lang3⟩

4741 \lst@definelanguage{Modula-2}%
4742   {morekeywords={AND,ARRAY,BEGIN,BY,CASE,CONST,DIV,DO,ELSE,ELSIF,END,%
4743        EXIT,EXPORT,FOR,FROM,IF,IMPLEMENTATION,IMPORT,IN,MOD,MODULE,NOT,%
4744        OF,OR,POINTER,PROCEDURE,QUALIFIED,RECORD,REPEAT,RETURN,SET,THEN,%
4745        TYPE,UNTIL,VAR,WHILE,WITH,ABS,BITSET,BOOLEAN,CAP,CARDINAL,CHAR,%
4746        CHR,DEC,EXCL,FALSE,FLOAT,HALT,HIGH,INC,INCL,INTEGER,LONGCARD,%
4747        LONGINT,LONGREAL,MAX,MIN,NIL,ODD,ORD,PROC,REAL,SIZE,TRUE,TRUNC,%
4748        VAL,DEFINITION,LOOP},% added keywords due to Peter Bartke 99/07/22
4749     sensitive,%
4750     morecomment=[n]{(*}{*)},%
4751     morestring=[d]',%
4752     morestring=[d]"%
4753   }[keywords,comments,strings]

4754 ⟨/lang3⟩
```

## 2.50 MuPAD

This definition was provided by Christopher Creutzig. Again thanks to Ulrike Fischer for pointing to a missing `@` in `\lstdefinelanguage`.

```
4755 ⟨*lang3⟩

4756 \lst@definelanguage{MuPAD}{%
4757     morekeywords={end,next,break,if,then,elif,else,end_if,case,end_case,%
4758         otherwise,for,from,to,step,downto,in,end_for,while,end_while,%
4759         repeat,until,end_repeat,or,and,not,xor,div,mod,union,minus,%
4760         intersect,subset,proc,begin,end_proc,domain,end_domain,category,%
4761         end_category,axiom,end_axiom,quit,delete,frame},%
4762     morekeywords=[2]{NIL,FAIL,TRUE,FALSE,UNKNOWN,I,RD_INF,RD_NINF,%
4763         RD_NAN,name,local,option,save,inherits,of,do},%
4764     otherkeywords={\%if,?,!,:=,<,>,=,<=,<>,>=,==>,<=>,::,..,...,->,%
4765         @,@@,\$},%
4766     sensitive=true,%
4767     morecomment=[l]{//},%
4768     morecomment=[n]{/*}{*/},%
4769     morestring=[b]",%
4770     morestring=[d]{'}%
4771   }[keywords,comments,strings]

4772 ⟨/lang3⟩
```

## 2.51 NASTRAN

```
4773 ⟨*lang3⟩
```

The definition is from Jeffrey Ratcliffe—except the `MoreSelectCharTable` part which simulates the keyword `BEGIN BULK`.

```
4774 \lst@definelanguage{NASTRAN}
4775   {morekeywords={ENDDATA},%
4776    morecomment=[l]$,%
4777    MoreSelectCharTable=%
4778        \lst@CArgX BEGIN\ BULK\relax\lst@CDef{}%
4779        {\lst@ifmode\else \ifnum\lst@length=\z@
4780            \lst@EnterMode{\lst@GPmode}{\lst@modetrue
4781                \let\lst@currstyle\lst@gkeywords@sty}%
4782         \fi \fi}%
4783        {\ifnum\lst@mode=\lst@GPmode
4784            \lst@XPrintToken \lst@LeaveMode
4785         \fi}%
4786   }[keywords,comments]%
4787 ⟨/lang3⟩
```

## 2.52 Oberon-2

```
4788 ⟨*lang3⟩

4789 \lst@definelanguage{Oberon-2}%
4790   {morekeywords={ARRAY,BEGIN,BOOLEAN,BY,CASE,CHAR,CONST,DIV,DO,ELSE,%
```

```
4791        ELSIF,END,EXIT,FALSE,FOR,IF,IMPORT,IN,INTEGER,IS,LONGINT,%
4792        LONGREAL,LOOP,MOD,MODULE,NIL,OF,OR,POINTER,PROCEDURE,REAL,RECORD,%
4793        REPEAT,RETURN,SET,SHORTINT,THEN,TO,TRUE,TYPE,UNTIL,VAR,WHILE,%
4794        WITH,ABS,ASH,CAP,CHR,COPY,DEC,ENTIER,EXCL,HALT,INC,INCL,LEN,LONG,%
4795        MAX,MIN,NEW,ODD,ORD,SHORT,SIZE},%
4796     sensitive,%
4797     morecomment=[n]{(*}{*)},%
4798     morestring=[d]',%
4799     morestring=[d]"%
4800   }[keywords,comments,strings]
```

4801 ⟨/lang3⟩

## 2.53   OCL

This definition is based on chapter 7 of the OMG UML standard version 1.3:

- OMG: **OMG Unified Modeling Language Specification**; © 1999 OMG; Available at `ftp://ftp.omg.org/pub/docs/ad/99-06-08.pdf`.

This language is due to Achim D. Brucker.

4802 ⟨∗lang3⟩

```
4803 %%
4804 %% OCL definition (c) 2000 Achim D. Brucker
4805 %%
4806 %% You are allowed to use, modify and distribute this code either under
4807 %% the terms of the LPPL (version 1.0 or later) or the GPL (version 2.0
4808 %% or later).
4809 %%
```

First we define are very decorative style. In the OMG standard only the boolean (infix (?)) operations are highlighted, but I think all OCL-defined operations should be highlighted, because they are *guaranteed* to be side-effect-free (in OCL only side effect free evaluations or path expressions are allowed).

```
4810 \lst@definelanguage[decorative]{OCL}[OMG]{OCL}
4811   {otherkeywords={@pre},%
4812    morendkeywords={name,attributes,associatoinEnds,operations,%
4813        supertypes,allSupertypes,allInstances,oclIsKindOf,oclIsTypeOf,%
4814        oclAsType,oclInState,oclIsNew,evaluationType,abs,floor,round,max,%
4815        min,div,mod,size,concat,toUpper,toLower,substring,includes,%
4816        excludes,count,includesAll,exludesAll,isEmpty,notEmpty,sum,%
4817        exists,forAll,isUnique,sortedBy,iterate,union,intersection,%
4818        including,excluding,symmetricDifference,select,reject,collect,%
4819        asSequence,asBag,asSequence,asSet,append,prepend,subSequence,at,%
4820        first,last,true,false,isQuery}%
4821   }%
```

Remark: "isQuery" is not real OCL, but a important attribute of the underlying UML model.

The dialect called `OMG` is a very spare version. If you use this variant with bold style for first and second order keywords you get the look and feel of the OMG

standard. First order keywords are the OCL context declarations (see section 7.3 of the OMG standard):

```
4822 \lst@definelanguage[OMG]{OCL}%
4823     {morekeywords={context,pre,inv,post},%
```

Second order keywords are the operation which are defined for type Boolean (see pages 7-34/35 of the OMG standard) and the let-operation (in principle these are the infix operations):

```
4824     ndkeywords={or,xor,and,not,implies,if,then,else,endif},%
```

Third order keywords are the basic data types as declared in section 7.4 of the OMG standard:

```
4825     morekeywords=[3]{Boolean,Integer,Real,String,Set,Sequence,Bag,%
4826         OclType,OclAny,OclExpression,Enumeration,Collection,},%
4827     sensitive=t,%
4828     morecomment=[l]--,%
4829     morestring=[d]'%
4830     }[keywords,comments,strings]
```

After a bug report by Martin Süßkraut `morerdkeywords` has been changed to the correct optional argument `[3]`.

```
4831 ⟨/lang3⟩
```

## 2.54   Octave

```
4832 ⟨*lang1⟩
```

As you can read below the definition is due to Ulrich G. Wortmann. Additions due to Sebastian  Schubert.

```
4833 %%
4834 %% Octave definition (c) 2001,2002 Ulrich G. Wortmann
4835 %%
4836 \lst@definelanguage{Octave}%
4837   {morekeywords={gt,lt,amp,abs,acos,acosh,acot,acoth,acsc,acsch,%
4838       all,angle,ans,any,asec,asech,asin,asinh,atan,atan2,atanh,auread,%
4839       auwrite,axes,axis,balance,bar,bessel,besselk,bessely,beta,%
4840       betainc,betaln,blanks,bone,break,brighten,capture,cart2pol,%
4841       cart2sph,caxis,cd,cdf2rdf,cedit,ceil,chol,cla,clabel,clc,clear,%
4842       clf,clock,close,colmmd,Colon,colorbar,colormap,ColorSpec,colperm,%
4843       comet,comet3,compan,compass,computer,cond,condest,conj,contour,%
4844       contour3,contourc,contrast,conv,conv2,cool,copper,corrcoef,cos,%
4845       cosh,cot,coth,cov,cplxpair,cputime,cross,csc,csch,csvread,%
4846       csvwrite,cumprod,cumsum,cylinder,date,dbclear,dbcont,dbdown,%
4847       dbquit,dbstack,dbstatus,dbstep,dbstop,dbtype,dbup,ddeadv,ddeexec,%
4848       ddeinit,ddepoke,ddereq,ddeterm,ddeunadv,deblank,dec2hex,deconv,%
4849       del2,delete,demo,det,diag,diary,diff,diffuse,dir,disp,dlmread,%
4850       dlmwrite,dmperm,dot,drawnow,echo,eig,ellipj,ellipke,else,elseif,%
4851       end,engClose,engEvalString,engGetFull,engGetMatrix,engOpen,%
4852       engOutputBuffer,engPutFull,engPutMatrix,engSetEvalCallback,%
4853       engSetEvalTimeout,engWinInit,eps,erf,erfc,erfcx,erfinv,%
```

```
4854        errorbar,etime,etree,eval,exist,exp,expint,expm,expo,eye,fclose,%
4855        feather,feof,ferror,feval,fft,fft2,fftshift,fgetl,fgets,figure,%
4856        fill,fill3,filter,filter2,find,findstr,finite,fix,flag,fliplr,%
4857        flipud,floor,flops,fmin,fmins,fopen,for,format,fplot,fprintf,%
4858        fread,frewind,fscanf,fseek,ftell,full,function,funm,fwrite,fzero,%
4859        gallery,gamma,gammainc,gammaln,gca,gcd,gcf,gco,get,getenv,%
4860        getframe,ginput,global,gplot,gradient,gray,graymon,grid,griddata,%
4861        gtext,hadamard,hankel,help,hess,hex2dec,hex2num,hidden,hilb,hist,%
4862        hold,home,hostid,hot,hsv,hsv2rgb,if,ifft,ifft2,imag,image,%
4863        imagesc,Inf,info,input,int2str,interp1,interp2,interpft,inv,%
4864        invhilb,isempty,isglobal,ishold,isieee,isinf,isletter,isnan,%
4865        isreal,isspace,issparse,isstr,jet,keyboard,kron,lasterr,lcm,%
4866        legend,legendre,length,lin2mu,line,linspace,load,log,log10,log2,%
4867        loglog,logm,logspace,lookfor,lower,ls,lscov,lu,magic,matClose,%
4868        matDeleteMatrix,matGetDir,matGetFp,matGetFull,matGetMatrix,%
4869        matGetNextMatrix,matGetString,matlabrc,matlabroot,matOpen,%
4870        matPutFull,matPutMatrix,matPutString,max,mean,median,menu,mesh,%
4871        meshc,meshgrid,meshz,mexAtExit,mexCallMATLAB,mexdebug,%
4872        mexErrMsgTxt,mexEvalString,mexFunction,mexGetFull,mexGetMatrix,%
4873        mexGetMatrixPtr,mexPrintf,mexPutFull,mexPutMatrix,mexSetTrapFlag,%
4874        min,more,movie,moviein,mu2lin,mxCalloc,mxCopyCharacterToPtr,%
4875        mxCopyComplex16ToPtr,mxCopyInteger4ToPtr,mxCopyPtrToCharacter,%
4876        mxCopyPtrToComplex16,mxCopyPtrToInteger4,mxCopyPtrToReal8,%
4877        mxCopyReal8ToPtr,mxCreateFull,mxCreateSparse,mxCreateString,%
4878        mxFree,mxFreeMatrix,mxGetIr,mxGetJc,mxGetM,mxGetN,mxGetName,%
4879        mxGetNzmax,mxGetPi,mxGetPr,mxGetScalar,mxGetString,mxIsComplex,%
4880        mxIsFull,mxIsNumeric,mxIsSparse,mxIsString,mxIsTypeDouble,%
4881        mxSetIr,mxSetJc,mxSetM,mxSetN,mxSetName,mxSetNzmax,mxSetPi,%
4882        mxSetPr,NaN,nargchk,nargin,nargout,newplot,nextpow2,nnls,nnz,%
4883        nonzeros,norm,normest,null,num2str,nzmax,ode23,ode45,orient,orth,%
4884        pack,pascal,patch,path,pause,pcolor,pi,pink,pinv,plot,plot3,%
4885        pol2cart,polar,poly,polyder,polyeig,polyfit,polyval,polyvalm,%
4886        pow2,print,printopt,prism,prod,pwd,qr,qrdelete,qrinsert,quad,%
4887        quad8,quit,quiver,qz,rand,randn,randperm,rank,rat,rats,rbbox,%
4888        rcond,real,realmax,realmin,refresh,rem,reset,reshape,residue,%
4889        return,rgb2hsv,rgbplot,rootobject,roots,rose,rosser,rot90,rotate,%
4890        round,rref,rrefmovie,rsf2csf,save,saxis,schur,sec,sech,semilogx,%
4891        semilogy,set,setstr,shading,sign,sin,sinh,size,slice,sort,sound,%
4892        spalloc,sparse,spaugment,spconvert,spdiags,specular,speye,spfun,%
4893        sph2cart,sphere,spinmap,spline,spones,spparms,sprandn,sprandsym,%
4894        sprank,sprintf,spy,sqrt,sqrtm,sscanf,stairs,startup,std,stem,%
4895        str2mat,str2num,strcmp,strings,strrep,strtok,subplot,subscribe,%
4896        subspace,sum,surf,surface,surfc,surfl,surfnorm,svd,symbfact,%
4897        symmmd,symrcm,tan,tanh,tempdir,tempname,terminal,text,tic,title,%
4898        toc,toeplitz,trace,trapz,tril,triu,type,uicontrol,uigetfile,%
4899        uimenu,uiputfile,unix,unwrap,upper,vander,ver,version,view,%
4900        viewmtx,waitforbuttonpress,waterfall,wavread,wavwrite,what,%
4901        whatsnew,which,while,white,whitebg,who,whos,wilkinson,wk1read,%
4902        stderr,stdout,plot,set,endif,wk1write,xlabel,xor,ylabel,zeros,%
4903        zlabel,zoom,endwhile,endfunction,printf,case,switch,otherwise,%
```

```
4904        system,lsode,endfor,error,ones,oneplot,__gnuplot_set__,do,until},%
4905    sensitive=t,%
4906    morecomment=[l]\#,%
4907    morecomment=[l]\#\#,%
4908    morecomment=[l]\%,%
4909    morestring=[m]',%
4910    morestring=[m]"%
4911  }[keywords,comments,strings]
4912 ⟨/lang1⟩
```

## 2.55    Oz

```
4913 ⟨∗lang2⟩
```

Thanks to Andres Becerra Sandoval for providing this language definition.

```
4914 %%
4915 %% Oz definition (c) Andres Becerra Sandoval
4916 %%
4917 \lst@definelanguage{Oz}%
4918    {morekeywords={andthen,at,attr,case,catch,choice,class,%
4919        cond,declare,define,dis,div,else,elsecase,%
4920        elseif,end,export,fail,false,feat,finally,%
4921        from,fun,functor,if,import,in,local,%
4922        lock,meth,mod,not,of,or,orelse,%
4923        prepare,proc,prop,raise,require,self,skip,%
4924        then,thread,true,try,unit},%
4925    sensitive=true,%
4926    morecomment=[l]{\%},%
4927    morecomment=[s]{/*}{*/},%
4928    morestring=[b]",%
4929    morestring=[d]'%
4930  }[keywords,comments,strings]
4931 ⟨/lang2⟩
```

## 2.56    Pascal

```
4932 ⟨∗lang1⟩
```

Thanks to Andreas Stephan for reporting non-keywords alpha, byte, pack and
unpack.

```
4933 \lst@definelanguage[XSC]{Pascal}[Standard]{Pascal}
4934    {deletekeywords={alfa,byte,pack,unpack},% 1998 Andreas Stephan
4935    morekeywords={dynamic,external,forward,global,module,nil,operator,%
4936        priority,sum,type,use,dispose,mark,page,release,cimatrix,%
4937        cinterval,civector,cmatrix,complex,cvector,dotprecision,imatrix,%
4938        interval,ivector,rmatrix,rvector,string,im,inf,re,sup,chr,comp,%
4939        eof,eoln,expo,image,ival,lb,lbound,length,loc,mant,maxlength,odd,%
4940        ord,pos,pred,round,rval,sign,substring,succ,trunc,ub,ubound}%
4941  }%
4942 \lst@definelanguage[Borland6]{Pascal}[Standard]{Pascal}
4943    {morekeywords={asm,constructor,destructor,implementation,inline,%
```

```
4944        interface,nil,object,shl,shr,string,unit,uses,xor},%
4945     morendkeywords={Abs,Addr,ArcTan,Chr,Concat,Copy,Cos,CSeg,DiskFree,%
4946        DiskSize,DosExitCode,DosVersion,DSeg,EnvCount,EnvStr,Eof,Eoln,%
4947        Exp,FExpand,FilePos,FileSize,Frac,FSearch,GetBkColor,GetColor,%
4948        GetDefaultPalette,GetDriverName,GetEnv,GetGraphMode,GetMaxMode,%
4949        GetMaxX,GetMaxY,GetModeName,GetPaletteSize,GetPixel,GetX,GetY,%
4950        GraphErrorMsg,GraphResult,Hi,ImageSize,InstallUserDriver,%
4951        InstallUserFont,Int,IOResult,KeyPressed,Length,Lo,MaxAvail,%
4952        MemAvail,MsDos,Odd,Ofs,Ord,OvrGetBuf,OvrGetRetry,ParamCount,%
4953        ParamStr,Pi,Pos,Pred,Ptr,Random,ReadKey,Round,SeekEof,SeekEoln,%
4954        Seg,SetAspectRatio,Sin,SizeOf,Sound,SPtr,Sqr,Sqrt,SSeg,Succ,%
4955        Swap,TextHeight,TextWidth,Trunc,TypeOf,UpCase,WhereX,WhereY,%
4956        Append,Arc,Assign,AssignCrt,Bar,Bar3D,BlockRead,BlockWrite,ChDir,%
4957        Circle,ClearDevice,ClearViewPort,Close,CloseGraph,ClrEol,ClrScr,%
4958        Dec,Delay,Delete,DelLine,DetectGraph,Dispose,DrawPoly,Ellipse,%
4959        Erase,Exec,Exit,FillChar,FillEllipse,FillPoly,FindFirst,FindNext,%
4960        FloodFill,Flush,FreeMem,FSplit,GetArcCoords,GetAspectRatio,%
4961        GetDate,GetDefaultPalette,GetDir,GetCBreak,GetFAttr,%
4962        GetFillSettings,GetFTime,GetImage,GetIntVec,GetLineSettings,%
4963        GetMem,GetPalette,GetTextSettings,GetTime,GetVerify,%
4964        GetViewSettings,GoToXY,Halt,HighVideo,Inc,InitGraph,Insert,%
4965        InsLine,Intr,Keep,Line,LineRel,LineTo,LowVideo,Mark,MkDir,Move,%
4966        MoveRel,MoveTo,MsDos,New,NormVideo,NoSound,OutText,OutTextXY,%
4967        OvrClearBuf,OvrInit,OvrInitEMS,OvrSetBuf,PackTime,PieSlice,%
4968        PutImage,PutPixel,Randomize,Rectangle,Release,Rename,%
4969        RestoreCrtMode,RmDir,RunError,Sector,Seek,SetActivePage,%
4970        SetAllPalette,SetBkColor,SetCBreak,SetColor,SetDate,SetFAttr,%
4971        SetFillPattern,SetFillStyle,SetFTime,SetGraphBufSize,%
4972        SetGraphMode,SetIntVec,SetLineStyle,SetPalette,SetRGBPalette,%
4973        SetTextBuf,SetTextJustify,SetTextStyle,SetTime,SetUserCharSize,%
4974        SetVerify,SetViewPort,SetVisualPage,SetWriteMode,Sound,Str,%
4975        SwapVectors,TextBackground,TextColor,TextMode,Truncate,%
4976        UnpackTime,Val,Window}%
4977     }%
4978 \lst@definelanguage[Standard]{Pascal}%
4979     {morekeywords={alfa,and,array,begin,boolean,byte,case,char,const,div,%
4980        do,downto,else,end,false,file,for,function,get,goto,if,in,%
4981        integer,label,maxint,mod,new,not,of,or,pack,packed,page,program,%
4982        put,procedure,read,readln,real,record,repeat,reset,rewrite,set,%
4983        text,then,to,true,type,unpack,until,var,while,with,write,%
4984        writeln},%
4985     sensitive=f,%
4986     morecomment=[s]{(*}{*)},%
4987     morecomment=[s]{\{}{\}},%
4988     morestring=[d]'%
4989     }[keywords,comments,strings]
4990 ⟨/lang1⟩
```

## 2.57 Perl

I got the data from `http://www.perl.com`. But I wish to thank Herbert Wein-handl for the book 'Learning Perl'.

4991 ⟨∗lang1⟩

```
4992 \lst@definelanguage{Perl}%
4993   {morekeywords={abs,accept,alarm,atan2,bind,binmode,bless,caller,%
4994       chdir,chmod,chomp,chop,chown,chr,chroot,close,closedir,connect,%
4995       continue,cos,crypt,dbmclose,dbmopen,defined,delete,die,do,dump,%
4996       each,else,elsif,endgrent,endhostent,endnetent,endprotoent,%
4997       endpwent,endservent,eof,eval,exec,exists,exit,exp,fcntl,fileno,%
4998       flock,for,foreach,fork,format,formline,getc,getgrent,getgrgid,%
4999       getgrnam,gethostbyaddr,gethostbyname,gethostent,getlogin,%
5000       getnetbyaddr,getnetbyname,getnetent,getpeername,getpgrp,%
5001       getppid,getpriority,getprotobyname,getprotobynumber,getprotoent,%
5002       getpwent,getpwnam,getpwuid,getservbyname,getservbyport,%
5003       getservent,getsockname,getsockopt,glob,gmtime,goto,grep,hex,if,%
5004       import,index,int,ioctl,join,keys,kill,last,lc,lcfirst,length,%
5005       link,listen,local,localtime,log,lstat,m,map,mkdir,msgctl,msgget,%
5006       msgrcv,msgsnd,my,next,no,oct,open,opendir,ord,pack,package,pipe,%
5007       pop,pos,print,printf,prototype,push,q,qq,quotemeta,qw,qx,rand,%
5008       read,readdir,readlink,recv,redo,ref,rename,require,reset,return,%
5009       reverse,rewinddir,rindex,rmdir,s,scalar,seek,seekdir,select,%
5010       semctl,semget,semop,send,setgrent,sethostent,setnetent,setpgrp,%
5011       setpriority,setprotoent,setpwent,setservent,setsockopt,shift,%
5012       shmctl,shmget,shmread,shmwrite,shutdown,sin,sleep,socket,%
5013       socketpair,sort,splice,split,sprintf,sqrt,srand,stat,study,sub,%
5014       substr,symlink,syscall,sysopen,sysread,system,syswrite,tell,%
5015       telldir,tie,tied,time,times,tr,truncate,uc,ucfirst,umask,undef,%
5016       unless,unlink,unpack,unshift,untie,until,use,utime,values,vec,%
5017       wait,waitpid,wantarray,warn,while,write,y},%
5018    sensitive,%
5019    morecomment=[l]\#,%
5020    morestring=[b]",%
5021    morestring=[b]',%
5022    MoreSelectCharTable=%
5023       \lst@ReplaceInput{\$\#}{\lst@ProcessOther\$\lst@ProcessOther\#}%
5024   }[keywords,comments,strings]
```

5025 ⟨/lang1⟩

## 2.58 PHP

Luca Balzerani sent me this language definition.

5026 ⟨∗lang2⟩

```
5027 %%
5028 %% PHP definition by Luca Balzerani
5029 %%
5030 \lst@definelanguage{PHP}%
```

```
5031    {morekeywords={%
5032    %--- core language
5033      <?,?>,::,break,case,continue,default,do,else,%
5034      elseif,for,foreach,if,include,require,phpinfo,%
5035      switch,while,false,FALSE,true,TRUE,%
5036    %--- apache functions
5037      apache_lookup_uri,apache_note,ascii2ebcdic,ebcdic2ascii,%
5038      virtual,apache_child_terminate,apache_setenv,%
5039    %--- array functions
5040      array,array_change_key_case,array_chunk,array_count_values,%
5041      array_filter,array_flip,array_fill,array_intersect,%
5042      array_keys,array_map,array_merge,array_merge_recursive,%
5043      array_pad,array_pop,array_push,array_rand,array_reverse,%
5044      array_shift,array_slice,array_splice,array_sum,array_unique,%
5045      array_values,array_walk,arsort,asort,compact,count,current,each,%
5046      extract,in_array,array_search,key,krsort,ksort,list,natsort,%
5047      next,pos,prev,range,reset,rsort,shuffle,sizeof,sort,uasort,%
5048      usort,%
5049    %--- aspell functions
5050      aspell_new,aspell_check,aspell_check_raw,aspell_suggest,%
5051    %--- bc functions
5052      bcadd,bccomp,bcdiv,bcmod,bcmul,bcpow,bcscale,bcsqrt,bcsub,%
5053    %--- bzip2 functions
5054      bzclose,bzcompress,bzdecompress,bzerrno,bzerror,bzerrstr,%
5055      bzopen,bzread,bzwrite,%
5056    %--- calendar functions
5057      JDToGregorian,GregorianToJD,JDToJulian,JulianToJD,JDToJewish,%
5058      JDToFrench,FrenchToJD,JDMonthName,JDDayOfWeek,easter_date,%
5059      unixtojd,jdtounix,cal_days_in_month,cal_to_jd,cal_from_jd,%
5060    %--- ccvs functions
5061      ccvs_init,ccvs_done,ccvs_new,ccvs_add,ccvs_delete,ccvs_auth,%
5062      ccvs_reverse,ccvs_sale,ccvs_void,ccvs_status,ccvs_count,%
5063      ccvs_report,ccvs_command,ccvs_textvalue,%
5064    %--- classobj functions
5065      call_user_method,call_user_method_array,class_exists,get_class,%
5066      get_class_vars,get_declared_classes,get_object_vars,%
5067      is_a,is_subclass_of,method_exists,%
5068    %--- com functions
5069      COM,VARIANT,com_load,com_invoke,com_propget,com_get,com_propput,%
5070      com_set,com_addref,com_release,com_isenum,com_load_typelib,%
5071    %--- cpdf functions
5072      cpdf_add_annotation,cpdf_add_outline,cpdf_arc,cpdf_begin_text,%
5073      cpdf_clip,cpdf_close,cpdf_closepath,cpdf_closepath_fill_stroke,%
5074      cpdf_continue_text,cpdf_curveto,cpdf_end_text,cpdf_fill,%
5075      cpdf_finalize,cpdf_finalize_page,%
5076      cpdf_import_jpeg,cpdf_lineto,cpdf_moveto,cpdf_newpath,cpdf_open,%
5077      cpdf_page_init,cpdf_place_inline_image,cpdf_rect,cpdf_restore,%
5078      cpdf_rmoveto,cpdf_rotate,cpdf_rotate_text,cpdf_save,%
5079      cpdf_scale,cpdf_set_char_spacing,cpdf_set_creator,%
5080      cpdf_set_font,cpdf_set_horiz_scaling,cpdf_set_keywords,%
```

```
5081     cpdf_set_page_animation,cpdf_set_subject,cpdf_set_text_matrix,%
5082     cpdf_set_text_rendering,cpdf_set_text_rise,cpdf_set_title,%
5083     cpdf_setdash,cpdf_setflat,cpdf_setgray,cpdf_setgray_fill,%
5084     cpdf_setlinecap,cpdf_setlinejoin,cpdf_setlinewidth,%
5085     cpdf_setrgbcolor,cpdf_setrgbcolor_fill,cpdf_setrgbcolor_stroke,%
5086     cpdf_show_xy,cpdf_stringwidth,cpdf_set_font_directories,%
5087     cpdf_set_viewer_preferences,cpdf_stroke,cpdf_text,%
5088     cpdf_set_action_url,%
5089  %--- crack functions
5090     crack_opendict,crack_closedict,crack_check,crack_getlastmessage,%
5091  %--- ctype functions
5092     ctype_alnum,ctype_alpha,ctype_cntrl,ctype_digit,ctype_lower,%
5093     ctype_print,ctype_punct,ctype_space,ctype_upper,ctype_xdigit,%
5094  %--- curl functions
5095     curl_init,curl_setopt,curl_exec,curl_close,curl_version,%
5096     curl_error,curl_getinfo,%
5097  %--- cybercash functions
5098     cybercash_encr,cybercash_decr,cybercash_base64_encode,%
5099  %--- cybermut functions
5100     cybermut_creerformulairecm,cybermut_testmac,%
5101  %--- cyrus functions
5102     cyrus_connect,cyrus_authenticate,cyrus_bind,cyrus_unbind,%
5103     cyrus_close,%
5104  %--- datetime functions
5105     checkdate,date,getdate,gettimeofday,gmdate,gmmktime,gmstrftime,%
5106     microtime,mktime,strftime,time,strtotime,%
5107  %--- dbase functions
5108     dbase_create,dbase_open,dbase_close,dbase_pack,dbase_add_record,%
5109     dbase_delete_record,dbase_get_record,%
5110     dbase_numfields,dbase_numrecords,%
5111  %--- dba functions
5112     dba_close,dba_delete,dba_exists,dba_fetch,dba_firstkey,%
5113     dba_nextkey,dba_popen,dba_open,dba_optimize,dba_replace,%
5114  %--- dbm functions
5115     dbmopen,dbmclose,dbmexists,dbmfetch,dbminsert,dbmreplace,%
5116     dbmfirstkey,dbmnextkey,dblist,%
5117  %--- dbx functions
5118     dbx_close,dbx_connect,dbx_error,dbx_query,dbx_sort,dbx_compare,%
5119  %--- dio functions
5120     dio_open,dio_read,dio_write,dio_truncate,dio_stat,dio_seek,%
5121     dio_close,%
5122  %--- dir functions
5123     chroot,chdir,dir,closedir,getcwd,opendir,readdir,rewinddir,%
5124  %--- dotnet functions
5125     dotnet_load,%
5126  %--- errorfunc functions
5127     error_log,error_reporting,restore_error_handler,%
5128     trigger_error,user_error,%
5129  %--- exec functions
5130     escapeshellarg,escapeshellcmd,exec,passthru,system,shell_exec,%
```

```
5131    %--- fbsql functions
5132      fbsql_affected_rows,fbsql_autocommit,fbsql_change_user,%
5133      fbsql_commit,fbsql_connect,fbsql_create_db,fbsql_create_blob,%
5134      fbsql_database_password,fbsql_data_seek,fbsql_db_query,%
5135      fbsql_drop_db,fbsql_errno,fbsql_error,fbsql_fetch_array,%
5136      fbsql_fetch_field,fbsql_fetch_lengths,fbsql_fetch_object,%
5137      fbsql_field_flags,fbsql_field_name,fbsql_field_len,%
5138      fbsql_field_table,fbsql_field_type,fbsql_free_result,%
5139      fbsql_list_dbs,fbsql_list_fields,fbsql_list_tables,%
5140      fbsql_num_fields,fbsql_num_rows,fbsql_pconnect,fbsql_query,%
5141      fbsql_read_clob,fbsql_result,fbsql_rollback,fbsql_set_lob_mode,%
5142      fbsql_start_db,fbsql_stop_db,fbsql_tablename,fbsql_warnings,%
5143      fbsql_get_autostart_info,fbsql_hostname,fbsql_password,%
5144      fbsql_username,%
5145    %--- fdf functions
5146      fdf_open,fdf_close,fdf_create,fdf_save,fdf_get_value,%
5147      fdf_next_field_name,fdf_set_ap,fdf_set_status,fdf_get_status,%
5148      fdf_get_file,fdf_set_flags,fdf_set_opt,%
5149      fdf_set_javascript_action,fdf_set_encoding,fdf_add_template,%
5150    %--- filepro functions
5151      filepro,filepro_fieldname,filepro_fieldtype,filepro_fieldwidth,%
5152      filepro_fieldcount,filepro_rowcount,%
5153    %--- filesystem functions
5154      basename,chgrp,chmod,chown,clearstatcache,copy,delete,dirname,%
5155      diskfreespace,disk_total_space,fclose,feof,fflush,fgetc,fgetcsv,%
5156      fgetss,file_get_contents,file,file_exists,fileatime,filectime,%
5157      fileinode,filemtime,fileowner,fileperms,filesize,filetype,flock,%
5158      fopen,fpassthru,fputs,fread,fscanf,fseek,fstat,ftell,ftruncate,%
5159      set_file_buffer,is_dir,is_executable,is_file,is_link,%
5160      is_writable,is_writeable,is_uploaded_file,link,linkinfo,mkdir,%
5161      parse_ini_file,pathinfo,pclose,popen,readfile,readlink,rename,%
5162      rmdir,stat,lstat,realpath,symlink,tempnam,tmpfile,touch,umask,%
5163    %--- fribidi functions
5164      fribidi_log2vis,%
5165    %--- ftp functions
5166      ftp_connect,ftp_login,ftp_pwd,ftp_cdup,ftp_chdir,ftp_mkdir,%
5167      ftp_nlist,ftp_rawlist,ftp_systype,ftp_pasv,ftp_get,ftp_fget,%
5168      ftp_fput,ftp_size,ftp_mdtm,ftp_rename,ftp_delete,ftp_site,%
5169      ftp_quit,ftp_exec,ftp_set_option,ftp_get_option,%
5170    %--- funchand functions
5171      call_user_func_array,call_user_func,create_function,%
5172      func_get_args,func_num_args,function_exists,%
5173      register_shutdown_function,register_tick_function,%
5174    %--- gettext functions
5175      bindtextdomain,bind_textdomain_codeset,dcgettext,dcngettext,%
5176      dngettext,gettext,ngettext,textdomain,%
5177    %--- gmp functions
5178      gmp_init,gmp_intval,gmp_strval,gmp_add,gmp_sub,gmp_mul,%
5179      gmp_div_r,gmp_div_qr,gmp_div,gmp_mod,gmp_divexact,gmp_cmp,%
5180      gmp_com,gmp_abs,gmp_sign,gmp_fact,gmp_sqrt,gmp_sqrtrm,%
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5181        gmp_pow,gmp_powm,gmp_prob_prime,gmp_gcd,gmp_gcdext,gmp_invert,%
5182        gmp_jacobi,gmp_random,gmp_and,gmp_or,gmp_xor,gmp_setbit,%
5183        gmp_scan0,gmp_scan1,gmp_popcount,gmp_hamdist,%
5184      %--- http functions
5185        header,headers_sent,setcookie,%
5186      %--- hw functions
5187        hw_Array2Objrec,hw_Children,hw_ChildrenObj,hw_Close,hw_Connect,%
5188        hw_Deleteobject,hw_DocByAnchor,hw_DocByAnchorObj,%
5189        hw_Document_BodyTag,hw_Document_Content,hw_Document_SetContent,%
5190        hw_ErrorMsg,hw_EditText,hw_Error,hw_Free_Document,hw_GetParents,%
5191        hw_GetChildColl,hw_GetChildCollObj,hw_GetRemote,%
5192        hw_GetSrcByDestObj,hw_GetObject,hw_GetAndLock,hw_GetText,%
5193        hw_GetObjectByQueryObj,hw_GetObjectByQueryColl,%
5194        hw_GetChildDocColl,hw_GetChildDocCollObj,hw_GetAnchors,%
5195        hw_Mv,hw_Identify,hw_InCollections,hw_Info,hw_InsColl,hw_InsDoc,%
5196        hw_InsertObject,hw_mapid,hw_Modifyobject,hw_New_Document,%
5197        hw_Output_Document,hw_pConnect,hw_PipeDocument,hw_Root,%
5198        hw_Who,hw_getusername,hw_stat,hw_setlinkroot,hw_connection_info,%
5199        hw_insertanchors,hw_getrellink,hw_changeobject,%
5200      %--- ibase functions
5201        ibase_connect,ibase_pconnect,ibase_close,ibase_query,%
5202        ibase_fetch_row,ibase_fetch_object,ibase_field_info,%
5203        ibase_free_result,ibase_prepare,ibase_execute,ibase_trans,%
5204        ibase_rollback,ibase_timefmt,ibase_num_fields,ibase_blob_add,%
5205        ibase_blob_close,ibase_blob_create,ibase_blob_echo,%
5206        ibase_blob_import,ibase_blob_info,ibase_blob_open,%
5207      %--- icap functions
5208        icap_open,icap_close,icap_fetch_event,icap_list_events,%
5209        icap_delete_event,icap_snooze,icap_list_alarms,%
5210        icap_rename_calendar,icap_delete_calendar,icap_reopen,%
5211      %--- iconv functions
5212        iconv,iconv_get_encoding,iconv_set_encoding,ob_iconv_handler,%
5213      %--- ifx functions
5214        ifx_connect,ifx_pconnect,ifx_close,ifx_query,ifx_prepare,ifx_do,%
5215        ifx_errormsg,ifx_affected_rows,ifx_getsqlca,ifx_fetch_row,%
5216        ifx_fieldtypes,ifx_fieldproperties,ifx_num_fields,ifx_num_rows,%
5217        ifx_create_char,ifx_free_char,ifx_update_char,ifx_get_char,%
5218        ifx_copy_blob,ifx_free_blob,ifx_get_blob,ifx_update_blob,%
5219        ifx_textasvarchar,ifx_byteasvarchar,ifx_nullformat,%
5220        ifxus_free_slob,ifxus_close_slob,ifxus_open_slob,%
5221        ifxus_seek_slob,ifxus_read_slob,ifxus_write_slob,%
5222      %--- iisfunc functions
5223        iis_get_server_by_path,iis_get_server_by_comment,iis_add_server,%
5224        iis_set_dir_security,iis_get_dir_security,iis_set_server_rights,%
5225        iis_set_script_map,iis_get_script_map,iis_set_app_settings,%
5226        iis_stop_server,iis_stop_service,iis_start_service,%
5227      %--- image functions
5228        exif_imagetype,exif_read_data,exif_thumbnail,getimagesize,%
5229        imagealphablending,imagearc,imagefilledarc,imageellipse,%
5230        imagechar,imagecharup,imagecolorallocate,imagecolordeallocate,%
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5231    imagecolorclosest,imagecolorclosestalpha,imagecolorclosestthwb,%
5232    imagecolorexactalpha,imagecolorresolve,imagecolorresolvealpha,%
5233    imagecolorset,imagecolorsforindex,imagecolorstotal,%
5234    imagecopy,imagecopymerge,imagecopymergegray,imagecopyresized,%
5235    imagecreate,imagecreatetruecolor,imagetruecolortopalette,%
5236    imagecreatefromgd2,imagecreatefromgd2part,imagecreatefromgif,%
5237    imagecreatefrompng,imagecreatefromwbmp,imagecreatefromstring,%
5238    imagecreatefromxpm,imagedashedline,imagedestroy,imagefill,%
5239    imagefilledrectangle,imagefilltoborder,imagefontheight,%
5240    imagegd,imagegd2,imagegif,imagepng,imagejpeg,imagewbmp,%
5241    imageline,imageloadfont,imagepalettecopy,imagepolygon,%
5242    imagepsencodefont,imagepsfreefont,imagepsloadfont,%
5243    imagepsslantfont,imagepstext,imagerectangle,imagesetpixel,%
5244    imagesetstyle,imagesettile,imagesetthickness,imagestring,%
5245    imagesx,imagesy,imagettfbbox,imageftbbox,imagettftext,%
5246    imagetypes,jpeg2wbmp,png2wbmp,iptcembed,read_exif_data,%
5247  %--- imap functions
5248    imap_8bit,imap_alerts,imap_append,imap_base64,imap_binary,%
5249    imap_bodystruct,imap_check,imap_clearflag_full,imap_close,%
5250    imap_delete,imap_deletemailbox,imap_errors,imap_expunge,%
5251    imap_fetchbody,imap_fetchheader,imap_fetchstructure,%
5252    imap_getmailboxes,imap_getsubscribed,imap_header,%
5253    imap_headers,imap_last_error,imap_listmailbox,%
5254    imap_mail,imap_mail_compose,imap_mail_copy,imap_mail_move,%
5255    imap_mime_header_decode,imap_msgno,imap_num_msg,imap_num_recent,%
5256    imap_ping,imap_popen,imap_qprint,imap_renamemailbox,imap_reopen,%
5257    imap_rfc822_parse_headers,imap_rfc822_write_address,%
5258    imap_search,imap_setacl,imap_set_quota,imap_setflag_full,%
5259    imap_status,imap_subscribe,imap_uid,imap_undelete,%
5260    imap_utf7_decode,imap_utf7_encode,imap_utf8,imap_thread,%
5261  %--- info functions
5262    assert,assert_options,extension_loaded,dl,getenv,get_cfg_var,%
5263    get_defined_constants,get_extension_funcs,getmygid,%
5264    get_loaded_extensions,get_magic_quotes_gpc,%
5265    getlastmod,getmyinode,getmypid,getmyuid,get_required_files,%
5266    ini_alter,ini_get,ini_get_all,ini_restore,ini_set,phpcredits,%
5267    phpversion,php_logo_guid,php_sapi_name,php_uname,putenv,%
5268    set_time_limit,version_compare,zend_logo_guid,zend_version,%
5269  %--- ircg functions
5270    ircg_pconnect,ircg_fetch_error_msg,ircg_set_current,ircg_join,%
5271    ircg_msg,ircg_notice,ircg_nick,ircg_topic,ircg_channel_mode,%
5272    ircg_whois,ircg_kick,ircg_ignore_add,ircg_ignore_del,%
5273    ircg_is_conn_alive,ircg_lookup_format_messages,%
5274    ircg_set_on_die,ircg_set_file,ircg_get_username,%
5275    ircg_nickname_unescape,%
5276  %--- java functions
5277    java_last_exception_clear,java_last_exception_get,%
5278  %--- ldap functions
5279    ldap_add,ldap_bind,ldap_close,ldap_compare,ldap_connect,%
5280    ldap_delete,ldap_dn2ufn,ldap_err2str,ldap_errno,ldap_error,%
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5281    ldap_first_attribute,ldap_first_entry,ldap_free_result,%
5282    ldap_get_dn,ldap_get_entries,ldap_get_option,ldap_get_values,%
5283    ldap_list,ldap_modify,ldap_mod_add,ldap_mod_del,%
5284    ldap_next_attribute,ldap_next_entry,ldap_read,ldap_rename,%
5285    ldap_set_option,ldap_unbind,ldap_8859_to_t61,%
5286    ldap_next_reference,ldap_parse_reference,ldap_parse_result,%
5287    ldap_sort,ldap_start_tls,ldap_t61_to_8859,%
5288  %--- mail functions
5289    mail,ezmlm_hash,%
5290  %--- math functions
5291    abs,acos,acosh,asin,asinh,atan,atanh,atan2,base_convert,bindec,%
5292    cos,cosh,decbin,dechex,decoct,deg2rad,exp,expm1,floor,%
5293    hexdec,hypot,is_finite,is_infinite,is_nan,lcg_value,log,log10,%
5294    max,min,mt_rand,mt_srand,mt_getrandmax,number_format,octdec,pi,%
5295    rad2deg,rand,round,sin,sinh,sqrt,srand,tan,tanh,%
5296  %--- mbstring functions
5297    mb_language,mb_parse_str,mb_internal_encoding,mb_http_input,%
5298    mb_detect_order,mb_substitute_character,mb_output_handler,%
5299    mb_strlen,mb_strpos,mb_strrpos,mb_substr,mb_strcut,mb_strwidth,%
5300    mb_convert_encoding,mb_detect_encoding,mb_convert_kana,%
5301    mb_decode_mimeheader,mb_convert_variables,%
5302    mb_decode_numericentity,mb_send_mail,mb_get_info,%
5303    mb_ereg,mb_eregi,mb_ereg_replace,mb_eregi_replace,mb_split,%
5304    mb_ereg_search,mb_ereg_search_pos,mb_ereg_search_regs,%
5305    mb_ereg_search_getregs,mb_ereg_search_getpos,%
5306  %--- mcal functions
5307    mcal_open,mcal_popen,mcal_reopen,mcal_close,%
5308    mcal_rename_calendar,mcal_delete_calendar,mcal_fetch_event,%
5309    mcal_append_event,mcal_store_event,mcal_delete_event,%
5310    mcal_list_alarms,mcal_event_init,mcal_event_set_category,%
5311    mcal_event_set_description,mcal_event_set_start,%
5312    mcal_event_set_alarm,mcal_event_set_class,mcal_is_leap_year,%
5313    mcal_date_valid,mcal_time_valid,mcal_day_of_week,%
5314    mcal_date_compare,mcal_next_recurrence,%
5315    mcal_event_set_recur_daily,mcal_event_set_recur_weekly,%
5316    mcal_event_set_recur_monthly_wday,mcal_event_set_recur_yearly,%
5317    mcal_event_add_attribute,mcal_expunge,mcal_week_of_year,%
5318  %--- mcrypt functions
5319    mcrypt_get_cipher_name,mcrypt_get_block_size,%
5320    mcrypt_create_iv,mcrypt_cbc,mcrypt_cfb,mcrypt_ecb,mcrypt_ofb,%
5321    mcrypt_list_modes,mcrypt_get_iv_size,mcrypt_encrypt,%
5322    mcrypt_module_open,mcrypt_module_close,mcrypt_generic_deinit,%
5323    mcrypt_generic,mdecrypt_generic,mcrypt_generic_end,%
5324    mcrypt_enc_is_block_algorithm_mode,%
5325    mcrypt_enc_is_block_mode,mcrypt_enc_get_block_size,%
5326    mcrypt_enc_get_supported_key_sizes,mcrypt_enc_get_iv_size,%
5327    mcrypt_enc_get_modes_name,mcrypt_module_self_test,%
5328    mcrypt_module_is_block_algorithm,mcrypt_module_is_block_mode,%
5329    mcrypt_module_get_algo_key_size,%
5330  %--- mhash functions
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5331      mhash_get_hash_name,mhash_get_block_size,mhash_count,mhash,%
5332   %--- misc functions
5333      connection_aborted,connection_status,connection_timeout,%
5334      define,defined,die,eval,exit,get_browser,highlight_file,%
5335      ignore_user_abort,iptcparse,leak,pack,show_source,sleep,uniqid,%
5336      usleep,%
5337   %--- mnogosearch functions
5338      udm_add_search_limit,udm_alloc_agent,udm_api_version,%
5339      udm_cat_list,udm_clear_search_limits,udm_errno,udm_error,%
5340      udm_free_agent,udm_free_ispell_data,udm_free_res,%
5341      udm_get_res_field,udm_get_res_param,udm_load_ispell_data,%
5342      udm_check_charset,udm_check_stored,udm_close_stored,udm_crc32,%
5343   %--- msession functions
5344      msession_connect,msession_disconnect,msession_count,%
5345      msession_destroy,msession_lock,msession_unlock,msession_set,%
5346      msession_uniq,msession_randstr,msession_find,msession_list,%
5347      msession_set_array,msession_listvar,msession_timeout,%
5348      msession_getdata,msession_setdata,msession_plugin,%
5349   %--- msql functions
5350      msql,msql_affected_rows,msql_close,msql_connect,msql_create_db,%
5351      msql_data_seek,msql_dbname,msql_drop_db,msql_dropdb,msql_error,%
5352      msql_fetch_field,msql_fetch_object,msql_fetch_row,%
5353      msql_field_seek,msql_fieldtable,msql_fieldtype,msql_fieldflags,%
5354      msql_free_result,msql_freeresult,msql_list_fields,%
5355      msql_list_dbs,msql_listdbs,msql_list_tables,msql_listtables,%
5356      msql_num_rows,msql_numfields,msql_numrows,msql_pconnect,%
5357      msql_regcase,msql_result,msql_select_db,msql_selectdb,%
5358   %--- mssql functions
5359      mssql_close,mssql_connect,mssql_data_seek,mssql_fetch_array,%
5360      mssql_fetch_object,mssql_fetch_row,mssql_field_length,%
5361      mssql_field_seek,mssql_field_type,mssql_free_result,%
5362      mssql_min_error_severity,mssql_min_message_severity,%
5363      mssql_num_fields,mssql_num_rows,mssql_pconnect,mssql_query,%
5364      mssql_select_db,mssql_bind,mssql_execute,mssql_fetch_assoc,%
5365      mssql_guid_string,mssql_init,mssql_rows_affected,%
5366   %--- muscat functions
5367      muscat_setup,muscat_setup_net,muscat_give,muscat_get,%
5368   %--- mysql functions
5369      mysql_affected_rows,mysql_change_user,mysql_character_set_name,%
5370      mysql_connect,mysql_create_db,mysql_data_seek,mysql_db_name,%
5371      mysql_drop_db,mysql_errno,mysql_error,mysql_escape_string,%
5372      mysql_fetch_assoc,mysql_fetch_field,mysql_fetch_lengths,%
5373      mysql_fetch_row,mysql_field_flags,mysql_field_name,%
5374      mysql_field_seek,mysql_field_table,mysql_field_type,%
5375      mysql_info,mysql_insert_id,mysql_list_dbs,mysql_list_fields,%
5376      mysql_list_tables,mysql_num_fields,mysql_num_rows,%
5377      mysql_ping,mysql_query,mysql_unbuffered_query,%
5378      mysql_result,mysql_select_db,mysql_tablename,mysql_thread_id,%
5379      mysql_get_host_info,mysql_get_proto_info,mysql_get_server_info,%
5380   %--- network functions
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5381     checkdnsrr,closelog,debugger_off,debugger_on,%
5382     fsockopen,gethostbyaddr,gethostbyname,gethostbynamel,getmxrr,%
5383     getprotobynumber,getservbyname,getservbyport,ip2long,long2ip,%
5384     pfsockopen,socket_get_status,socket_set_blocking,%
5385     syslog,%
5386   %--- nis functions
5387     yp_get_default_domain,yp_order,yp_master,yp_match,yp_first,%
5388     yp_errno,yp_err_string,yp_all,yp_cat,%
5389   %--- oci8 functions
5390     OCIDefineByName,OCIBindByName,OCILogon,OCIPLogon,OCINLogon,%
5391     OCIExecute,OCICommit,OCIRollback,OCINewDescriptor,OCIRowCount,%
5392     OCIResult,OCIFetch,OCIFetchInto,OCIFetchStatement,%
5393     OCIColumnName,OCIColumnSize,OCIColumnType,OCIServerVersion,%
5394     OCINewCursor,OCIFreeStatement,OCIFreeCursor,OCIFreeDesc,%
5395     OCIError,OCIInternalDebug,OCICancel,OCISetPrefetch,%
5396     OCISaveLobFile,OCISaveLob,OCILoadLob,OCIColumnScale,%
5397     OCIColumnTypeRaw,OCINewCollection,OCIFreeCollection,%
5398     OCICollAppend,OCICollAssignElem,OCICollGetElem,OCICollMax,%
5399     OCICollTrim,%
5400   %--- oracle functions
5401     Ora_Bind,Ora_Close,Ora_ColumnName,Ora_ColumnSize,Ora_ColumnType,%
5402     Ora_CommitOff,Ora_CommitOn,Ora_Do,Ora_Error,Ora_ErrorCode,%
5403     Ora_Fetch,Ora_Fetch_Into,Ora_GetColumn,Ora_Logoff,Ora_Logon,%
5404     Ora_Numcols,Ora_Numrows,Ora_Open,Ora_Parse,Ora_Rollback,%
5405   %--- outcontrol functions
5406     flush,ob_start,ob_get_contents,ob_get_length,ob_get_level,%
5407     ob_flush,ob_clean,ob_end_flush,ob_end_clean,ob_implicit_flush,%
5408   %--- ovrimos functions
5409     ovrimos_connect,ovrimos_close,ovrimos_longreadlen,%
5410     ovrimos_execute,ovrimos_cursor,ovrimos_exec,ovrimos_fetch_into,%
5411     ovrimos_result,ovrimos_result_all,ovrimos_num_rows,%
5412     ovrimos_field_name,ovrimos_field_type,ovrimos_field_len,%
5413     ovrimos_free_result,ovrimos_commit,ovrimos_rollback,%
5414   %--- pcntl functions
5415     pcntl_fork,pcntl_signal,pcntl_waitpid,pcntl_wexitstatus,%
5416     pcntl_wifsignaled,pcntl_wifstopped,pcntl_wstopsig,%
5417     pcntl_exec,%
5418   %--- pcre functions
5419     preg_match,preg_match_all,preg_replace,preg_replace_callback,%
5420     preg_quote,preg_grep,Pattern Modifiers,Pattern Syntax,%
5421   %--- pdf functions
5422     pdf_add_annotation,pdf_add_bookmark,pdf_add_launchlink,%
5423     pdf_add_note,pdf_add_outline,pdf_add_pdflink,pdf_add_thumbnail,%
5424     pdf_arc,pdf_arcn,pdf_attach_file,pdf_begin_page,%
5425     pdf_begin_template,pdf_circle,pdf_clip,pdf_close,pdf_closepath,%
5426     pdf_closepath_stroke,pdf_close_image,pdf_close_pdi,%
5427     pdf_concat,pdf_continue_text,pdf_curveto,pdf_delete,%
5428     pdf_endpath,pdf_end_pattern,pdf_end_template,pdf_fill,%
5429     pdf_findfont,pdf_get_buffer,pdf_get_font,pdf_get_fontname,%
5430     pdf_get_image_height,pdf_get_image_width,pdf_get_parameter,%
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5431     pdf_get_pdi_value,pdf_get_majorversion,pdf_get_minorversion,%
5432     pdf_initgraphics,pdf_lineto,pdf_makespotcolor,pdf_moveto,%
5433     pdf_open,pdf_open_CCITT,pdf_open_file,pdf_open_gif,%
5434     pdf_open_image_file,pdf_open_jpeg,pdf_open_memory_image,%
5435     pdf_open_pdi_page,pdf_open_png,pdf_open_tiff,pdf_place_image,%
5436     pdf_rect,pdf_restore,pdf_rotate,pdf_save,pdf_scale,pdf_setcolor,%
5437     pdf_setflat,pdf_setfont,pdf_setgray,pdf_setgray_fill,%
5438     pdf_setlinecap,pdf_setlinejoin,pdf_setlinewidth,pdf_setmatrix,%
5439     pdf_setpolydash,pdf_setrgbcolor,pdf_setrgbcolor_fill,%
5440     pdf_set_border_color,pdf_set_border_dash,pdf_set_border_style,%
5441     pdf_set_duration,pdf_set_font,pdf_set_horiz_scaling,%
5442     pdf_set_info_author,pdf_set_info_creator,pdf_set_info_keywords,%
5443     pdf_set_info_title,pdf_set_leading,pdf_set_parameter,%
5444     pdf_set_text_rendering,pdf_set_text_rise,pdf_set_text_matrix,%
5445     pdf_set_word_spacing,pdf_show,pdf_show_boxed,pdf_show_xy,%
5446     pdf_stringwidth,pdf_stroke,pdf_translate,%
5447   %--- pfpro functions
5448     pfpro_init,pfpro_cleanup,pfpro_process,pfpro_process_raw,%
5449   %--- pgsql functions
5450     pg_close,pg_affected_rows,pg_connect,pg_dbname,pg_end_copy,%
5451     pg_query,pg_fetch_array,pg_fetch_object,pg_fetch_row,%
5452     pg_field_name,pg_field_num,pg_field_prtlen,pg_field_size,%
5453     pg_free_result,pg_last_oid,pg_host,pg_last_notice,pg_lo_close,%
5454     pg_lo_export,pg_lo_import,pg_lo_open,pg_lo_read,pg_lo_seek,%
5455     pg_lo_read_all,pg_lo_unlink,pg_lo_write,pg_num_fields,%
5456     pg_options,pg_pconnect,pg_port,pg_put_line,pg_fetch_result,%
5457     pg_client_encoding,pg_trace,pg_tty,pg_untrace,pg_get_result,%
5458     pg_send_query,pg_cancel_query,pg_connection_busy,%
5459     pg_connection_status,pg_copy_from,pg_copy_to,pg_escape_bytea,%
5460     pg_result_error,%
5461   %--- posix functions
5462     posix_kill,posix_getpid,posix_getppid,posix_getuid,%
5463     posix_getgid,posix_getegid,posix_setuid,posix_seteuid,%
5464     posix_setegid,posix_getgroups,posix_getlogin,posix_getpgrp,%
5465     posix_setpgid,posix_getpgid,posix_getsid,posix_uname,%
5466     posix_ctermid,posix_ttyname,posix_isatty,posix_getcwd,%
5467     posix_getgrnam,posix_getgrgid,posix_getpwnam,posix_getpwuid,%
5468   %--- printer functions
5469     printer_open,printer_abort,printer_close,printer_write,%
5470     printer_set_option,printer_get_option,printer_create_dc,%
5471     printer_start_doc,printer_end_doc,printer_start_page,%
5472     printer_create_pen,printer_delete_pen,printer_select_pen,%
5473     printer_delete_brush,printer_select_brush,printer_create_font,%
5474     printer_select_font,printer_logical_fontheight,%
5475     printer_draw_rectangle,printer_draw_elipse,printer_draw_text,%
5476     printer_draw_chord,printer_draw_pie,printer_draw_bmp,%
5477   %--- pspell functions
5478     pspell_add_to_personal,pspell_add_to_session,pspell_check,%
5479     pspell_config_create,pspell_config_ignore,pspell_config_mode,%
5480     pspell_config_repl,pspell_config_runtogether,%
```

```
5481      pspell_new,pspell_new_config,pspell_new_personal,%
5482      pspell_store_replacement,pspell_suggest,%
5483  %--- qtdom functions
5484      qdom_tree,qdom_error,%
5485  %--- readline functions
5486      readline,readline_add_history,readline_clear_history,%
5487      readline_info,readline_list_history,readline_read_history,%
5488  %--- recode functions
5489      recode_string,recode,recode_file,%
5490  %--- regex functions
5491      ereg,ereg_replace,eregi,eregi_replace,split,spliti,sql_regcase,%
5492  %--- sem functions
5493      sem_get,sem_acquire,sem_release,sem_remove,shm_attach,%
5494      shm_remove,shm_put_var,shm_get_var,shm_remove_var,ftok,%
5495  %--- sesam functions
5496      sesam_connect,sesam_disconnect,sesam_settransaction,%
5497      sesam_rollback,sesam_execimm,sesam_query,sesam_num_fields,%
5498      sesam_diagnostic,sesam_fetch_result,sesam_affected_rows,%
5499      sesam_field_array,sesam_fetch_row,sesam_fetch_array,%
5500      sesam_free_result,%
5501  %--- session functions
5502      session_start,session_destroy,session_name,session_module_name,%
5503      session_id,session_register,session_unregister,session_unset,%
5504      session_get_cookie_params,session_set_cookie_params,%
5505      session_encode,session_set_save_handler,session_cache_limiter,%
5506      session_write_close,%
5507  %--- shmop functions
5508      shmop_open,shmop_read,shmop_write,shmop_size,shmop_delete,%
5509  %--- snmp functions
5510      snmpget,snmpset,snmpwalk,snmpwalkoid,snmp_get_quick_print,%
5511      snmprealwalk,%
5512  %--- strings functions
5513      addcslashes,addslashes,bin2hex,chop,chr,chunk_split,%
5514      count_chars,crc32,crypt,echo,explode,get_html_translation_table,%
5515      hebrev,hebrevc,htmlentities,htmlspecialchars,implode,join,%
5516      localeconv,ltrim,md5,md5_file,metaphone,nl_langinfo,nl2br,ord,%
5517      print,printf,quoted_printable_decode,quotemeta,str_rot13,rtrim,%
5518      setlocale,similar_text,soundex,sprintf,strncasecmp,strcasecmp,%
5519      strcmp,strcoll,strcspn,strip_tags,stripcslashes,stripslashes,%
5520      strlen,strnatcmp,strnatcasecmp,strncmp,str_pad,strpos,strrchr,%
5521      strrev,strrpos,strspn,strstr,strtok,strtolower,strtoupper,%
5522      strtr,substr,substr_count,substr_replace,trim,ucfirst,ucwords,%
5523      vsprintf,wordwrap,%
5524  %--- swf functions
5525      swf_openfile,swf_closefile,swf_labelframe,swf_showframe,%
5526      swf_getframe,swf_mulcolor,swf_addcolor,swf_placeobject,%
5527      swf_removeobject,swf_nextid,swf_startdoaction,%
5528      swf_actiongeturl,swf_actionnextframe,swf_actionprevframe,%
5529      swf_actionstop,swf_actiontogglequality,swf_actionwaitforframe,%
5530      swf_actiongotolabel,swf_enddoaction,swf_defineline,%
```

```
5531    swf_definepoly,swf_startshape,swf_shapelinesolid,%
5532    swf_shapefillsolid,swf_shapefillbitmapclip,%
5533    swf_shapemoveto,swf_shapelineto,swf_shapecurveto,%
5534    swf_shapearc,swf_endshape,swf_definefont,swf_setfont,%
5535    swf_fontslant,swf_fonttracking,swf_getfontinfo,swf_definetext,%
5536    swf_definebitmap,swf_getbitmapinfo,swf_startsymbol,%
5537    swf_startbutton,swf_addbuttonrecord,swf_oncondition,%
5538    swf_viewport,swf_ortho,swf_ortho2,swf_perspective,swf_polarview,%
5539    swf_pushmatrix,swf_popmatrix,swf_scale,swf_translate,swf_rotate,%
5540 %--- sybase functions
5541    sybase_affected_rows,sybase_close,sybase_connect,%
5542    sybase_fetch_array,sybase_fetch_field,sybase_fetch_object,%
5543    sybase_field_seek,sybase_free_result,sybase_get_last_message,%
5544    sybase_min_error_severity,sybase_min_message_severity,%
5545    sybase_num_fields,sybase_num_rows,sybase_pconnect,sybase_query,%
5546    sybase_select_db,%
5547 %--- uodbc functions
5548    odbc_autocommit,odbc_binmode,odbc_close,odbc_close_all,%
5549    odbc_connect,odbc_cursor,odbc_do,odbc_error,odbc_errormsg,%
5550    odbc_execute,odbc_fetch_into,odbc_fetch_row,odbc_fetch_array,%
5551    odbc_fetch_object,odbc_field_name,odbc_field_num,%
5552    odbc_field_len,odbc_field_precision,odbc_field_scale,%
5553    odbc_longreadlen,odbc_num_fields,odbc_pconnect,odbc_prepare,%
5554    odbc_result,odbc_result_all,odbc_rollback,odbc_setoption,%
5555    odbc_tableprivileges,odbc_columns,odbc_columnprivileges,%
5556    odbc_primarykeys,odbc_foreignkeys,odbc_procedures,%
5557    odbc_specialcolumns,odbc_statistics,%
5558 %--- url functions
5559    base64_decode,base64_encode,parse_url,rawurldecode,rawurlencode,%
5560    urlencode,%
5561 %--- var functions
5562    doubleval,empty,floatval,gettype,get_defined_vars,%
5563    import_request_variables,intval,is_array,is_bool,is_double,%
5564    is_int,is_integer,is_long,is_null,is_numeric,is_object,is_real,%
5565    is_scalar,is_string,isset,print_r,serialize,settype,strval,%
5566    unset,var_dump,var_export,is_callable,%
5567 %--- vpopmail functions
5568    vpopmail_add_domain,vpopmail_del_domain,%
5569    vpopmail_add_domain_ex,vpopmail_del_domain_ex,%
5570    vpopmail_add_user,vpopmail_del_user,vpopmail_passwd,%
5571    vpopmail_auth_user,vpopmail_alias_add,vpopmail_alias_del,%
5572    vpopmail_alias_get,vpopmail_alias_get_all,vpopmail_error,%
5573 %--- w32api functions
5574    w32api_set_call_method,w32api_register_function,%
5575    w32api_deftype,w32api_init_dtype,%
5576 %--- wddx functions
5577    wddx_serialize_value,wddx_serialize_vars,wddx_packet_start,%
5578    wddx_add_vars,wddx_deserialize,%
5579 %--- xml functions
5580    xml_parser_create,xml_set_object,xml_set_element_handler,%
```

```
5581    xml_set_processing_instruction_handler,xml_set_default_handler,%
5582    xml_set_notation_decl_handler,%
5583    xml_parse,xml_get_error_code,xml_error_string,%
5584    xml_get_current_column_number,xml_get_current_byte_index,%
5585    xml_parser_free,xml_parser_set_option,xml_parser_get_option,%
5586    utf8_encode,xml_parser_create_ns,%
5587    xml_set_start_namespace_decl_handler,%
5588  %--- xslt functions
5589    xslt_set_log,xslt_create,xslt_errno,xslt_error,xslt_free,%
5590    xslt_set_sax_handler,xslt_set_scheme_handler,%
5591    xslt_set_base,xslt_set_encoding,xslt_set_sax_handlers,%
5592  %--- yaz functions
5593    yaz_addinfo,yaz_close,yaz_connect,yaz_errno,yaz_error,yaz_hits,%
5594    yaz_database,yaz_range,yaz_record,yaz_search,yaz_present,%
5595    yaz_scan,yaz_scan_result,yaz_ccl_conf,yaz_ccl_parse,%
5596    yaz_wait,yaz_sort,%
5597  %--- zip functions
5598    zip_close,zip_entry_close,zip_entry_compressedsize,%
5599    zip_entry_filesize,zip_entry_name,zip_entry_open,zip_entry_read,%
5600    zip_read,%
5601  %--- zlib functions
5602    gzclose,gzeof,gzfile,gzgetc,gzgets,gzgetss,gzopen,gzpassthru,%
5603    gzread,gzrewind,gzseek,gztell,gzwrite,readgzfile,gzcompress,%
5604    gzdeflate,gzinflate,gzencode,},%
5605    sensitive,%
5606    morecomment=[l]\#,%
5607    morecomment=[l]//,%
5608    morecomment=[s]{/*}{*/},%
5609    morestring=[b]",%
5610    morestring=[b]'%
5611  }[keywords,comments,strings]

5612 ⟨/lang2⟩
```

## 2.59 Plasm

Alessio Pace provided the following definition.

```
5613 ⟨∗lang3⟩

5614 \lst@definelanguage{Plasm}%
5615   {sensitive=false,%
5616   morekeywords={aa,abs,ac,acolor,acos,actor,al,alias,align,and,%
5617       animation,animation,appearance,apply,ar,arc,as,asin,assoc,atan,%
5618       axialcamera,axialcameras,basehermite,bbox,bbox,bernstein,%
5619       bernsteinbasis,bezier,beziercurve,beziermanifold,bezierstripe,%
5620       beziersurface,bigger,biggest,bilinearsurface,binormal,%
5621       biquadraticsurface,black,blend,blue,bottom,box,brown,bspize,%
5622       bspline,bsplinebasis,c,cabinet,camera,cart,case,cat,catch,ceil,%
5623       centeredcameras,centralcavalier,char,charseq,choose,circle,%
5624       circumference,class,cmap,color,comp,computecoords,cone,%
```

```
5625    conicalsurface,cons,control,convexcoords,convexhull,coonspatch,%
5626    copy,cos,cosh,crease,crosspolytope,cube,cubiccardinal,%
5627    cubiccardinalbasis,cubichermite,cubicubspline,cubicubsplinebasis,%
5628    cuboid,curl,curvature,curve2cspath,curve2mapvect,cyan,cylinder,%
5629    cylindricalsurface,d,deboor,def,depol,depth_sort,depth_test,%
5630    derbernstein,derbernsteinbase,derbezier,determinant,difference,%
5631    differencepr,dim,dimetric,dirproject,displaygraph,displaynubspline,%
5632    displaynurbspline,distl,distr,div,divergence,dodecahedron,dot,down,%
5633    dp,drawedges,drawforks,drawtree,ds,dsphere,dump,dumprep,ellipse,%
5634    embed,end,eq,ex,exp,explode,export,extract_bodies,extract_polygons,%
5635    extract_wires,extrude,extrusion,fact,false,feature,ff,fillcolor,%
5636    filter,finitecone,first,flash,flashani,floor,fontcolor,fontheight,%
5637    fontspacing,fontwidth,fractalsimplex,frame,frame,frameflash,fromto,%
5638    gausscurvature,ge,grad,gradient,gradmap,gray,green,gt,help,hermite,%
5639    hermitebasis,hermitesurface,hexahedron,icosahedron,id,idnt,if,in,%
5640    inarcs,innerprod,inset,insl,insr,intersection,intersectionpr,%
5641    intervals,intmax,intmin,intsto,inv,isa,isanimpol,isbool,ischar,%
5642    isclosedshape,iscloseto,isempty,iseven,isfun,isfunvect,isge,isgt,%
5643    isint,isintneg,isinto,isintpos,isle,islt,ismat,ismatof,isnat,%
5644    isnull,isnum,isnumneg,isnumpos,isodd,isometric,isorthoshape,ispair,%
5645    ispoint,ispointseq,ispol,ispoldim,ispolytope,ispurepol,isreal,%
5646    isrealneg,isrealpos,isrealvect,isseq,isseqof,isshape,issimplex,%
5647    issqrmat,isstring,isvect,iszero,jacobian,join,joints,k,last,le,%
5648    left,leftcavalier,len,less,lesseq,lex,lift,light,linecolor,%
5649    linesize,list,ln,load,loadlib,loop,lt,lxmy,magenta,map,mapshapes,%
5650    markersize,mat,matdotprod,material,mathom,max,mean,meanpoint,med,%
5651    merge,mesh,min,minkowski,mirror,mixedprod,mk,mkframe,mkpol,%
5652    mkvector,mkversork,mod,model,move,mul,multextrude,mxby,mxmy,mxty,%
5653    myfont,n,nat2string,neq,ngon,norm2,normalmap,not,nu_grid,nubspline,%
5654    nubsplineknots,nurbspline,nurbsplineknots,octahedron,offset,%
5655    onepoint,open,optimize,or,orange,ord,ortho,orthoproject,orthox,%
5656    orthoy,orthoz,outarcs,outerloop,outerwarp,pairdiff,parallel,%
5657    pascaltriangle,pdiff,pdifference,permutahedron,permutations,%
5658    perspective,perspective,pi,pivotop,plane,planemapping,pmap,%
5659    points2shape,polar,polyline,polymarker,polypoint,power,powerset,%
5660    presort,principalnormal,print,prism,profileprodsurface,%
5661    progressivesum,project,projection,purple,pyramid,q,quadarray,%
5662    quadmesh,quote,r,raise,range,rationalbezier,rationalblend,%
5663    rationalbspline,rationalize,red,rev,reverse,rgbacolor,right,%
5664    rightcavalier,ring,rn,rotatedtext,rotationalsurface,rotn,rtail,%
5665    ruledsurface,rxmy,s,save,scalarmatprod,scalarvectprod,schlegel2d,%
5666    schlegel3d,sdifference,sdifferencepr,segment,sel,setand,setdiff,%
5667    setfontcolor,setor,setxor,sex,shape_0,shape_1,shape2points,%
5668    shape2pol,shapeclosed,shapecomb,shapediff,shapedist,%
5669    shapeinbetweening,shapeinf,shapejoin,shapelen,shapenorm,%
5670    shapenormal,shapeprod,shaperot,shapesum,shapesup,shapezero,shift,%
5671    showprop,sign,signal,simplex,simplexpile,sin,sinh,size,skeleton,%
5672    skew,smaller,smallest,solidifier,solidify,sort,sphere,spline,%
5673    splinesampling,splitcells,splitpols,sqr,sqrt,star,string,%
5674    stringtokens,struct,sub,svg,sweep,t,tail,tan,tangent,tanh,%
```

```
5675        tensorprodsurface,tetrahedron,text,texture,textwithattributes,%
5676        thinsolid,threepoints,time,tmax,tmin,top,torus,torusmap,trace,%
5677        trans,tree,trianglefan,trianglestripe,trimetric,true,truncone,tt,%
5678        tube,twopoints,uk,ukpol,ukpolf,union,unionpr,unitvect,unprune,up,%
5679        vect2dtoangle,vect2mat,vectdiff,vectnorm,vectprod,vectsum,view,%
5680        viewmodel,viewmodel,vrml,warp,warp,where,white,with,xcavalier,xor,%
5681        xquadarray,xx,ycavalier,yellow},%
5682    moredirectives={loadlib},%
5683    otherkeywords={-,+,*,**,/,~,|,..,^,\&,\&\&,\#,\#\#},%
5684    morecomment=[s]{\%}{\%},%
5685    morestring=[b]',%
5686    literate={~}{{$\sim$}}{1} {^}{$\wedge$}{1},%
5687    }[keywords,directives,comments,strings]
```

5688 ⟨/lang3⟩

## 2.60   PL/I

Found the data in

- BERNHARD FISCHER, HERMAN FISCHER: **Structured Programming in PL/I and PL/C**; Copyright © 1976 by Marcel Dekker, Inc.; ISBN 0-8247-6394-7

5689 ⟨*lang3⟩

```
5690 \lst@definelanguage{PL/I}{%
5691   morekeywords={ABS, ATAN, AUTOMATIC, AUTO, ATAND, BEGIN, BINARY, BIN, BIT,%
5692     BUILTIN, BY, CALL, CHARACTER, CHAR, CHECK, COLUMN, COL, COMPLEX, CPLX,%
5693     COPY, COS, COSD, COSH, DATA, DATE, DECIMAL, DEC, DECLARE, DCL, DO,%
5694     EDIT, ELSE, END, ENDFILE, ENDPAGE, ENTRY, EXP, EXTERNAL, EXT, FINISH,%
5695     FIXED, FIXEDOVERFLOW, FOFL, FLOAT, FORMAT, GET, GO, GOTO, IF, IMAG,%
5696     INDEX, INITIAL, INIT, INTERNAL, INT, LABEL, LENGTH, LIKE, LINE, LIST,%
5697     LOG, LOG2, LOG10, MAIN, MAX, MIN, MOD, NOCHECK, NOFIXEDOVERFLOW,%
5698     NOFOFL, NOOVERFLOW, NOOFL, NOSIZE, NOUNDERFLOW, NOUFL, NOZERODIVIDE,%
5699     NOZDIV, ON, OPTIONS, OVERFLOW, OFL, PAGE, PICTURE, PROCEDURE, PROC,%
5700     PUT, READ, REPEAT, RETURN, RETURNS, ROUND, SIN, SIND, SINH, SIZE, SKIP,%
5701     SQRT, STATIC, STOP, STRING, SUBSTR, SUM, SYSIN, SYSPRINT, TAN, TAND,%
5702     TANH, THEN, TO, UNDERFLOW, UFL, VARYING, WHILE, WRITE, ZERODIVIDE,%
5703     ZDIV},%
5704   sensitive=f,%
5705   morecomment=[s]{/*}{*/},%
5706   morestring=[d]'%
5707 }[keywords,comments,strings]
```

5708 ⟨/lang3⟩

## 2.61   PostScript

Herbert Voss provided the following definition, written by Christophe Jorssen provided the following definition.

5709 ⟨*lang3⟩

```
5710 %%
5711 %% PostScript language definition (c) 2005 Christophe Jorssen.
5712 %%
5713 \lst@definelanguage{PostScript}{%
5714   morekeywords={abs, add, aload, anchorsearch, and, arc, arcn, arct, arcto,%
5715     array, ashow, astore, atan, awidthshow, begin, bind, bitshift,%
5716     bytesavailable, cachestatus, ceiling, charpath, clear, cleartomark,%
5717     cleardictstack, clip, clippath, closefile, closepath, colorimage,%
5718     concat, concatmatrix, condition, copy, copypage, cos, count,%
5719     countdictstack, countexecstack, counttomark, cshow,%
5720     currentblackgeneration, currentcacheparams, currentcmykcolor,%
5721     currentcolor, currentcolorrendering, currentcolorscreen,%
5722     currentcolorspace, currentcolortransfer, currentcontext, currentdash,%
5723     currentdevparams, currentdict, currentfile, currentflat, currentfont,%
5724     currentglobal, currentgray, currentgstate, currenthalftone,%
5725     currenthalftonephase, currenthsbcolor, currentlinecap, currentlinejoin,%
5726     currentlinewidth, currentmatrix, currentmiterlimit,%
5727     currentobjectformat, currentpacking, currentpagedevice, currentpoint,%
5728     currentrgbcolor, currentscreen, currentshared, currentstrokeadjust,%
5729     currentsystemparams, currenttransfer, currentundercolorremoval,%
5730     currentuserparams, curveto, cvi, cvlit, cvn, cvr, cvrs, cvs, cvx, def,%
5731     defaultmatrix, definefont, defineresource, defineusername,%
5732     defineuserobject, deletefile, detach, deviceinfo, dict, dictstack, div,%
5733     dtransform, dup, echo, eexec, end, eoclip, eofill, eoviewclip, eq,%
5734     erasepage, errordict, exch, exec, execform, execstack, execuserobject,%
5735     executeonly, executive, exit, exp, false, file, filenameforall,%
5736     fileposition, fill, filter, findencoding, findfont, findresource,%
5737     flattenpath, floor, flush, flushfile, FontDirectory, for, forall, fork,%
5738     ge, get, getinterval, globaldict, GlobalFontDirectory, glyphshow,%
5739     grestore, grestoreall, gsave, gstate, gt, identmatrix, idiv,%
5740     idtransform, if, ifelse, image, imagemask, index, ineofill, infill,%
5741     initclip, initgraphics, initmatrix, initviewclip, instroke,%
5742     internaldict, inueofill, inufill, inustroke, invertmatrix,%
5743     ISOLatin1Encoding, itransform, join, kshow, known, languagelevel, le,%
5744     length, lineto, ln, load, lock, log, loop, lt, makefont, makepattern,%
5745     mark, matrix, maxlength, mod, monitor, moveto, mul, ne, neg, newpath,%
5746     noaccess, not, notify, null, nulldevice, or, packedarray, pathbbox,%
5747     pathforall, pop, print, printobject, product, prompt, pstack, put,%
5748     putinterval, quit, rand, rcurveto, read, readhexstring, readline,%
5749     readonly, readstring, realtime, rectclip, rectfill, rectstroke,%
5750     rectviewclip, renamefile, repeat, resetfile, resourceforall,%
5751     resourcestatus, restore, reversepath, revision, rlineto, rmoveto, roll,%
5752     rootfont, rotate, round, rrand, run, save, scale, scalefont, scheck,%
5753     search, selectfont, serialnumber, setbbox, setblackgeneration,%
5754     setcachedevice, setcachedevice2, setcachelimit, setcacheparams,%
5755     setcharwidth, setcmykcolor, setcolor, setcolorrendering,%
5756     setcolorscreen, setcolorspace, setcolortransfer, setdash, setdevparams,%
5757     setfileposition, setflat, setfont, setglobal, setgray, setgstate,%
5758     sethalftone, sethalftonephase, sethsbcolor, setlinecap, setlinejoin,%
5759     setlinewidth, setmatrix, setmiterlimit, setobjectformat, setoverprint,%
```

```
5760    setpacking, setpagedevice, setpattern, setrgbcolor, setscreen,%
5761    setshared, setstrokeadjust, setsystemparams, settransfer,%
5762    setucacheparams, setundercolorremoval, setuserparams, setvmthreshold,%
5763    shareddict, show, showpage, sin, sqrt, srand, stack, StandardEncoding,%
5764    start, startjob, status, statusdict, stop, stopped, store, string,%
5765    stringwidth, stroke, strokepath, sub, systemdict, transform, translate,%
5766    true, truncate, type, token, uappend, ucache, ucachestatus, ueofill,%
5767    ufill, undef, upath, userdict, UserObjects, usertime, ustroke,%
5768    ustrokepath, version, viewclip, viewclippath, vmreclaim, vmstatus,%
5769    wait, wcheck, where, widthshow, write, writehexstring, writeobject,%
5770    writestring, wtranslation, xcheck, xor, xshow, xyshow, yield, yshow},%
5771  sensitive,%
5772  morecomment=[l]\%}[keywords,comments]

5773 ⟨/lang3⟩
```

## 2.62  POV-Ray

Berthold Höllmann sent me the definition. But I removed `blankstring=false`
and `flexiblecolumns=true` from the driver since they have nothing to do with a
language definition.

```
5774 ⟨*lang1⟩

5775 %%
5776 %% POV definition (c) 1999 Berthold H\"ollmann
5777 %%
5778 \lst@definelanguage{POV}%
5779   {morekeywords={abs,absorption,acos,acosh,adaptive,adc_bailout,agate,%
5780       agate_turb,all,alpha,ambient,ambient_light,angle,aperture,append,%
5781       arc_angle,area_light,array,asc,asin,asinh,assumed_gamma,atan,%
5782       atan2,atanh,average,background,bezier_spline,bicubic_patch,%
5783       black_hole,blob,blue,blur_samples,bounded_by,box,boxed,bozo,%
5784       break,brick,brick_size,brightness,brilliance,bumps,bump_map,%
5785       bump_size,camera,case,caustics,ceil,checker,chr,clipped_by,clock,%
5786       clock_delta,color,color_map,colour,colour_map,component,%
5787       composite,concat,cone,confidence,conic_sweep,control0,control1,%
5788       cos,cosh,count,crackle,crand,cube,cubic,cubic_spline,cubic_wave,%
5789       cylinder,cylindrical,debug,declare,default,defined,degrees,%
5790       density,density_file,density_map,dents,difference,diffuse,%
5791       dimensions,dimension_size,direction,disc,distance,%
5792       distance_maximum,div,eccentricity,else,emission,end,error,%
5793       error_bound,exp,extinction,fade_distance,fade_power,falloff,%
5794       falloff_angle,false,fclose,file_exists,filter,finish,fisheye,%
5795       flatness,flip,floor,focal_point,fog,fog_alt,fog_offset,fog_type,%
5796       fopen,frequency,gif,global_settings,gradient,granite,%
5797       gray_threshold,green,height_field,hexagon,hf_gray_16,hierarchy,%
5798       hollow,hypercomplex,if,ifdef,iff,ifndef,image_map,include,int,%
5799       interior,interpolate,intersection,intervals,inverse,ior,irid,%
5800       irid_wavelength,jitter,julia_fractal,lambda,lathe,leopard,%
5801       light_source,linear_spline,linear_sweep,local,location,log,%
```

```
5802      looks_like,look_at,low_error_factor,macro,mandel,map_type,marble,%
5803      material,material_map,matrix,max,max_intersections,max_iteration,%
5804      max_trace_level,media,media_attenuation,media_interaction,merge,%
5805      mesh,metallic,min,minimum_reuse,mod,mortar,nearest_count,no,%
5806      normal,normal_map,no_shadow,number_of_waves,object,octaves,off,%
5807      offset,omega,omnimax,on,once,onion,open,orthographic,panoramic,%
5808      perspective,pgm,phase,phong,phong_size,pi,pigment,pigment_map,%
5809      planar,plane,png,point_at,poly,polygon,poly_wave,pot,pow,ppm,%
5810      precision,prism,pwr,quadratic_spline,quadric,quartic,quaternion,%
5811      quick_color,quick_colour,quilted,radial,radians,radiosity,radius,%
5812      rainbow,ramp_wave,rand,range,ratio,read,reciprocal,%
5813      recursion_limit,red,reflection,reflection_exponent,refraction,%
5814      render,repeat,rgb,rgbf,rgbft,rgbt,right,ripples,rotate,roughness,%
5815      samples,scale,scallop_wave,scattering,seed,shadowless,sin,%
5816      sine_wave,sinh,sky,sky_sphere,slice,slope_map,smooth,%
5817      smooth_triangle,sor,specular,sphere,spherical,spiral1,spiral2,%
5818      spotlight,spotted,sqr,sqrt,statistics,str,strcmp,strength,strlen,%
5819      strlwr,strupr,sturm,substr,superellipsoid,switch,sys,t,tan,tanh,%
5820      text,texture,texture_map,tga,thickness,threshold,tightness,tile2,%
5821      tiles,torus,track,transform,translate,transmit,triangle,%
5822      triangle_wave,true,ttf,turbulence,turb_depth,type,u,%
5823      ultra_wide_angle,undef,union,up,use_color,use_colour,use_index,%
5824      u_steps,v,val,variance,vaxis_rotate,vcross,vdot,version,vlength,%
5825      vnormalize,vrotate,v_steps,warning,warp,water_level,waves,while,%
5826      width,wood,wrinkles,write,x,y,yes,z},%
5827    moredirectives={break,case,debug,declare,default,else,end,fclose,%
5828      fopen,local,macro,read,render,statistics,switch,undef,version,%
5829      warning,write},%
5830    moredelim=*[directive]\#,%
5831    sensitive,%
5832    morecomment=[l]//,%
5833    morecomment=[s]{/*}{*/},%
5834    morestring=[d]",%
5835  }[keywords,directives,comments,strings]

5836 ⟨/lang1⟩
```

## 2.63   Prolog

Dominique de Waleffe mailed me the data for Prolog. He took the keywords from
the LGrind language definition file.

```
5837 ⟨*lang2⟩

5838 %%
5839 %% Prolog definition (c) 1997 Dominique de Waleffe
5840 %%
5841 \lst@definelanguage{Prolog}%
5842   {morekeywords={op,mod,abort,ancestors,arg,ascii,ask,assert,asserta,%
5843      assertz,atom,atomic,char,clause,close,concat,consult,ed,ef,em,%
5844      eof,fail,file,findall,write,functor,getc,integer,is,length,%
```

```
5845        listing,load,name,nl,nonvar,not,numbervars,op,or,pp,prin,print,%
5846        private,prompt,putc,ratom,read,read_from_this_file,rename,repeat,%
5847        retract,retractall,save,see,seeing,seen,sh,skip,statistics,%
5848        subgoal_of,system,tab,tell,telling,time,told,trace,true,unload,%
5849        untrace,var,write},%
5850    sensitive=f,%
5851    morecomment=[l]\%,%
5852    morecomment=[s]{/*}{*/},%
5853    morestring=[bd]",%
5854    morestring=[bd]'%
5855   }[keywords,comments,strings]
```

5856 ⟨/lang2⟩

## 2.64  Promela

Thanks to William ThimblebyPromela for this language definition.

5857 ⟨∗lang3⟩

```
5858 %%
5859 %% Promela definition (c) 2004 William Thimbleby
5860 %%
5861 \lst@definelanguage{Promela}
5862   {morekeywords={active,assert,atomic,bit,bool,break,byte,chan,d_step,%
5863        Dproctype,do,else,empty,enabled,fi,full,goto,hidden,if,init,int,%
5864        len,mtype,nempty,never,nfull,od,of,pcvalue,printf,priority,%
5865        proctype,provided,run,short,skip,timeout,typedef,unless,unsigned,%
5866        xr,xs,true,false,inline,eval},%
5867    moredirectives={define,ifdef,ifndef,if,if,else,endif,undef,include},%
5868    moredelim=*[directive]\#,%
5869    morecomment=[s]{/*}{*/},%
5870    morestring=[b]"%
5871   }[keywords,comments,strings,directives]%
```

5872 ⟨/lang3⟩

## 2.65  PSTricks

PSTricks is a TeX macro package bundle.  Herbert Voss provided the following
definition.

5873 ⟨∗lang3⟩

```
5874 %%
5875 %% PSTricks definition (c) 2006 Herbert Voss
5876 %%
5877 \lst@definelanguage{PSTricks}%
5878   {morekeywords={%
5879    begin,end,definecolor,multido,%
5880    KillGlue,DontKillGlue,pslbrace,bsrbrace,psscalebox,psset,pstVerb,pstverb,%
5881    pst@def,psframebox,psclip,endclip,endpspicture,psframe,%
5882 %%    pspicture,%
```

137

```
5883        multirput,multips,Rput,rput,uput,cput,lput,%
5884        newrgbcolor,newgray,newcmykcolor,%
5885 %%
5886 %% pstricks-add
5887        psStep,psgraph,psbrace,psPrintValue,%
5888 %%
5889 %% pst-plot
5890        psvlabel,pshlabel,psplot,psline,pscustom,pscurve,psccurve,%
5891        readdata,savedata,fileplot,dataplot,listplot,%
5892        psecurce,psgraph,parametricplot,%
5893        psellipse,psaxes,ncline,nccurve,psbezier,parabola,%
5894        qdisk,qline,clipbox,endpsclip,%
5895        psgrid,pscircle,pscirclebox,psdiabox,pstribox,%
5896        newpsfontdot,psdot,psdots,%
5897        pspolygon,psdiamond,psoval,pstriangle,%
5898        psarc,psarcn,psellipticarc,psellipticarcn,pswedge,psellipticwedge,%
5899        pcline,pcdiag,pcdiagg,pccurve,pccurve,pcecurve,%
5900        scalebox,scaleboxto,psmathboxtrue,everypsbox,psverbboxtrue,overlaybox,%
5901        psoverlay,putoverlaybox,%
5902        newpsstyle,newpsobject,%
5903        moveto,newpath,closepath,stroke,fill,gsave,grestore,msave,mrestore,%
5904        translate,scale,swapaxes,rotate,openshadow,closedshadow,movepath,%
5905        lineto,rlineto,curveto,rcurveto,code,dim,coor,rcoor,file,arrows,%
5906        setcolor,rotateleft,rotateright,rotatedown,%
5907 %%
5908 %% pst-node
5909        nput,naput,nbput,ncput,%
5910        ncarc,ncbox,ncangle,ncangles,ncloop,ncdiag,ncdiagg,ncarcbox,ncbar,%
5911        cnodeput,nccircle,%
5912        pnode,rnode,Rnode,Cnode,cnode,fnode,%
5913        circlenode,ovalnode,trinode,dianode,%
5914        psmatrix,endpsmatrix,psspan,%
5915 %%
5916 %% pst-tree
5917        pstree,Tcircle,TCircle,Ttri,Tn,TC,Tc,Tfan,TR,Tr,Tdia,Toval,Tdot,Tp,Tf,%
5918        skiplevel,skiplevels,endskiplevels,tspace,tlput,%
5919 %%
5920 %% pst-text
5921        pscharpath,pstextpath,%
5922 %%
5923 %% pst-barcode
5924        psbarcode,%
5925 %%
5926 %% pst-coil
5927        psboxfill,pscoil,psCoil,pszigzag,nccoil,%
5928        psshadow,pstilt,psTilt,ThreeDput,%
5929 %%
5930 %% pst-gr3d
5931        PstGridThreeDNodeProcessor,%
5932 %%
```

```
5933 %% pst-vue3d
5934     PstGridThreeD,%
5935     AxesThreeD,LineThreeD,DieThreeD,FrameThreeD,SphereCircleThreeD,%
5936     SphereMeridienThreeD,QuadrillageThreeD,TetraedreThreeD,%
5937     PyramideThreeD,ConeThreeD,CylindreThreeD,DodecahedronThreeD,%
5938     ConeThreeD,SphereThreeD,SphereInverseThreeD,DemiSphereThreeD,%
5939     SphereCreuseThreeD,SphereCircledThreeD,PortionSphereThreeD,%
5940     pNodeThreeD,CubeThreeD,%
5941 %%
5942 %% pst-3dplot
5943     pstThreeDCoor, pstThreeDDot, pstThreeDTriangle, pstThreeDCircle,%
5944     pstPlanePut, pstThreeDBox, pstThreeDEllipse, pstThreeDLine,%
5945     pstThreeDPut, pstThreeDNode, pstThreeDSquare, psplotThreeD,%
5946     parametricplotThreeD, fileplotThreeD, dataplotThreeD,%
5947     pstScalePoints,%
5948 %%
5949 %% pst-circ
5950     resistor,battery,Ucc,Icc,capacitor,coil,diode,Zener,LED,lamp,switch,%
5951     wire,tension,circledipole,multidipole,OA,transistor,Tswitch,%
5952     potentiometer,transformer,optoCoupler,logic,%
5953 %%
5954 %% pst-eucl
5955     pstTriangle,pstMediatorAB,pstInterLL,pstMiddleAB,pstProjection,%
5956     pstCircleOA,pstLineAB,%
5957 %%
5958 %% pst-func
5959     psBessel,psPolynomial,psFourier,psGaussI,psGauss,psSi,pssi,psCi,psci,%
5960 %%
5961 %% pst-infixplot
5962     psPlot,%
5963 %%
5964 %% pst-ob3d
5965     PstDie,PstCube,%
5966 %%
5967 %% pst-poly
5968     PstPolygon,pspolygonbox,%
5969 %%
5970 %% pst-bar
5971     psbarchart,readpsbardata,psbarscale,newpsbarstyle,%
5972 %%
5973 %% pst-lens
5974     PstLens,%
5975 %%
5976 %% pst-geo
5977     WorldMap,WorldMapII,WorldMapThreeD,WorldMapThreeDII,pnodeMap,MapPut,%
5978 %%
5979 %% pst-autoseg
5980     asr,firstnode,merge,massoc,labelmerge,%
5981 %%
5982 %% gastex
```

```
5983      node,imark,fmark,rmark,drawqbpedge,drawedge,drawloop,%
5984 %%
5985 %% pst-labo
5986      Distillation,Ballon,%
5987 %%
5988 %% pst-optic
5989      lens,Transform,%
5990 %%
5991 %% pst-light3d
5992      PstLightThreeDText,%
5993 %%
5994 %% calendrier
5995      Calendrier,%
5996 %%
5997 %% pst-osci
5998     Oscillo%
5999   },%
6000    sensitive,%
6001    alsoother={0123456789$_},%
6002    morecomment=[l]\% %
6003   }[keywords,comments]%
```

6004 ⟨/lang3⟩

## 2.66 Python

Michael Weber sent me the definition. He got data from MARK LUTZ: **Programming Python**; O'Reilly 1996; ISBN 1-56592-197-6. Stephen Kelly reported some problems that indicated that the comment definitions needed to be moved after the string definitions to work correctly.

In August 2013 Alexis Dimitriadis reworked the definition by supplying the builtins. The current version is based on [https://docs.python.org/2/reference/lexical_analysis.html#identifiers](https://docs.python.org/2/reference/lexical_analysis.html#identifiers).

6005 ⟨*lang1⟩

```
6006 %%
6007 %% Python definition (c) 1998 Michael Weber
6008 %% Additional definitions (2013) Alexis Dimitriadis
6009 %% small corrections based on
6010 %% https://docs.python.org/2/reference/lexical_analysis.html#identifiers
6011 %%
6012 \lst@definelanguage[2]{Python}{%
6013   morekeywords={and, as, assert, break, class, continue, def, del, elif,%
6014     else, except, exec, finally, for, from, global, if, import, in, is,%
6015     lambda, not, or, pass, print, raise, return, try, while, with, yield},%
```

Python has a long list of builtin-in functions (altogether 76 entries plus 5 special ones) ([http://docs.python.org/2/library/functions.html](http://docs.python.org/2/library/functions.html)) and it is a good idea to make them visible in printed code.

```
6016   % Built-ins according to
```

```
6017   % http://docs.python.org/2/library/functions.html,
6018   % the last five entries are known as advanced or not essential
6019   morekeywords=[2]{abs, all, any, basestring, bin, bool, bytearray,%
6020     callable, chr, classmethod, cmp, compile, complex, delattr, dict, dir,%
6021     divmod, enumerate, eval, execfile, file, filter, float, format,%
6022     frozenset, getattr, globals, hasattr, hash, help, hex, id, input, int,%
6023     isinstance, issubclass, iter, len, list, locals, long, map, max,%
6024     memoryview, min, next, object, oct, open, ord, pow, property, range,%
6025     raw_input, reduce, reload, repr, reversed, round, set, setattr, slice,%
6026     sorted, staticmethod, str, sum, super, tuple, type, unichr, unicode,%
6027     vars, xrange, zip, __import__, apply, buffer, coerce, intern},%
6028   sensitive=true,%
6029   morecomment=[l]\#,%
6030   morestring=[s]{'''}{'''},% used for documentation text
6031                           % (multiline strings)
6032   morestring=[s]{"""}{"""},% added by Philipp Matthias Hahn
6033   morestring=[b]',%
6034   morestring=[b]"%
6035 }
```

Philipp Matthias Hahn added the third comment above. eRreuR found a bug using Python and Nicolas Markey informed me about the corresponding thread on `fr.comp.text.tex` and provided the fix—adding `[b]` to both `morestring` declarations.

Jürgen Dietel provided an example with a wrong representation of documentation strings, so the two lines added by Philipp Matthias Hahn got changed from `morestring` → `morecomment`.[3]

Python 3.0 was released in December 2008 and brought with it a number of new features. Naoki Sean Pross provided the lists of new keywords and built-in functions as well as the support for special strings.

```
6036 \lst@definelanguage[3]{Python}[2]{Python}{%
6037   % keywords
6038   deletekeywords={exec, print},
6039   morekeywords={False, None, True, async, await, nonlocal,
```

Python knows so called soft keywords:

```
6040                 match, case},
```

The list of built-in functions has changed considerably (only 71 entries, no special ones):

```
6041   % built-in functions
6042   deletekeywords=[2]{apply, basestring, buffer, cmp, coerce, execfile, %
6043     file, intern, long, raw_input, reduce, reload, unichr, unicode, xrange},
6044   morekeywords=[2]{aiter, anext, ascii, breakpoint, bytes, exec},
```

Python now supports special strings like *raw strings*, Unicode strings, and some more. Here is the definition of these strings:

```
6045   % 'raw' strings
```

---

[3] According to PEP (Python Enhancement Proposals—https://peps.python.org/pep-0257/) comment should be distinguished from documentation strings.

```
6046    morestring=[s]{r'}{'},
6047    morestring=[s]{r"}{"},
6048    morestring=[s]{r'''}{'''},
6049    morestring=[s]{r"""}{"""},
6050    morestring=[s]{R'}{'},
6051    morestring=[s]{R"}{"},
6052    morestring=[s]{R'''}{'''},
6053    morestring=[s]{R"""}{"""},
6054    % Unicode strings
6055    morestring=[s]{u'}{'},
6056    morestring=[s]{u"}{"},
6057    morestring=[s]{u'''}{'''},
6058    morestring=[s]{u"""}{"""},
6059    morestring=[s]{U'}{'},
6060    morestring=[s]{U"}{"},
6061    morestring=[s]{U'''}{'''},
6062    morestring=[s]{U"""}{"""},
6063    % Format strings
6064    morestring=[s]{f'}{'},
6065    morestring=[s]{f"}{"},
6066    morestring=[s]{f'''}{'''},
6067    morestring=[s]{f"""}{"""},
6068    morestring=[s]{F'}{'},
6069    morestring=[s]{F"}{"},
6070    morestring=[s]{F'''}{'''},
6071    morestring=[s]{F"""}{"""},
6072    % Byte literals
6073    morestring=[s]{b'}{'},
6074    morestring=[s]{b"}{"},
6075    morestring=[s]{b'''}{'''},
6076    morestring=[s]{b"""}{"""},
6077    morestring=[s]{B'}{'},
6078    morestring=[s]{B"}{"},
6079    morestring=[s]{B'''}{'''},
6080    morestring=[s]{B"""}{"""},
6081 }%
```

6082 ⟨/lang1⟩

Alexis Dimitriadis also proposes the following configuration for printing Python code which simulates colorizing the code as it's done by the IDLE GUI:

6083 ⟨*python-prf⟩

```
6084 \usepackage{xcolor}
6085 \usepackage{textcomp}
6086
6087 %% Actual colors from idlelib/config-highlight.def
6088 %%      --> corrected to ''web-safe''
6089 %% Unimplemented IDLE syntax: function/class names being
6090 %% defined should be blue
6091 %% strings  = #00aa00 / 0,170,0      (a darker green)
```

```
6092 %% builtins = #900090 / 144,0,144     (purple-ish)
6093 %% keywords = #FF7700 / 255,119,0     (quite close to plain 'orange')
6094 %\definecolor{IDLEorange}{RGB}{255,119,0} % pretty close to real orange
6095 %\definecolor{IDLEpurple}{RGB}{144,0,144}
6096 %\definecolor{IDLEgreen}{RGB}{0,170,0}
6097 %\definecolor{IDLEred}{RGB}{221,0,0}
6098 %% Corrected to ''web-safe''
6099 %\definecolor{orange2}{RGB}{255,102,0}
6100 \definecolor{purple2}{RGB}{153,0,153} % there's actually no standard purple
6101 \definecolor{green2}{RGB}{0,153,0} % a darker green
6102 %\definecolor{red2}{RGB}{221,0,0}
6103
6104 % Except for green and purple, the other colors are pretty good in standard
6105 % hue
6106 \lstdefinestyle{python-idle-code}{%
6107   language=Python,                  % the language
6108   basicstyle=\normalsize\ttfamily,  % size of the fonts for the code
6109   % Color settings to match IDLE style
6110   keywordstyle=\color{orange},      % core keywords
6111   keywordstyle={[2]\color{purple2}}, % built-ins
6112   stringstyle=\color{green2},%
6113   commentstyle=\color{red},%
6114   upquote=true,                     % requires textcomp
6115 }
6116 % Unimplemented IDLE syntax: function/class names being defined should be
6117 % blue
```

This code is provided in the file `listings-python.prf`, see section 2.4.1 (Preferences) of the listings documentation.

```
6118 ⟨/python-prf⟩
```

## 2.67  Rexx

Patrick TJ McPhee provided this definition.

```
6119 ⟨*lang2⟩

6120 %%
6121 %% classic rexx listings definition
6122 %% by Patrick TJ McPhee <ptjm@interlog.com>
6123 %%
6124 \lst@definelanguage{Rexx}{%
6125     morekeywords={address,arg,call,do,drop,else,end,exit,if,interpret,%
6126                   iterate,leave,nop,numeric,options,otherwise,parse,%
6127                   procedure,pull,push,queue,return,say,select,signal,then,%
6128                   to,trace,when},%
6129     sensitive=false,%
6130     morecomment=[l]{--},%
6131     morecomment=[n]{/*}{*/},%
6132     morestring=[d]{'},%
6133     morestring=[d]{"},%
```

```
6134    }[keywords,comments,strings]
```

6135 ⟨/lang2⟩

There are two dialects of Rexx: the one from System Product Interpreter Reference, VM/XA SP Release 1 and Release 2 and the modern version ooRexx (see http://www.oorexx.org/).

### 2.67.1 Rexx—VM/XA

6136 ⟨∗lang2⟩

```
6137 %%
6138 %% REXX keywords from System Product Interpreter Reference, VM/XA SP Release 1
6139 %% and Release 2
6140 \lst@definelanguage[VM/XA]{Rexx}[]{Rexx}{%
6141   morekeywords={all,by,digits,commands,end,engineering,error,errors,expose,%
6142     external,for,form,fuzz,halt,labels,intermediates,negative,normal,novalue,%
6143     on,off,results,scan,scientific,select,source,stream,syntax,until,upper,%
6144     value,var,version,while,with},%
6145   morekeywords=[2]{abbrev,abs,address,bitand,bitor,bitxor,center,centre,%
6146     compare,copies,c2d,c2x,datatype,date,delstr,delword,diag,diagrc,%
6147     d2c,d2x,errortext,externals,find,format,index,insert,justify,%
6148     lastpos,left,length,linein,lineout,lines,linesize,max,min,overlay,%
6149     pos,queued,random,reverse,rigth,sign,sourceline,space,storage,%
6150     strip,substr,subword,symbol,time,translate,trunc,userid,value,verify,%
6151     word,wordindex,wordlength,words,xrange,x2c,x2d},%
6152   morekeywords=[3]{result,rc,self,sigl,super},%
6153   sensitive=false,%
6154   morestring=[d]",%
6155   morestring=[d]',%
6156 }[keywords,comments,strings]
```

6157 ⟨/lang2⟩

Shmuel (Seymour J.) Metz pointed out the previously unsupported special variables `result` etc.. He also gave the advice to complete the definitions for OORexx in the following section.

### 2.67.2 ooRexx

6158 ⟨∗lang2⟩

```
6159 %%
6160 %% ooREXX keywords (http://www.oorexx.org/)
6161 \lst@definelanguage[]{OORexx}[VM/XA]{Rexx}{%
6162   morekeywords={::annotate, ::attribute, ::class, ::constant, ::method,%
6163     ::options, ::requires, ::resource, ::routine,%
6164     forward, guard, local, loop, raise, strict,%
6165   },%
6166   alsoletter={:}
6167 }[keywords,comments,strings]
```

6168 ⟨/lang2⟩

Jobst Hoffmann added the following configuration for printing Rexx code which is similar to the colors used by the Fortran preferences file.

6169 ⟨∗rexx-prf⟩

```
6170 \usepackage{xcolor}                    % needed for colors like yellow!10
6171 \usepackage{textcomp}                  % needed for upquote
6172
6173 \lstdefinestyle{rexx-colored}{%
6174   language=oorexx,                     % the language
6175   backgroundcolor=\color{yellow!10},
6176   basicstyle=\normalsize\ttfamily,     % size of the fonts for
6177                                        % the code
6178   % Color settings to match JHf's preferred style
6179   keywordstyle=\color{blue},           % core keywords
6180   keywordstyle={[2]\color{cyan}},      % built-ins
6181   keywordstyle={[3]\color{olive}},     % special keywords
6182   stringstyle=\color{teal},%
6183   commentstyle=\color{orange},%
6184   upquote=true,                        % requires textcomp
6185 }
```

This code is provided in the file `listings-rexx.prf`, see section 2.4.1 (Preferences) of the listings documentation.

6186 ⟨/rexx-prf⟩

## 2.68   Reduce

was provided by Geraint Paul Bevan.

6187 ⟨∗lang3⟩

```
6188 %%
6189 %% Reduce definition (c) 2002 Geraint Paul Bevan
6190 %%
6191 \lst@definelanguage{Reduce}%
6192   {morekeywords={%
6193 %% reserved identifiers
6194   abs,acos,acosh,acot,acoth,acsc,acsch,%
6195   adjprec,algebraic,algint,allbranch,allfac,and,%
6196   antisymmetric,append,arglength,array,asec,asech,%
6197   asin,asinh,atan,atan2,atanh,begin,bfspace,bye,%
6198   card_no,ceiling,clear,clearrules,coeff,coeffn,%
6199   cofactor,combineexpt,combinelogs,comment,comp,%
6200   complex,conj,cons,cont,cos,cosh,cot,coth,cramer,%
6201   cref,csc,csch,decompose,define,defn,deg,demo,den,%
6202   depend,det,df,difference,dilog,display,div,do,e,%
6203   echo,ed,editdef,ei,end,eps,eq,equal,erf,errcont,%
6204   evallhseqp,eval_mode,even,evenp,exp,expandlogs,%
6205   expr,expt,ezgcd,factor,factorial,factorize,fexpr,%
6206   first,fix,fixp,floor,for,forall,foreach,fort,%
6207   fort_width,freeof,fullroots,g,gcd,geq,go,goto,%
```

```
6208 greaterp,high_pow,hypot,i,if,ifactor,impart,in,%
6209 index,infinity,infix,input,int,integer,interpol,%
6210 intstr,k,korder,lambda,lcm,lcof,length,leq,lessp,%
6211 let,lhs,linear,linelength,lisp,list,listargp,%
6212 listargs,ln,load,load_package,log,log10,logb,%
6213 low_pow,lterm,macro,mainvar,mass,mat,match,%
6214 mateigen,matrix,max,mcd,member,memq,min,minus,mkid,%
6215 modular,msg,mshell,multiplicities,nat,neq,nero,%
6216 nextprime,nil,nodepend,noncom,nonzero,nosplit,%
6217 nospur,nullspace,num,numberp,odd,off,on,operator,%
6218 or,order,ordp,out,output,part,pause,period,pf,pi,%
6219 plus,precedence,precise,precision,pret,pri,primep,%
6220 print_precision,procedure,product,quit,quotient,%
6221 random,random_new_seed,rank,rat,ratarg,rational,%
6222 rationalize,ratpri,real,rederr,reduct,remainder,%
6223 remfac,remind,repart,repeat,rest,resultant,retry,%
6224 return,reverse,revpri,rhs,rlisp88,%
6225 root_multiplicity,round,roundall,roundbf,rounded,%
6226 saveas,savestructr,scalar,sec,sech,second,set,%
6227 setmod,setq,share,showrules,showtime,shut,sign,sin,%
6228 sinh,smacro,solve,solvesingular,spur,sqrt,structr,%
6229 sub,sum,symbolic,symmetric,t,tan,tanh,third,time,%
6230 times,tp,tra,trace,trfac,trigform,trint,until,%
6231 varname,vecdim,vector,weight,when,where,while,%
6232 write,ws,wtlevel,%
6233 %% identifiers with spaces
6234 %% for all,for each,go to,such that,%
6235 },%
6236   sensitive=false,%
6237   morecomment=[l]\%,%
6238   morecomment=[s]{COMMENT}{;},%
6239   morecomment=[s]{COMMENT}{$},%
6240   morestring="%
6241 }[keywords,comments,strings]

6242 ⟨/lang3⟩
```

## 2.69   RSL

Thanks go to Brian Christensen.

```
6243 ⟨∗lang3⟩

6244 %%
6245 %% RSL definition (c) 2004 Brian Christensen
6246 %%
6247 \lst@definelanguage{RSL}%
6248   {morekeywords={Bool,Char,devt_relation,Int,Nat,Real,Text,Unit,abs,any,%
6249       as,axiom,card,case,channel,chaos,class,do,dom,elems,else,elsif,end,%
6250       extend,false,for,hd,hide,if,in,inds,initialise,int,len,let,local,%
6251       object,of,out,post,pre,read,real,rng,scheme,skip,stop,swap,%
```

```
6252        test_case,theory,then,tl,true,type,until,use,value,variable,while,%
6253        with,write},%
6254 literate=%
6255 {<}{$<$}{1}%
6256 {>}{$>$}{1}%
6257 {[}{$[$}{1}%%
6258 {]}{$]$}{1}%%
6259 {^}{{\mbox{$\widehat{\;}$}}}{1}%%
6260 {'}{{\raisebox{1ex}[1ex][0ex]{\protect\scriptsize$\prime$}}}{1}%%
6261 {||}{{\mbox{$\parallel$}}}{2}%%
6262 {|-}{$\vdash$}{1}%%
6263 {|=|}{{\mbox{$\lceil\!\rceil\!\!\!\!\!\!\;\lfloor\!\rfloor$}}}{1}%%
6264 {**}{$\uparrow$}{1}%
6265 {/\\}{$\wedge$}{1}%%
6266 {inter}{$\cap$}{1}%%
6267 {-\\}{$\lambda$}{1}%%
6268 {->}{$\rightarrow$}{1}%%
6269 {-m->}{{\mbox{$\rightarrow \hspace{-2.5\lst@width} _{m}\;$}}}{1}%
6270 {-~m->}{{\mbox{$\stackrel{\sim}{\mbox{$\rightarrow%
6271              \hspace{-2.5\lst@width} _{m}\;$}}$}}}{1}%
6272 {-~->}{{\mbox{$\stackrel{\sim}{\rightarrow}$}}}{1}%%
6273 {-set}{\bf{-set}}{4}%%
6274 {-list}{{$^{\ast}$}}{1}%%
6275 {-inflist}{$^\omega$}{1}%
6276 {-infset}{{\mbox{{\bf -infset}}}}{7}%
6277 {\#}{$\circ$}{1}%
6278 {:-}{{\raisebox{.4ex}{\tiny $\bullet$}}}{1}%%
6279 {=}{$=$}{1}%%
6280 {==}{$==$}{2}%%
6281 {=>}{$\Rightarrow$}{1}%%
6282 {\ is\protect\^^M}{{$\;\equiv$}}{2}%
6283 {\ is\ }{{$\equiv$}}{3}%%
6284 {\ isin\protect\^^M}{$\;\in$}{2}%%
6285 {~}{$\sim$}{1}%%
6286 {~=}{$\neq$}{1}%%
6287 {~isin}{$\notin$}{1}%%
6288 {+>}{$\mapsto$}{1}%%
6289 {++}{}{1}%
6290 {|^|}{{\mbox{$\lceil\!\rceil$}}}{1}%%
6291 {\\/}{$\vee$}{1}%%
6292 {exists}{$\exists$}{1}%%
6293 {union}{$\cup$}{1}%%
6294 {>=}{$\geq$}{1}%%
6295 {><}{$\times$}{1}%%
6296 {>>}{$\supset$}{1}%
6297 {>>=}{$\supseteq$}{1}%%
6298 {<=}{$\leq$}{1}%%
6299 {<<}{$\subset$}{1}%
6300 {<.}{$\langle$}{1}%%
6301 {<<=}{$\subseteq$}{1}%%
```

```
6302 {<->}{$\leftrightarrow$}{1}%%
6303 {[=}{$\sqsubseteq$}{1}%%
6304 {\{=}{$\preceq$}{1}%%
6305 {\ all\protect\^^M}{$\forall$}{2}%%
6306 {\ all\ }{$\forall$}{3}%%
6307 {!!}{$\dagger$}{1}%%
6308 {always}{$\Box$}{1}%%
6309 {.>}{$\rangle$}{1}%%
6310 {`alpha}{$\alpha$}{1}%
6311 {`beta}{$\beta$}{1}%
6312 {`gamma}{$\gamma$}{1}%
6313 {`delta}{$\delta$}{1}%
6314 {`epsilon}{$\epsilon$}{1}%
6315 {`zeta}{$\zeta$}{1}%
6316 {`eta}{$\eta$}{1}%
6317 {`theta}{$\theta$}{1}%
6318 {`iota}{$\iota$}{1}%
6319 {`kappa}{$\kappa$}{1}%
6320 {`mu}{$\mu$}{1}%
6321 {`nu}{$\nu$}{1}%
6322 {`xi}{$\xi$}{1}%
6323 {`pi}{$\pi$}{1}%
6324 {`rho}{$\rho$}{1}%
6325 {`sigma}{$\sigma$}{1}%
6326 {`tau}{$\tau$}{1}%
6327 {`upsilon}{$\upsilon$}{1}%
6328 {`phi}{$\phi$}{1}%
6329 {`chi}{$\chi$}{1}%
6330 {`psi}{$\psi$}{1}%
6331 {`omega}{$\omega$}{1}%
6332 {`Gamma}{$\Gamma$}{1}%
6333 {`Delta}{$\Delta$}{1}%
6334 {`Theta}{$\Theta$}{1}%
6335 {`Lambda}{$\Lambda$}{1}%
6336 {`Xi}{$\Xi$}{1}%
6337 {`Pi}{$\Pi$}{1}%
6338 {`Sigma}{$\Sigma$}{1}%
6339 {`Upsilon}{$\Upsilon$}{1}%
6340 {`Phi}{$\Phi$}{1}%
6341 {`Psi}{$\Psi$}{1}%
6342 {`Omega}{$\Omega$}{1},%
6343   sensitive=true,%
6344   morecomment=[l]{--},%
6345   morecomment=[s]{/*}{*/}%
6346  }[keywords,comments]%

6347 ⟨/lang3⟩
```

## 2.70  Ruby

Christian Kaiser provided the initial definition. Xavier Noria replaced the keywords with the keywords from the at the time of writing current stable Ruby version. An erroneous string delimiter was removed following a bug reported on comp.text.tex on 2006/09/01.

Ruby supports string delimiters of the form %q!...!, where ! can be any character, or can be matched braces or parentheses or brackets. The included string definitions include most of the common variants, but are of course not comprehensive.

6348 ⟨∗lang2⟩

```
6349 \lst@definelanguage{Ruby}%
6350   {morekeywords={__FILE__,__LINE__,BEGIN,END,alias,and,begin,break,%
6351       case,class,def,defined?,do,else,elsif,end,ensure,false,for,%
6352       if,in,module,next,nil,not,or,redo,rescue,retry,return,self,%
6353       super,then,true,undef,unless,until,when,while,yield},%
6354   sensitive=true,%
6355   morecomment=[l]\#,%
6356   morecomment=[l]\#\#,%
6357   morecomment=[s]{=BEGIN}{=END},%
6358   morestring=[b]',%
6359   morestring=[b]",%
6360   morestring=[s]{\%q/}{/},%
6361   morestring=[s]{\%q!}{!},%
6362   morestring=[s]{\%q\{}{\}},%
6363   morestring=[s]{\%q(}{)},%
6364   morestring=[s]{\%q[}{]},%
6365   morestring=[s]{\%q-}{-},%
6366   morestring=[s]{\%Q/}{/},%
6367   morestring=[s]{\%Q!}{!},%
6368   morestring=[s]{\%Q\{}{\}},%
6369   morestring=[s]{\%Q(}{)},%
6370   morestring=[s]{\%Q[}{]},%
6371   morestring=[s]{\%Q-}{-}%
6372   }[keywords,comments,strings]
6373 %     \begin{macrocode}
```

6374 ⟨/lang2⟩

## 2.71  Scilab

Thanks go to Jean-Philippe Grivet.

6375 ⟨∗lang1⟩

```
6376 %%
6377 %% Scilab definition (c) 2002,2003 Jean-Philippe Grivet
6378 %%
6379 \lst@definelanguage{Scilab}%
6380   {morekeywords={abcd,abinv,abort,abs,acoshm,acosh,acosm,acos,addcolor,%
6381       addf,addinter,addmenu,add_edge,add_node,adj2sp,adj_lists,aff2ab,%
```

```
6382    amell,analpf,analyze,ans,apropos,arc_graph,arc_number,argn,arhnk,%
6383    arl2,arma2p,armac,armax1,armax,arma,arsimul,artest,articul,ascii,%
6384    asinhm,asinh,asinm,asin,atanhm,atanh,atanm,atan,augment,auread,%
6385    auwrite,balanc,balreal,bandwr,basename,bdiag,besseli,besselj,%
6386    besselk,bessely,best_match,bezout,bifish,bilin,binomial,black,%
6387    bloc2exp,bloc2ss,bode,bool2s,boolean,boucle,break,bstap,buttmag,%
6388    bvode,cainv,calerf,calfrq,call,canon,casc,case,ccontrg,cdfbet,%
6389    cdfbin,cdfchi,cdfchn,cdffnc,cdff,cdfgam,cdfnbn,cdfnor,cdfpoi,%
6390    cdft,ceil,center,cepstrum,chaintest,chain_struct,champ1,champ,%
6391    chart,chdir,cheb1mag,cheb2mag,check_graph,check_io,chepol,chfact,%
6392    chol,chsolve,circuit,classmarkov,clean,clearfun,clearglobal,%
6393    clear,close,cls2dls,cmb_lin,cmndred,cmoment,code2str,coeff,coffg,%
6394    coff,colcompr,colcomp,colinout,colormap,colregul,companion,comp,%
6395    cond,conj,connex,contour2di,contour2d,contourf,contour,%
6396    contract_edge,contrss,contr,cont_frm,cont_mat,convex_hull,convol,%
6397    convstr,con_nodes,copfac,copy,correl,corr,coshm,cosh,cosm,cos,%
6398    cotg,cothm,coth,covar,csim,cspect,ctr_gram,cumprod,cumsum,%
6399    curblock,cycle_basis,czt,c_link,dasrt,dassl,datafit,date,dbphi,%
6400    dcf,ddp,debug,dec2hex,deff,definedfields,degree,delbpt,%
6401    delete_arcs,delete_nodes,delete,delip,delmenu,demos,denom,%
6402    derivative,derivat,des2ss,des2tf,determ,detr,det,dft,dhinf,%
6403    dhnorm,diag,diary,diff,diophant,dirname,dispbpt,dispfiles,disp,%
6404    dlgamma,double,dragrect,drawaxis,drawlater,drawnow,draw,driver,%
6405    dscr,dsearch,dsimul,dtsi,dt_ility,duplicate,edge_number,%
6406    edit_curv,edit_graph_menus,edit_graph,edit,eigenmarkov,ell1mag,%
6407    elseif,else,emptystr,endfunction,end,eqfir,eqiir,equil1,equil,%
6408    ereduc,erfcx,erfc,erf,errbar,errcatch,errclear,error,eval3dp,%
6409    eval3d,eval,evans,evstr,excel2sci,execstr,exec,exists,exit,expm,%
6410    exp,external,eye,fac3d,factors,faurre,fchamp,fcontour2d,fcontour,%
6411    fec,feedback,feval,ffilt,fftshift,fft,fgrayplot,figure,fileinfo,%
6412    file,filter,findm,findobj,findx0BD,find_freq,find_path,find,%
6413    findABCD,findAC,findBD,findBDK,findR,fit_dat,fix,floor,flts,foo,%
6414    formatman,format,fort,for,fourplan,fplot2d,fplot3d1,fplot3d,%
6415    fprintf,fprintfMat,frep2tf,freq,freson,frexp,frfit,frmag,fscanf,%
6416    fscanfMat,fsfirlin,fsolve,fspecg,fstabst,fstair,ftest,ftuneq,%
6417    fullrfk,fullrf,full,fun2string,funcprot,functions,function,%
6418    funptr,fusee,gainplot,gamitg,gammaln,gamma,gcare,gcd,gcf,%
6419    genfac3d,genlib,genmarkov,gen_net,geom3d,geomean,getblocklabel,%
6420    getcolor,getcurblock,getcwd,getdate,getd,getenv,getfield,getfont,%
6421    getf,getio,getlinestyle,getmark,getpid,getscicosvars,getsymbol,%
6422    getvalue,getversion,get_function_path,get,gfare,gfrancis,girth,%
6423    givens,glever,glist,global,glue,gpeche,graduate,grand,%
6424    graphics_entities,graph_2_mat,graph_center,graph_complement,%
6425    graph_diameter,graph_power,graph_simp,graph_sum,graph_union,%
6426    graph-list,graycolormap,grayplot,graypolarplot,grep,group,%
6427    gr_menu,gschur,gsort,gspec,gstacksize,gtild,g_margin,h2norm,halt,%
6428    hamilton,hankelsv,hank,harmean,havewindow,help,hermit,hess,%
6429    hex2dec,hilb,hinf,hist3d,histplot,horner,host,hotcolormap,%
6430    householder,hrmt,htrianr,hypermat,h_cl,h_inf_st,h_inf,h_norm,%
6431    iconvert,icon_edit,ieee,if,iirgroup,iirlp,iir,ilib_build,%
```

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```
6432        ilib_compile,ilib_for_link,ilib_gen_gateway,ilib_gen_loader,%
6433        ilib_gen_Make,imag,impl,imrep2ss,imult,im_inv,inistate,input,%
6434        int16,int2d,int32,int3d,int8,intc,intdec,integrate,interpln,%
6435        interp,intersci,intersect,intg,intl,intppty,intsplin,inttrap,%
6436        inttype,int,invr,invsyslin,inv_coeff,inv,iqr,isdef,isdir,isequal,%
6437        iserror,isglobal,isinf,isnan,isoview,isreal,is_connex,jmat,%
6438        justify,kalm,karmarkar,kernel,keyboard,knapsack,kpure,krac2,%
6439        kroneck,kron,lasterror,lattn,lattp,lcf,lcmdiag,lcm,ldivf,ldiv,%
6440        leastsq,legends,length,leqr,levin,lev,lex_sort,lft,lgfft,library,%
6441        lib,lin2mu,lincos,lindquist,lines,line_graph,linfn,linf,link,%
6442        linmeq,linpro,linsolve,linspace,lin,listfiles,list,lmisolver,%
6443        lmitool,loadmatfile,loadplots,loadwave,load_graph,load,locate,%
6444        log10,log1p,log2,logm,logspace,log,lotest,lqe,lqg2stan,lqg_ltr,%
6445        lqg,lqr,lsq,lsslist,lstcat,lstsize,ltitr,ludel,lufact,luget,%
6446        lusolve,lu,lyap,macglov,macr2lst,macrovar,macro,mad,make_graph,%
6447        make_index,manedit,man,mapsound,markp2ss,matfile2sci,matrix,%
6448        mat_2_graph,maxi,max_cap_path,max_clique,max_flow,max,mclearerr,%
6449        mclose,meanf,mean,median,meof,mese,mesh2d,mfft,mfile2sci,mgeti,%
6450        mgetl,mgetstr,mget,milk_drop,mine,mini,minreal,minss,%
6451        min_lcost_cflow,min_lcost_flow1,min_lcost_flow2,min_qcost_flow,%
6452        min_weight_tree,min,mlist,mode,modulo,moment,mopen,move,%
6453        mps2linpro,mputl,mputstr,mput,mrfit,msd,mseek,mtell,mtlb_load,%
6454        mtlb_mode,mtlb_save,mtlb_sparse,mu2lin,mulf,mvvacov,m_circle,%
6455        names,nand2mean,nanmax,nanmeanf,nanmean,nanmedian,nanmin,%
6456        nanstdev,nansum,narsimul,ndims,nearfloat,nehari,neighbors,%
6457        netclose,netwindows,netwindow,newest,newfun,nextpow2,nf3d,nfreq,%
6458        nlev,nnz,nodes_2_path,nodes_degrees,node_number,noisegen,norm,%
6459        null,numdiff,numer,nyquist,obscont1,obscont,observer,obsvss,%
6460        obsv_mat,obs_gram,odedc,odedi,odeoptions,ode_discrete,ode_root,%
6461        ode,oldload,oldsave,ones,optim,orth,param3d1,param3d,%
6462        paramfplot2d,parrot,part,pathconvert,path_2_nodes,pause,pbig,%
6463        pdiv,pen2ea,pencan,penlaur,perctl,perfect_match,pertrans,pfss,%
6464        phasemag,phc,pinv,pipe_network,playsnd,plot2d1,plot2d2,plot2d3,%
6465        plot2d4,plot2d,plot3d1,plot3d2,plot3d3,plot3d,plotframe,%
6466        plotprofile,plot_graph,plot,plzr,pmodulo,pol2des,pol2str,pol2tex,%
6467        polarplot,polar,polfact,poly,portr3d,portrait,power,ppol,prbs_a,%
6468        predecessors,predef,printf,printing,print,prod,profile,projsl,%
6469        projspec,proj,psmall,pspect,pvm_addhosts,pvm_barrier,pvm_bcast,%
6470        pvm_bufinfo,pvm_config,pvm_delhosts,pvm_error,pvm_exit,%
6471        pvm_f772sci,pvm_getinst,pvm_gettid,pvm_get_timer,pvm_gsize,%
6472        pvm_halt,pvm_joingroup,pvm_kill,pvm_lvgroup,pvm_mytid,pvm_parent,%
6473        pvm_probe,pvm_recv,pvm_reduce,pvm_sci2f77,pvm_send,pvm_set_timer,%
6474        pvm_spawn_independent,pvm_spawn,pvm_start,pvm_tasks,%
6475        pvm_tidtohost,pvm,pwd,p_margin,qassign,qr,quapro,quart,quaskro,%
6476        quit,randpencil,rand,range,rankqr,rank,rat,rcond,rdivf,read4b,%
6477        readb,readc_,readmps,read,real,recur,reglin,regress,remezb,remez,%
6478        repfreq,replot,residu,resume,return,riccati,riccsl,ricc,ric_desc,%
6479        rlist,roots,rotate,round,routh_t,rowcompr,rowcomp,rowinout,%
6480        rowregul,rowshuff,rpem,rref,rtitr,rubberbox,salesman,savewave,%
6481        save_graph,save,scaling,scanf,schur,sci2exp,sci2for,sci2map,%
```

```
6482        sciargs,scicosim,scicos,scifunc_block,sd2sci,secto3d,select,%
6483        semidef,sensi,setbpt,seteventhandler,setfield,setmenu,%
6484        setscicosvars,set,sfact,sgrid,shortest_path,showprofile,%
6485        show_arcs,show_graph,show_nodes,sident,signm,sign,simp_mode,simp,%
6486        sincd,sinc,sinc,sinhm,sinh,sinm,sin,size,sm2des,sm2ss,smooth,%
6487        solve,sorder,sort,sound,sp2adj,spaninter,spanplus,spantwo,sparse,%
6488        spchol,spcompack,specfact,spec,speye,spget,splin,split_edge,%
6489        spones,sprand,sprintf,spzeros,sqroot,sqrtm,sqrt,squarewave,%
6490        square,srfaur,srkf,ss2des,ss2ss,ss2tf,sscanf,sskf,ssprint,ssrand,%
6491        stabil,stacksize,standard_define,standard_draw,standard_input,%
6492        standard_origin,standard_output,startup,stdevf,stdev,steadycos,%
6493        str2code,strange,strcat,strindex,strings,string,stripblanks,%
6494        strong_connex,strong_con_nodes,strsubst,st_deviation,st_ility,%
6495        subf,subgraph,subplot,successors,sum,supernode,sva,svd,svplot,%
6496        sylm,sylv,sysconv,sysdiag,sysfact,syslin,syssize,systems,system,%
6497        systmat,tabul,tangent,tanhm,tanh,tanm,tan,tdinit,testmatrix,%
6498        texprint,tf2des,tf2ss,then,thrownan,timer,time_id,titlepage,%
6499        tk_getdir,tk_getfile,tlist,toeplitz,tokenpos,tokens,trace,%
6500        translatepaths,trans_closure,trans,trfmod,trianfml,tril,trimmean,%
6501        trisolve,triu,trzeros,typename,typeof,type,uicontrol,uimenu,%
6502        uint16,uint32,uint8,ui_observer,ulink,unglue,union,unique,unix_g,%
6503        unix_s,unix_w,unix_x,unix,unobs,unsetmenu,user,varargin,%
6504        varargout,variancef,variance,varn,warning,wavread,wavwrite,%
6505        wcenter,wfir,what,whereami,whereis,where,while,whos,who_user,who,%
6506        wiener,wigner,window,winsid,with_gtk,with_pvm,with_texmacs,%
6507        with_tk,writb,write4b,write,xarcs,xarc,xarrows,xaxis,xbasc,%
6508        xbasimp,xbasr,xchange,xclear,xclea,xclick,xclip,xdel,xend,xfarcs,%
6509        xfarc,xfpolys,xfpoly,xfrect,xgetech,xgetfile,xgetmouse,xget,%
6510        xgraduate,xgrid,xinfo,xinit,xlfont,xload,xname,xnumb,xpause,%
6511        xpolys,xpoly,xrects,xrect,xrpoly,xs2fig,xs2gif,xs2ppm,xs2ps,%
6512        xsave,xsegs,select,xsetech,xsetm,xset,xstringb,xstringl,xstring,%
6513        xtape,xtitle,x_choices,x_choose,x_dialog,x_matrix,x_mdialog,%
6514        x_message_modeless,x_message,yulewalk,zeropen,zeros,zgrid,zpbutt,%
6515        zpch1,zpch2,zpell,mfprintf,mfscanf,mprintf,mscanf,msprintf,%
6516        msscanf,mucomp,%
6517        ABSBLK_f,AFFICH_f,ANDLOG_f,ANIMXY_f,BIGSOM_f,CLINDUMMY_f,CLKIN_f,%
6518        CLKINV_f,CLKOUT_f,CLKOUTV_f,CLKSOM_f,CLKSOMV_f,CLKSPLIT_f,%
6519        CLOCK_f,CLR_f,CLSS_f,CONST_f,COSBLK_f,CURV_f,DELAY_f,DELAYV_f,%
6520        DEMUX_f,DLR_f,DLRADAPT_f,DLSS_f,EVENTSCOPE_f,EVTDLY_f,EVTGEN_f,%
6521        EXPBLK_f,G_make,GAIN_f,GAINBLK_f,GENERAL_f,GENERIC_f,GENSIN_f,%
6522        GENSQR_f,HALT_f,IFTHEL_f,IN_f,INTEGRAL_f,INTRP2BLK_f,INTRPLBLK_f,%
6523        INVBLK_f,LOGBLK_f,LOOKUP_f,Matplot1,Matplot,MAX_f,MCLOCK_f,%
6524        MFCLCK_f,MIN_f,MUX_f,NDcost,NEGTOPOS_f,OUT_f,POSTONEG_f,POWBLK_f,%
6525        PROD_f,QUANT_f,RAND_f,READC_f,REGISTER_f,RELAY_f,RFILE_f,%
6526        ScilabEval,Sfgrayplot,Sgrayplot,SAMPLEHOLD_f,SAT_f,SAWTOOTH_f,%
6527        SCOPE_f,SCOPXY_f,SELECT_f,SINBLK_f,SOM_f,SPLIT_f,STOP_f,SUPER_f,%
6528        TANBLK_f,TCLSS_f,TEXT_f,TIME_f,TK_EvalFile,TK_EvalStr,TK_GetVar,%
6529        TK_SetVar,TRASH_f,WFILE_f,WRITEC_f,ZCROSS_f,%
6530        \%asn,\%helps,\%k,\%sn},%
6531    alsoletter=\%,% chmod
```

```
6532    sensitive,%
6533    morecomment=[l]//,%
6534    morestring=[b]",%
6535    morestring=[m]'%
6536    }[keywords,comments,strings]
```

6537 ⟨/lang1⟩

## 2.72   SHELXL

Thanks to Aidan Philip Heerdegen for mailing this definition.

6538 ⟨*lang2⟩

```
6539 %%
6540 %% SHELXL definition (c) 1999 Aidan Philip Heerdegen
6541 %%
6542 \lst@definelanguage{SHELXL}%
6543   {morekeywords={TITL,CELL,ZERR,LATT,SYMM,SFAC,DISP,UNIT,LAUE,%
6544       REM,MORE,TIME,END,HKLF,OMIT,SHEL,BASF,TWIN,EXTI,SWAT,%
6545       MERG,SPEC,RESI,MOVE,ANIS,AFIX,HFIX,FRAG,FEND,EXYZ,EADP,%
6546       EQIV,OMIT,CONN,PART,BIND,FREE,DFIX,BUMP,SAME,SADI,CHIV,%
6547       FLAT,DELU,SIMU,DEFS,ISOR,SUMP,L.S.,CGLS,SLIM,BLOC,DAMP,%
6548       WGHT,FVAR,BOND,CONF,MPLA,RTAB,LIST,ACTA,SIZE,TEMP,WPDB,%
6549       FMAP,GRID,PLAN,MOLE},%
6550     sensitive=false,%
6551     alsoother=_,% Makes the syntax highlighting ignore the underscores
6552     morecomment=[l]{! },%
6553   }%
```

6554 ⟨/lang2⟩

## 2.73   Simula

Took data from

- GÜNTHER LAMPRECHT: **Introduction to SIMULA 67**; Braunschweig; Wiesbaden: Vieweg, 1981

6555 ⟨*lang3⟩

```
6556 \lst@definelanguage[IBM]{Simula}[DEC]{Simula}{}%
```

```
6557 \lst@definelanguage[DEC]{Simula}[67]{Simula}%
6558   {morekeywords={and,eq,eqv,ge,gt,hidden,imp,le,long,lt,ne,not,%
6559       options,or,protected,short}%
6560   }%
6561 \lst@definelanguage[CII]{Simula}[67]{Simula}%
6562   {morekeywords={and,equiv,exit,impl,not,or,stop}}%
```

```
6563 \lst@definelanguage[67]{Simula}%
6564   {morekeywords={activate,after,array,at,before,begin,boolean,%
6565       character,class,comment,delay,detach,do,else,end,external,false,%
6566       for,go,goto,if,in,inner,inspect,integer,is,label,name,new,none,%
```

```
6567        notext,otherwise,prior,procedure,qua,reactivate,real,ref,resume,%
6568        simset,simulation,step,switch,text,then,this,to,true,until,value,%
6569        virtual,when,while},%
6570     sensitive=f,%
6571     keywordcommentsemicolon={end}{else,end,otherwise,when}{comment},%
6572     morestring=[d]",%
6573     morestring=[d]'%
6574   }[keywords,keywordcomments,strings]
```

6575 ⟨/lang3⟩

## 2.74 SPARQL

This definition for the SPARQL query language (SPARQL Protocol and RDF
Query Language, http://www.w3.org/TR/rdf-sparql-query/) was provided by
Christoph Kiefer.

6576 ⟨∗lang3⟩

```
6577 %%
6578 %% SPARQL definition (c) 2006 Christoph Kiefer
6579 %%
6580 \lst@definelanguage{SPARQL}%
6581   {morekeywords={BASE,PREFIX,SELECT,DISTINCT,CONSTRUCT,DESCRIBE,ASK,%
6582        FROM,NAMED,WHERE,ORDER,BY,ASC,DESC,LIMIT,OFFSET,OPTIONAL,%
6583        GRAPH,UNION,FILTER,a,STR,LANG,LANGMATCHES,DATATYPE,BOUND,%
6584        isIRI,isURI,isBLANK,isLITERAL,REGEX,true,false},%
6585     sensitive=false,%
6586     morecomment=[l]\#,%
6587     morestring=[d]',%
6588     morestring=[d]"%
6589   }[keywords,comments,strings]
```

6590 ⟨/lang3⟩

## 2.75 SQL

Data come from Christian Haul. Neil Conway added some keywords, ditto
Torsten Flatter, Robert Frank and Dirk Jesko. Hilmar Preuße informed about
an issue mentioned at https://bugs.debian.org/626521, the issue got cor-
rected.

6591 ⟨∗lang1⟩

```
6592 %%
6593 %% SQL definition (c) 1998 Christian Haul
6594 %%                 (c) 2002 Neil Conway
6595 %%                 (c) 2002 Robert Frank
6596 %%                 (c) 2003 Dirk Jesko
6597 %%
6598 \lst@definelanguage{SQL}%
6599   {morekeywords={ABSOLUTE,ACTION,ADD,ALLOCATE,ALTER,ARE,AS,ASSERTION,%
```

```
6600        AT,BEGIN,BETWEEN,BIT_LENGTH,BOTH,BY,CASCADE,CASCADED,CASE,CAST,%
6601        CATALOG,CHAR_LENGTH,CHARACTER_LENGTH,CLUSTER,COALESCE,%
6602        COLLATE,COLLATION,COLUMN,CONNECT,CONNECTION,CONSTRAINT,%
6603        CONSTRAINTS,CONVERT,CORRESPONDING,CREATE,CROSS,CURRENT_DATE,%
6604        CURRENT_TIME,CURRENT_TIMESTAMP,CURRENT_USER,DAY,DEALLOCATE,%
6605        DEC,DEFERRABLE,DEFERED,DESCRIBE,DESCRIPTOR,DIAGNOSTICS,%
6606        DISCONNECT,DOMAIN,DROP,ELSE,END,EXEC,EXCEPT,EXCEPTION,EXECUTE,%
6607        EXTERNAL,EXTRACT,FALSE,FIRST,FOREIGN,FROM,FULL,GET,GLOBAL,%
6608        GRAPHIC,HAVING,HOUR,IDENTITY,IMMEDIATE,INDEX,INITIALLY,INNER,%
6609        INPUT,INSENSITIVE,INSERT,INTO,INTERSECT,INTERVAL,%
6610        ISOLATION,JOIN,KEY,LAST,LEADING,LEFT,LEVEL,LIMIT,LOCAL,LOWER,%
6611        MATCH,MINUTE,MONTH,NAMES,NATIONAL,NATURAL,NCHAR,NEXT,NO,NOT,NULL,%
6612        NULLIF,OCTET_LENGTH,ON,ONLY,ORDER,ORDERED,OUTER,OUTPUT,OVERLAPS,%
6613        PAD,PARTIAL,POSITION,PREPARE,PRESERVE,PRIMARY,PRIOR,READ,%
6614        RELATIVE,RESTRICT,REVOKE,RIGHT,ROWS,SCROLL,SECOND,SELECT,SESSION,%
6615        SESSION_USER,SIZE,SPACE,SQLSTATE,SUBSTRING,SYSTEM_USER,%
6616        TABLE,TEMPORARY,THEN,TIMEZONE_HOUR,%
6617        TIMEZONE_MINUTE,TRAILING,TRANSACTION,TRANSLATE,TRANSLATION,TRIM,%
6618        TRUE,UNIQUE,UNKNOWN,UPPER,USAGE,USING,VALUE,VALUES,%
6619        VARGRAPHIC,VARYING,WHEN,WHERE,WRITE,YEAR,ZONE,%
6620        AND,ASC,avg,CHECK,COMMIT,count,DECODE,DESC,DISTINCT,GROUP,IN,% FF
6621        LIKE,NUMBER,ROLLBACK,SUBSTR,sum,VARCHAR2,% FF
6622        MIN,MAX,UNION,UPDATE,% RF
6623        ALL,ANY,CUBE,CUBE,DEFAULT,DELETE,EXISTS,GRANT,OR,RECURSIVE,% DJ
6624        ROLE,ROLLUP,SET,SOME,TRIGGER,VIEW},% DJ
6625    morendkeywords={BIT,BLOB,CHAR,CHARACTER,CLOB,DATE,DECIMAL,FLOAT,% DJ
6626        INT,INTEGER,NUMERIC,SMALLINT,TIME,TIMESTAMP,VARCHAR},% moved here
6627    sensitive=false,% DJ
6628    morecomment=[l]--,%
6629    morecomment=[s]{/*}{*/},%
6630    morestring=[d]',%
6631    morestring=[d]"%
6632    }[keywords,comments,strings]

6633 ⟨/lang1⟩
```

## 2.76   Swift

The definition for Swift was provided by Stefan Jager.

```
6634 ⟨∗lang3⟩

6635 \lst@definelanguage{Swift}{%
6636   morekeywords={associatedtype,class,deinit,enum,extension,fileprivate,%
6637     func,import,init,inout,internal,let,open,operator,private,protocol,%
6638     public,static,struct,subscript,typealias,var,break,case,continue,%
6639     default,defer,do,else,fallthrough,for,guard,if,in,repeat,return,%
6640     switch,where,while,as,Any,catch,false,is,nil,rethrows,super,self,%
6641     Self,throw,throws,true,try,_,associativity,convenience,dynamic,%
6642     didSet,final,get,infix,indirect,lazy,left,mutating,none,%
6643     nonmutating,optional,override,postfix,precedence,prefix,Protocol,%
```

```
6644      required,right,set,Type,unowned,weak,willSet},%
6645  sensitive,%
6646  morecomment=[s]{/*}{*/},%
6647  morecomment=[s]{/**}{*/},%
6648  morecomment=[l]//,%
6649  morecomment=[l]///,%
6650  morestring=[b]",%
6651  morestring=[b]""",%
6652  moredelim=*[directive]\#,%
6653  moredirectives={available,colorLiteral,column,else,elseif,endif,file,%
6654      fileLiteral,function,if,imageLiteral,line,selector,sourceLocation}%
6655 }[keywords,comments,strings,directives]%
```

6656 ⟨/lang3⟩

## 2.77   Tcl/Tk

Tcl/Tk is a very dynamic language. A statical analysis might not be adequate. Nevertheless the following definitions produce the desired result for my programs with a minimum of "misses".

Data come from

- WELCH, BRENT B.: **Practical Programming in Tcl and Tk**; © 1997 Prentice Hall, Inc.; ISBN 0-13-616830-2.

- OUSTERHOUT, JOHN K.: **Tcl and the Tk Toolkit**; © 1997 Addison-Wesley Publishing Company; ISBN 0-201-6337-X.

Gerd Neugebauer added support for Tcl/Tk.

6657 ⟨∗lang2⟩

```
6658 %%
6659 %% Tcl/Tk definition (c) Gerd Neugebauer
6660 %%
6661 \lst@definelanguage[tk]{tcl}[]{tcl}%
6662   {morekeywords={activate,add,separator,radiobutton,checkbutton,%
6663       command,cascade,all,bell,bind,bindtags,button,canvas,canvasx,%
6664       canvasy,cascade,cget,checkbutton,config,configu,configur,%
6665       configure,clipboard,create,arc,bitmap,image,line,oval,polygon,%
6666       rectangle,text,textwindow,curselection,delete,destroy,end,entry,%
6667       entrycget,event,focus,font,actual,families,measure,metrics,names,%
6668       frame,get,grab,current,release,status,grid,columnconfigure,%
6669       rowconfigure,image,image,create,bitmap,photo,delete,height,types,%
6670       widt,names,index,insert,invoke,itemconfigure,label,listbox,lower,%
6671       menu,menubutton,message,move,option,add,clear,get,readfile,pack,%
6672       photo,place,radiobutton,raise,scale,scroll,scrollbar,search,see,%
6673       selection,send,stdin,stdout,stderr,tag,bind,text,tk,tkerror,%
6674       tkwait,window,variable,visibility,toplevel,unknown,update,winfo,%
6675       class,exists,ismapped,parent,reqwidth,reqheight,rootx,rooty,%
6676       width,height,wm,aspect,client,command,deiconify,focusmodel,frame,%
6677       geometry,group,iconbitmap,iconify,iconmask,iconname,iconposition,%
6678       iconwindow,maxsize,minsize,overrideredirect,positionfrom,%
```

```
6679        protocol,sizefrom,state,title,transient,withdraw,xview,yview,%
6680        yposition,%
6681        -accelerator,-activebackground,-activeborderwidth,%
6682        -activeforeground,-after,-anchor,-arrow,-arrowshape,-aspect,%
6683        -async,-background,-before,-bg,-bigincrement,-bitmap,-bordermode,%
6684        -borderwidth,-button,-capstyle,-channel,-class,-closeenough,%
6685        -colormap,-column,-columnspan,-command,-confine,-container,%
6686        -count,-cursor,-data,-default,-detail,-digits,-direction,%
6687        -displayof,-disableforeground,-elementborderwidth,-expand,%
6688        -exportselection,-extend,-family,-fg,-file,-fill,-focus,-font,%
6689        -fontmap,-foreground,-format,-from,-gamma,-global,-height,%
6690        -highlightbackground,-highlightcolor,-highlightthickness,-icon,%
6691        -image,-in,-insertbackground,-insertborderwidth,-insertofftime,%
6692        -insertontime,-imsertwidth,-ipadx,-ipady,-joinstyle,-jump,%
6693        -justify,-keycode,-keysym,-label,-lastfor,-length,-maskdata,%
6694        -maskfile,-menu,-message,-mode,-offvalue,-onvalue,-orient,%
6695        -outlien,-outlinestipple,-overstrike,-override,-padx,-pady,%
6696        -pageanchor,-pageheight,-pagewidth,-pagey,-pagey,-palette,%
6697        -parent,-place,-postcommand,-relheight,-relief,-relwidth,-relx,%
6698        -rely,-repeatdelay,-repeatinterval,-resolution,-root,-rootx,%
6699        -rooty,-rotate,-row,-rowspan,-screen,-selectcolor,-selectimage,%
6700        -sendevent,-serial,-setgrid,-showvalue,-shrink,-side,-size,%
6701        -slant,-sliderlength,-sliderrelief,-smooth,-splinesteps,-state,%
6702        -sticky,-stipple,-style,-subsample,-subwindow,-tags,-takefocus,%
6703        -tearoff,-tearoffcommand,-text,-textvariable,-tickinterval,-time,%
6704        -title,-to,-troughcolor,-type,-underline,-use,-value,-variable,%
6705        -visual,-width,-wrap,-wraplength,-x,-xscrollcommand,-y,%
6706        -bgstipple,-fgstipple,-lmargin1,-lmargin2,-rmargin,-spacing1,%
6707        -spacing2,-spacing3,-tabs,-yscrollcommand,-zoom,%
6708        activate,add,addtag,bbox,cget,clone,configure,coords,%
6709        curselection,debug,delete,delta,deselect,dlineinfo,dtag,dump,%
6710        entrycget,entryconfigure,find,flash,fraction,get,gettags,handle,%
6711        icursor,identify,index,insert,invoke,itemcget,itemconfigure,mark,%
6712        moveto,own,post,postcascade,postscript,put,redither,ranges,%
6713        scale,select,show,tag,type,unpost,xscrollcommand,xview,%
6714        yscrollcommand,yview,yposition}%
6715    }%
6716 \lst@definelanguage[]{tcl}%
6717    {alsoletter={.:,*=&-},%
6718     morekeywords={after,append,array,names,exists,anymore,donesearch,%
6719        get,nextelement,set,size,startsearch,auto_mkindex,binary,break,%
6720        case,catch,cd,clock,close,concat,console,continue,default,else,%
6721        elseif,eof,error,eval,exec,-keepnewline,exit,expr,fblocked,%
6722        fconfigure,fcopy,file,atime,dirname,executable,exists,extension,%
6723        isdirectory,isfile,join,lstat,mtime,owned,readable,readlink,%
6724        rootname,size,stat,tail,type,writable,-permissions,-group,-owner,%
6725        -archive,-hidden,-readonly,-system,-creator,-type,-force,%
6726        fileevent,flush,for,foreach,format,gets,glob,global,history,if,%
6727        incr,info,argsbody,cmdcount,commands,complete,default,exists,%
```

```
6728        globals,level,library,locals,patchlevel,procs,script,tclversion,%
6729        vars,interp,join,lappend,lindex,linsert,list,llength,lrange,%
6730        lreplace,lsearch,-exact,-regexp,-glob,lsort,-ascii,-integer,%
6731        -real,-dictionary,-increasing,-decreasing,-index,-command,load,%
6732        namespace,open,package,forget,ifneeded,provide,require,unknown,%
6733        vcompare,versions,vsatisfies,pid,proc,puts,-nonewline,pwd,read,%
6734        regexp,-indices,regsub,-all,-nocaserename,return,scan,seek,set,%
6735        socket,source,split,string,compare,first,index,last,length,match,%
6736        range,tolower,toupper,trim,trimleft,trimright,subst,switch,tell,%
6737        time,trace,variable,vdelete,vinfo,unknown,unset,uplevel,upvar,%
6738        vwait,while,acos,asin,atan,atan2,ceil,cos,cosh,exp,floor,fmod,%
6739        hypot,log,log10,pow,sin,sinh,sqrt,tan,tanh,abs,double,int,round%
6740        },%
6741    morestring=[d]",%
6742    morecomment=[f]\#,%
6743    morecomment=[l]{;\#},%
6744    morecomment=[l]{[\#},%
6745    morecomment=[l]{\{\#}%
6746  }[keywords,comments,strings]
```

And after receiving a bug report from Vitaly A. Repin I converted the version 0.21 contents of `MoreSelectCharTable` to version 1.0.

```
6747 ⟨/lang2⟩
```

## 2.78   Statistical languages

These languages have been added by Winfried Theis. Robert Denham contributed the additional string delimiter '.

```
6748 ⟨*lang3⟩
```

```
6749 \lst@definelanguage{S}[]{R}{}
6750 \lst@definelanguage[PLUS]{S}[]{R}{}
6751 \lst@definelanguage{R}%
6752   {keywords={abbreviate,abline,abs,acos,acosh,action,add1,add,%
6753        aggregate,alias,Alias,alist,all,anova,any,aov,aperm,append,apply,%
6754        approx,approxfun,apropos,Arg,args,array,arrows,as,asin,asinh,%
6755        atan,atan2,atanh,attach,attr,attributes,autoload,autoloader,ave,%
6756        axis,backsolve,barplot,basename,besselI,besselJ,besselK,besselY,%
6757        beta,binomial,body,box,boxplot,break,browser,bug,builtins,bxp,by,%
6758        c,C,call,Call,case,cat,category,cbind,ceiling,character,char,%
6759        charmatch,check,chol,chol2inv,choose,chull,class,close,cm,codes,%
6760        coef,coefficients,co,col,colnames,colors,colours,commandArgs,%
6761        comment,complete,complex,conflicts,Conj,contents,contour,%
6762        contrasts,contr,control,helmert,contrib,convolve,cooks,coords,%
6763        distance,coplot,cor,cos,cosh,count,fields,cov,covratio,wt,CRAN,%
6764        create,crossprod,cummax,cummin,cumprod,cumsum,curve,cut,cycle,D,%
6765        data,dataentry,date,dbeta,dbinom,dcauchy,dchisq,de,debug,%
6766        debugger,Defunct,default,delay,delete,deltat,demo,de,density,%
6767        deparse,dependencies,Deprecated,deriv,description,detach,%
6768        dev2bitmap,dev,cur,deviance,off,prev,,dexp,df,dfbetas,dffits,%
```

```
6769        dgamma,dgeom,dget,dhyper,diag,diff,digamma,dim,dimnames,dir,%
6770        dirname,dlnorm,dlogis,dnbinom,dnchisq,dnorm,do,dotplot,double,%
6771        download,dpois,dput,drop,drop1,dsignrank,dt,dummy,dump,dunif,%
6772        duplicated,dweibull,dwilcox,dyn,edit,eff,effects,eigen,else,%
6773        emacs,end,environment,env,erase,eval,equal,evalq,example,exists,%
6774        exit,exp,expand,expression,External,extract,extractAIC,factor,%
6775        fail,family,fft,file,filled,find,fitted,fivenum,fix,floor,for,%
6776        For,formals,format,formatC,formula,Fortran,forwardsolve,frame,%
6777        frequency,ftable,ftable2table,function,gamma,Gamma,gammaCody,%
6778        gaussian,gc,gcinfo,gctorture,get,getenv,geterrmessage,getOption,%
6779        getwd,gl,glm,globalenv,gnome,GNOME,graphics,gray,grep,grey,grid,%
6780        gsub,hasTsp,hat,heat,help,hist,home,hsv,httpclient,I,identify,if,%
6781        ifelse,Im,image,\%in\%,index,influence,measures,inherits,install,%
6782        installed,integer,interaction,interactive,Internal,intersect,%
6783        inverse,invisible,IQR,is,jitter,kappa,kronecker,labels,lapply,%
6784        layout,lbeta,lchoose,lcm,legend,length,levels,lgamma,library,%
6785        licence,license,lines,list,lm,load,local,locator,log,log10,log1p,%
6786        log2,logical,loglin,lower,lowess,ls,lsfit,lsf,ls,machine,Machine,%
6787        mad,mahalanobis,make,link,margin,match,Math,matlines,mat,matplot,%
6788        matpoints,matrix,max,mean,median,memory,menu,merge,methods,min,%
6789        missing,Mod,mode,model,response,mosaicplot,mtext,mvfft,na,nan,%
6790        names,omit,nargs,nchar,ncol,NCOL,new,next,NextMethod,nextn,%
6791        nlevels,nlm,noquote,NotYetImplemented,NotYetUsed,nrow,NROW,null,%
6792        numeric,\%o\%,objects,offset,old,on,Ops,optim,optimise,optimize,%
6793        options,or,order,ordered,outer,package,packages,page,pairlist,%
6794        pairs,palette,panel,par,parent,parse,paste,path,pbeta,pbinom,%
6795        pcauchy,pchisq,pentagamma,persp,pexp,pf,pgamma,pgeom,phyper,pico,%
6796        pictex,piechart,Platform,plnorm,plogis,plot,pmatch,pmax,pmin,%
6797        pnbinom,pnchisq,pnorm,points,poisson,poly,polygon,polyroot,pos,%
6798        postscript,power,ppoints,ppois,predict,preplot,pretty,Primitive,%
6799        print,prmatrix,proc,prod,profile,proj,prompt,prop,provide,%
6800        psignrank,ps,pt,ptukey,punif,pweibull,pwilcox,q,qbeta,qbinom,%
6801        qcauchy,qchisq,qexp,qf,qgamma,qgeom,qhyper,qlnorm,qlogis,qnbinom,%
6802        qnchisq,qnorm,qpois,qqline,qqnorm,qqplot,qr,Q,qty,qy,qsignrank,%
6803        qt,qtukey,quantile,quasi,quit,qunif,quote,qweibull,qwilcox,%
6804        rainbow,range,rank,rbeta,rbind,rbinom,rcauchy,rchisq,Re,read,csv,%
6805        csv2,fwf,readline,socket,real,Recall,rect,reformulate,regexpr,%
6806        relevel,remove,rep,repeat,replace,replications,report,require,%
6807        resid,residuals,restart,return,rev,rexp,rf,rgamma,rgb,rgeom,R,%
6808        rhyper,rle,rlnorm,rlogis,rm,rnbinom,RNGkind,rnorm,round,row,%
6809        rownames,rowsum,rpois,rsignrank,rstandard,rstudent,rt,rug,runif,%
6810        rweibull,rwilcox,sample,sapply,save,scale,scan,scan,screen,sd,se,%
6811        search,searchpaths,segments,seq,sequence,setdiff,setequal,set,%
6812        setwd,show,sign,signif,sin,single,sinh,sink,solve,sort,source,%
6813        spline,splinefun,split,sqrt,stars,start,stat,stem,step,stop,%
6814        storage,strstrheight,stripplot,strsplit,structure,strwidth,sub,%
6815        subset,substitute,substr,substring,sum,summary,sunflowerplot,svd,%
6816        sweep,switch,symbol,symbols,symnum,sys,status,system,t,table,%
6817        tabulate,tan,tanh,tapply,tempfile,terms,terrain,tetragamma,text,%
6818        time,title,topo,trace,traceback,transform,tri,trigamma,trunc,try,%
```

```
6819        ts,tsp,typeof,unclass,undebug,undoc,union,unique,uniroot,unix,%
6820        unlink,unlist,unname,untrace,update,upper,url,UseMethod,var,%
6821        variable,vector,Version,vi,warning,warnings,weighted,weights,%
6822        which,while,window,write,\%x\%,x11,X11,xedit,xemacs,xinch,xor,%
6823        xpdrows,xy,xyinch,yinch,zapsmall,zip},%
6824    otherkeywords={!,!=,~,$,*,\&,\%/\%,\%*\%,\%\%,<-,<<-,_,/},%
6825    alsoother={._$},%
6826    sensitive,%
6827    morecomment=[l]\#,%
6828    morestring=[d]",%
6829    morestring=[d]'% 2001 Robert Denham
6830    }%
```

Benjamin Janson got a `prockeywords undefined` error, which was removed by Heiko Oberdiek.

```
6831 \lst@definelanguage{SAS}{%
6832    procnamekeys={proc},%
6833    morekeywords={DATA, AND, OR, NOT, EQ, GT, LT, GE, LE, NE, INFILE, INPUT,%
6834        DO, BY, TO, SIN, COS, OUTPUT, END, PLOT, RUN, LIBNAME, VAR, TITLE,%
6835        FIRSTOBS, OBS, DELIMITER, DLM, EOF, ABS, DIM, HBOUND, LBOUND, MAX, MIN,%
6836        MOD, SIGN, SQRT, CEIL, FLOOR, FUZZ, INT, ROUND, TRUNC, DIGAMMA, ERF,%
6837        ERFC, EXP, GAMMA, LGAMMA, LOG, LOG2, LOG10, ARCOS, ARSIN, ATAN, COSH,%
6838        SINH, TANH, TAN, POISSON, PROBBETA, PROBBNML, PROBCHI, PROBF, PROBGAM,%
6839        PROBHYPR, PROBNEGB, PROBNORM, PROBT, BETAINV, CINV, FINV, GAMINV,%
6840        PROBIT, TINV, CSS, CV, KURTOSIS, MEAN, NMISS, RANGE, SKEWNESS, STD,%
6841        STDERR, SUM, USS, NORMAL, RANBIN, RANCAU, RANEXP, RANGAM, RANNOR,%
6842        RANPOI, RANTBL, RANTRI, RANUNI, UNIFORM, IF, THEN, ELSE, WHILE, UNTIL,%
6843        DROP, KEEP, LABEL, DEFAULT, ARRAY, MERGE, CARDS, CARDS4, PUT, SET,%
6844        UPDATE, ABORT, DELETE, DISPLAY, LIST, LOSTCARD, MISSING, STOP, WHERE,%
6845        ARRAY, DROP, KEEP, WINDOW, LENGTH, RENAME, RETAIN, MEANS, UNIVARIATE,%
6846        SUMMARY, TABULATE, CORR, FREQ, FOOTNOTE, NOTE, SHOW},%
6847    otherkeywords={!,!=,~,$,*,\&,_,/,<,>=,=<,>},%
6848    morestring=[d]'%
6849 }[keywords,comments,strings,procnames]%
6850 ⟨/lang3⟩
```

## 2.79 TEX

I extracted the data from `plain.tex`, `latex.ltx`, and `size10.clo`. Dr. Peter Leibner reported that some keywords are missing and also added a couple.

```
6851 ⟨*lang3⟩
6852 \lst@definelanguage[AlLaTeX]{TeX}[LaTeX]{TeX}%
6853    {moretexcs={AtBeginDocument,AtBeginDvi,AtEndDocument,AtEndOfClass,%
6854        AtEndOfPackage,ClassError,ClassInfo,ClassWarning,%
6855        ClassWarningNoLine,CurrentOption,DeclareErrorFont,%
6856        DeclareFixedFont,DeclareFontEncoding,DeclareFontEncodingDefaults,%
6857        DeclareFontFamily,DeclareFontShape,DeclareFontSubstitution,%
6858        DeclareMathAccent,DeclareMathAlphabet,DeclareMathAlphabet,%
```

```
6859        DeclareMathDelimiter,DeclareMathRadical,DeclareMathSizes,%
6860        DeclareMathSymbol,DeclareMathVersion,DeclareOldFontCommand,%
6861        DeclareOption,DeclarePreloadSizes,DeclareRobustCommand,%
6862        DeclareSizeFunction,DeclareSymbolFont,DeclareSymbolFontAlphabet,%
6863        DeclareTextAccent,DeclareTextAccentDefault,DeclareTextCommand,%
6864        DeclareTextCommandDefault,DeclareTextComposite,%
6865        DeclareTextCompositeCommand,DeclareTextFontCommand,%
6866        DeclareTextSymbol,DeclareTextSymbolDefault,ExecuteOptions,%
6867        GenericError,GenericInfo,GenericWarning,IfFileExists,%
6868        InputIfFileExists,LoadClass,LoadClassWithOptions,MessageBreak,%
6869        OptionNotUsed,PackageError,PackageInfo,PackageWarning,%
6870        PackageWarningNoLine,PassOptionsToClass,PassOptionsToPackage,%
6871        ProcessOptionsProvidesClass,ProvidesFile,ProvidesFile,%
6872        ProvidesPackage,ProvideTextCommand,RequirePackage,%
6873        RequirePackageWithOptions,SetMathAlphabet,SetSymbolFont,%
6874        TextSymbolUnavailable,UseTextAccent,UseTextSymbol},%
6875      morekeywords={array,center,displaymath,document,enumerate,eqnarray,%
6876        equation,flushleft,flushright,itemize,list,lrbox,math,minipage,%
6877        picture,sloppypar,tabbing,tabular,trivlist,verbatim}%
6878    }%
6879  \lst@definelanguage[LaTeX]{TeX}[common]{TeX}%
6880    {moretexcs={a,AA,aa,addcontentsline,addpenalty,addtocontents,%
6881        addtocounter,addtolength,addtoversion,addvspace,alph,Alph,and,%
6882        arabic,array,arraycolsep,arrayrulewidth,arraystretch,author,%
6883        baselinestretch,begin,bezier,bfseries,bibcite,bibdata,bibitem,%
6884        bibliography,bibliographystyle,bibstyle,bigskip,boldmath,%
6885        botfigrule,bottomfraction,Box,caption,center,CheckCommand,circle,%
6886        citation,cite,cleardoublepage,clearpage,cline,columnsep,%
6887        columnseprule,columnwidth,contentsline,dashbox,date,dblfigrule,%
6888        dblfloatpagefraction,dblfloatsep,dbltextfloatsep,dbltopfraction,%
6889        defaultscriptratio,defaultscriptscriptratio,depth,Diamond,%
6890        displaymath,document,documentclass,documentstyle,doublerulesep,%
6891        em,emph,endarray,endcenter,enddisplaymath,enddocument,%
6892        endenumerate,endeqnarray,endequation,endflushleft,endflushright,%
6893        enditemize,endlist,endlrbox,endmath,endminipage,endpicture,%
6894        endsloppypar,endtabbing,endtabular,endtrivlist,endverbatim,%
6895        enlargethispage,ensuremath,enumerate,eqnarray,equation,%
6896        evensidemargin,extracolsep,fbox,fboxrule,fboxsep,filecontents,%
6897        fill,floatpagefraction,floatsep,flushbottom,flushleft,flushright,%
6898        fnsymbol,fontencoding,fontfamily,fontseries,fontshape,fontsize,%
6899        fontsubfuzz,footnotemark,footnotesep,footnotetext,footskip,frac,%
6900        frame,framebox,fussy,glossary,headheight,headsep,height,hline,%
6901        hspace,I,include,includeonly,index,inputlineno,intextsep,%
6902        itemindent,itemize,itemsep,iterate,itshape,Join,kill,label,%
6903        labelsep,labelwidth,LaTeX,LaTeXe,leadsto,lefteqn,leftmargin,%
6904        leftmargini,leftmarginii,leftmarginiii,leftmarginiv,leftmarginv,%
6905        leftmarginvi,leftmark,lhd,lim,linebreak,linespread,linethickness,%
6906        linewidth,list,listfiles,listfiles,listparindent,lrbox,%
6907        makeatletter,makeatother,makebox,makeglossary,makeindex,%
```

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```
6908        makelabel,MakeLowercase,MakeUppercase,marginpar,marginparpush,%
6909        marginparsep,marginparwidth,markboth,markright,math,mathbf,%
6910        mathellipsis,mathgroup,mathit,mathrm,mathsf,mathsterling,mathtt,%
6911        mathunderscore,mathversion,mbox,mdseries,mho,minipage,%
6912        multicolumn,multiput,NeedsTeXFormat,newcommand,newcounter,%
6913        newenvironment,newfont,newhelp,newlabel,newlength,newline,%
6914        newmathalphabet,newpage,newsavebox,newtheorem,nobreakspace,%
6915        nobreakspace,nocite,nocorr,nocorrlist,nofiles,nolinebreak,%
6916        nonumber,nopagebreak,normalcolor,normalfont,normalmarginpar,%
6917        numberline,obeycr,oddsidemargin,oldstylenums,onecolumn,oval,%
6918        pagebreak,pagenumbering,pageref,pagestyle,paperheight,paperwidth,%
6919        paragraphmark,parbox,parsep,partopsep,picture,poptabs,pounds,%
6920        protect,pushtabs,put,qbezier,qbeziermax,r,raggedleft,raisebox,%
6921        ref,refstepcounter,renewcommand,renewenvironment,restorecr,%
6922        reversemarginpar,rhd,rightmargin,rightmark,rmfamily,roman,Roman,%
6923        rootbox,rule,samepage,sbox,scshape,secdef,section,sectionmark,%
6924        selectfont,setcounter,settodepth,settoheight,settowidth,sffamily,%
6925        shortstack,showoutput,showoverfull,sloppy,sloppypar,slshape,%
6926        smallskip,sqsubset,sqsupset,SS,stackrel,stepcounter,stop,stretch,%
6927        subparagraphmark,subsectionmark,subsubsectionmark,sum,%
6928        suppressfloats,symbol,tabbing,tabbingsep,tabcolsep,tabular,%
6929        tabularnewline,textasciicircum,textasciitilde,textbackslash,%
6930        textbar,textbf,textbraceleft,textbraceright,textbullet,%
6931        textcircled,textcompwordmark,textdagger,textdaggerdbl,textdollar,%
6932        textellipsis,textemdash,textendash,textexclamdown,textfloatsep,%
6933        textfraction,textgreater,textheight,textit,textless,textmd,%
6934        textnormal,textparagraph,textperiodcentered,textquestiondown,%
6935        textquotedblleft,textquotedblright,textquoteleft,textquoteright,%
6936        textregistered,textrm,textsc,textsection,textsf,textsl,%
6937        textsterling,textsuperscript,texttrademark,texttt,textunderscore,%
6938        textup,textvisiblespace,textwidth,thanks,thefootnote,thempfn,%
6939        thempfn,thempfootnote,thepage,thepage,thicklines,thinlines,%
6940        thispagestyle,title,today,topfigrule,topfraction,topmargin,%
6941        topsep,totalheight,tracingfonts,trivlist,ttfamily,twocolumn,%
6942        typein,typeout,unboldmath,unitlength,unlhd,unrhd,upshape,usebox,%
6943        usecounter,usefont,usepackage,value,vector,verb,verbatim,vline,%
6944        vspace,width,%
6945        normalsize,small,footnotesize,scriptsize,tiny,large,Large,LARGE,%
6946        huge,Huge}%
6947    }%

6948 \lst@definelanguage[plain]{TeX}[common]{TeX}%
6949   {moretexcs={advancepageno,beginsection,bf,bffam,bye,cal,cleartabs,%
6950        columns,dosupereject,endinsert,eqalign,eqalignno,fiverm,fivebf,%
6951        fivei,fivesy,folio,footline,hang,headline,it,itemitem,itfam,%
6952        leqalignno,magnification,makefootline,makeheadline,midinsert,mit,%
6953        mscount,nopagenumbers,normalbottom,of,oldstyle,pagebody,%
6954        pagecontents,pageinsert,pageno,plainoutput,preloaded,proclaim,rm,%
6955        settabs,sevenbf,seveni,sevensy,sevenrm,sl,slfam,supereject,%
6956        tabalign,tabs,tabsdone,tabsyet,tenbf,tenex,teni,tenit,tenrm,%
```

```
6957        tensl,tensy,tentt,textindent,topglue,topins,topinsert,tt,ttfam,%
6958        ttraggedright,vfootnote}%
6959    }%
```

The following language is only a helper.

```
6960  \lst@definelanguage[common]{TeX}[primitive]{TeX}
6961    {moretexcs={active,acute,ae,AE,aleph,allocationnumber,allowbreak,%
6962        alpha,amalg,angle,approx,arccos,arcsin,arctan,arg,arrowvert,%
6963        Arrowvert,ast,asymp,b,backslash,bar,beta,bgroup,big,Big,bigbreak,%
6964        bigcap,bigcirc,bigcup,bigg,Bigg,biggl,Biggl,biggm,Biggm,biggr,%
6965        Biggr,bigl,Bigl,bigm,Bigm,bigodot,bigoplus,bigotimes,bigr,Bigr,%
6966        bigskip,bigskipamount,bigsqcup,bigtriangledown,bigtriangleup,%
6967        biguplus,bigvee,bigwedge,bmod,bordermatrix,bot,bowtie,brace,%
6968        braceld,bracelu,bracerd,braceru,bracevert,brack,break,breve,%
6969        buildrel,bullet,c,cap,cases,cdot,cdotp,cdots,centering,%
6970        centerline,check,chi,choose,circ,clubsuit,colon,cong,coprod,%
6971        copyright,cos,cosh,cot,coth,csc,cup,d,dag,dagger,dashv,ddag,%
6972        ddagger,ddot,ddots,deg,delta,Delta,det,diamond,diamondsuit,dim,%
6973        displaylines,div,do,dospecials,dot,doteq,dotfill,dots,downarrow,%
6974        Downarrow,downbracefill,egroup,eject,ell,empty,emptyset,endgraf,%
6975        endline,enskip,enspace,epsilon,equiv,eta,exists,exp,filbreak,%
6976        flat,fmtname,fmtversion,footins,footnote,footnoterule,forall,%
6977        frenchspacing,frown,gamma,Gamma,gcd,ge,geq,gets,gg,goodbreak,%
6978        grave,H,hat,hbar,heartsuit,hglue,hideskip,hidewidth,hom,%
6979        hookleftarrow,hookrightarrow,hphantom,hrulefill,i,ialign,iff,Im,%
6980        imath,in,inf,infty,int,interdisplaylinepenalty,%
6981        interfootnotelinepenalty,intop,iota,item,j,jmath,joinrel,jot,%
6982        kappa,ker,l,L,lambda,Lambda,land,langle,lbrace,lbrack,lceil,%
6983        ldotp,ldots,le,leavevmode,leftarrow,Leftarrow,leftarrowfill,%
6984        leftharpoondown,leftharpoonup,leftline,leftrightarrow,%
6985        Leftrightarrow,leq,lfloor,lg,lgroup,lhook,lim,liminf,limsup,line,%
6986        ll,llap,lmoustache,ln,lnot,log,longleftarrow,Longleftarrow,%
6987        longleftrightarrow,Longleftrightarrow,longmapsto,longrightarrow,%
6988        Longrightarrow,loop,lor,lq,magstep,magstep,magstephalf,mapsto,%
6989        mapstochar,mathhexbox,mathpalette,mathstrut,matrix,max,maxdimen,%
6990        medbreak,medskip,medskipamount,mid,min,models,mp,mu,multispan,%
6991        nabla,narrower,natural,ne,nearrow,neg,negthinspace,neq,newbox,%
6992        newcount,newdimen,newfam,newif,newinsert,newlanguage,newmuskip,%
6993        newread,newskip,newtoks,newwrite,next,ni,nobreak,nointerlineskip,%
6994        nonfrenchspacing,normalbaselines,normalbaselineskip,%
6995        normallineskip,normallineskiplimit,not,notin,nu,null,nwarrow,o,O,%
6996        oalign,obeylines,obeyspaces,odot,oe,OE,offinterlineskip,oint,%
6997        ointop,omega,Omega,ominus,ooalign,openup,oplus,oslash,otimes,%
6998        overbrace,overleftarrow,overrightarrow,owns,P,parallel,partial,%
6999        perp,phantom,phi,Phi,pi,Pi,pm,pmatrix,pmod,Pr,prec,preceq,prime,%
7000        prod,propto,psi,Psi,qquad,quad,raggedbottom,raggedright,rangle,%
7001        rbrace,rbrack,rceil,Re,relbar,Relbar,removelastskip,repeat,%
7002        rfloor,rgroup,rho,rhook,rightarrow,Rightarrow,rightarrowfill,%
7003        rightharpoondown,rightharpoonup,rightleftharpoons,rightline,rlap,%
7004        rmoustache,root,rq,S,sb,searrow,sec,setminus,sharp,showhyphens,%
```

```
7005        sigma,Sigma,sim,simeq,sin,sinh,skew,slash,smallbreak,smallint,%
7006        smallskip,smallskipamount,smash,smile,sp,space,spadesuit,sqcap,%
7007        sqcup,sqrt,sqsubseteq,sqsupseteq,ss,star,strut,strutbox,subset,%
7008        subseteq,succ,succeq,sum,sup,supset,supseteq,surd,swarrow,t,tan,%
7009        tanh,tau,TeX,theta,Theta,thinspace,tilde,times,to,top,tracingall,%
7010        triangle,triangleleft,triangleright,u,underbar,underbrace,%
7011        uparrow,Uparrow,upbracefill,updownarrow,Updownarrow,uplus,%
7012        upsilon,Upsilon,v,varepsilon,varphi,varpi,varrho,varsigma,%
7013        vartheta,vdash,vdots,vec,vee,vert,Vert,vglue,vphantom,wedge,%
7014        widehat,widetilde,wlog,wp,wr,xi,Xi,zeta}%
7015    }%
```

Herbert Voss pointed to a typo: the TEX primitive is `lineskiplimit` instead of `lineskiplimits`.

```
7016 \lst@definelanguage[primitive]{TeX}%
7017    {moretexcs={above,abovedisplayshortskip,abovedisplayskip,aftergroup,%
7018        abovewithdelims,accent,adjdemerits,advance,afterassignment,atop,%
7019        atopwithdelims,badness,baselineskip,batchmode,begingroup,%
7020        belowdisplayshortskip,belowdisplayskip,binoppenalty,botmark,box,%
7021        boxmaxdepth,brokenpenalty,catcode,char,chardef,cleaders,closein,%
7022        closeout,clubpenalty,copy,count,countdef,cr,crcr,csname,day,%
7023        deadcycles,def,defaulthyphenchar,defaultskewchar,delcode,%
7024        delimiter,delimiterfactor,delimitershortfall,dimen,dimendef,%
7025        discretionary,displayindent,displaylimits,displaystyle,%
7026        displaywidowpenalty,displaywidth,divide,doublehyphendemerits,dp,%
7027        edef,else,emergencystretch,end,endcsname,endgroup,endinput,%
7028        endlinechar,eqno,errhelp,errmessage,errorcontextlines,%
7029        errorstopmode,escapechar,everycr,everydisplay,everyhbox,everyjob,%
7030        everymath,everypar,everyvbox,exhyphenpenalty,expandafter,fam,fi,%
7031        finalhyphendemerits,firstmark,floatingpenalty,font,fontdimen,%
7032        fontname,futurelet,gdef,global,globaldefs,halign,hangafter,%
7033        hangindent,hbadness,hbox,hfil,hfill,hfilneg,hfuzz,hoffset,%
7034        holdinginserts,hrule,hsize,hskip,hss,ht,hyphenation,hyphenchar,%
7035        hyphenpenalty,if,ifcase,ifcat,ifdim,ifeof,iffalse,ifhbox,ifhmode,%
7036        ifinner,ifmmode,ifnum,ifodd,iftrue,ifvbox,ifvmode,ifvoid,ifx,%
7037        ignorespaces,immediate,indent,input,insert,insertpenalties,%
7038        interlinepenalty,jobname,kern,language,lastbox,lastkern,%
7039        lastpenalty,lastskip,lccode,leaders,left,lefthyphenmin,leftskip,%
7040        leqno,let,limits,linepenalty,lineskip,lineskiplimit,long,%
7041        looseness,lower,lowercase,mag,mark,mathaccent,mathbin,mathchar,%
7042        mathchardef,mathchoice,mathclose,mathcode,mathinner,mathop,%
7043        mathopen,mathord,mathpunct,mathrel,mathsurround,maxdeadcycles,%
7044        maxdepth,meaning,medmuskip,message,mkern,month,moveleft,%
7045        moveright,mskip,multiply,muskip,muskipdef,newlinechar,noalign,%
7046        noboundary,noexpand,noindent,nolimits,nonscript,nonstopmode,%
7047        nulldelimiterspace,nullfont,number,omit,openin,openout,or,outer,%
7048        output,outputpenalty,over,overfullrule,overline,overwithdelims,%
7049        pagedepth,pagefilllstretch,pagefillstretch,pagefilstretch,%
7050        pagegoal,pageshrink,pagestretch,pagetotal,par,parfillskip,%
7051        parindent,parshape,parskip,patterns,pausing,penalty,%
```

```
7052        postdisplaypenalty,predisplaypenalty,predisplaysize,pretolerance,%
7053        prevdepth,prevgraf,radical,raise,read,relax,relpenalty,right,%
7054        righthyphenmin,rightskip,romannumeral,scriptfont,%
7055        scriptscriptfont,scriptscriptstyle,scriptspace,scriptstyle,%
7056        scrollmode,setbox,setlanguage,sfcode,shipout,show,showbox,%
7057        showboxbreadth,showboxdepth,showlists,showthe,skewchar,skip,%
7058        skipdef,spacefactor,spaceskip,span,special,splitbotmark,%
7059        splitfirstmark,splitmaxdepth,splittopskip,string,tabskip,%
7060        textfont,textstyle,the,thickmuskip,thinmuskip,time,toks,toksdef,%
7061        tolerance,topmark,topskip,tracingcommands,tracinglostchars,%
7062        tracingmacros,tracingonline,tracingoutput,tracingpages,%
7063        tracingparagraphs,tracingrestores,tracingstats,uccode,uchyph,%
7064        underline,unhbox,unhcopy,unkern,unpenalty,unskip,unvbox,unvcopy,%
7065        uppercase,vadjust,valign,vbadness,vbox,vcenter,vfil,vfill,%
7066        vfilneg,vfuzz,voffset,vrule,vsize,vskip,vsplit,vss,vtop,wd,%
7067        widowpenalty,write,xdef,xleaders,xspaceskip,year},%
7068     sensitive,%
7069     alsoother={0123456789$_},%$ to make Emacs fontlocking happy
7070     morecomment=[l]\%%
7071     }[keywords,tex,comments]%
7072 ⟨/lang3⟩
```

## 2.80   VBScript

Sonja WeidmannVBScript sent me this language definition.

```
7073 ⟨*lang2⟩

7074 %%
7075 %% VBScript definition (c) 2000 Sonja Weidmann
7076 %%
7077 \lst@definelanguage{VBScript}%
7078   {morekeywords={Call,Case,Const,Dim,Do,Each,Else,End,Erase,Error,Exit,%
7079       Explicit,For,Function,If,Loop,Next,On,Option,Private,Public,%
7080       Randomize,ReDim,Rem,Select,Set,Sub,Then,Wend,While,Abs,Array,Asc,%
7081       Atn,CBool,CByte,CCur,CDate,CDbl,Chr,CInt,CLng,Cos,CreateObject,%
7082       CSng,CStr,Date,DateAdd,DateDiff,DatePart,DateSerial,DateValue,%
7083       Day,Exp,Filter,Fix,FormatCurrency,FormatDateTime,FormatNumber,%
7084       FormatPercent,GetObject,Hex,Hour,InputBox,InStr,InStrRev,Int,%
7085       IsArray,IsDate,IsEmpty,IsNull,IsNumeric,IsObject,Join,LBound,%
7086       LCase,Left,Len,LoadPicture,Log,LTrim,Mid,Minute,Month,MonthName,%
7087       MsgBox,Now,Oct,Replace,RGB,Right,Rnd,Round,RTrim,ScriptEngine,%
7088       ScriptEngineBuildVersion,ScriptEngineMajorVersion,%
7089       ScriptEngineMinorVersion,Second,Sgn,Sin,Space,Split,Sqr,StrComp,%
7090       StrReverse,String,Tan,Time,TimeSerial,TimeValue,Trim,TypeName,%
7091       UBound,UCase,VarType,Weekday,WeekdayName,Year, And,Eqv,Imp,Is,%
7092       Mod,Not,Or,Xor,Add,BuildPath,Clear,Close,Copy,CopyFile,%
7093       CopyFolder,CreateFolder,CreateTextFile,Delete,DeleteFile,%
7094       DeleteFolder,Dictionary,Drive,DriveExists,Drives,Err,Exists,File,%
7095       FileExists,FileSystemObject,Files,Folder,FolderExists,Folders,%
```

```
7096          GetAbsolutePathName,GetBaseName,GetDrive,GetDriveName,%
7097          GetExtensionName,GetFile,GetFileName,GetFolder,%
7098          GetParentFolderName,GetSpecialFolder,GetTempName,Items,Keys,Move,%
7099          MoveFile,MoveFolder,OpenAsTextStream,OpenTextFile,Raise,Read,%
7100          ReadAll,ReadLine,Remove,RemoveAll,Skip,SkipLine,TextStream,Write,%
7101          WriteBlankLines,WriteLine,Alias,Archive,CDROM,Compressed,%
7102          Directory,Fixed,ForAppending,ForReading,ForWriting,Hidden,Normal,%
7103          RAMDisk,ReadOnly,Remote,Removable,System,SystemFolder,%
7104          TemporaryFolder,TristateFalse,TristateTrue,TristateUseDefault,%
7105          Unknown,Volume,WindowsFolder,vbAbortRetryIgnore,%
7106          vbApplicationModal,vbArray,vbBinaryCompare,vbBlack,vbBlue,%
7107          vbBoolean,vbByte,vbCr,vbCrLf,vbCritical,vbCurrency,vbCyan,%
7108          vbDataObject,vbDate,vbDecimal,vbDefaultButton1,vbDefaultButton2,%
7109          vbDefaultButton3,vbDefaultButton4,vbDouble,vbEmpty,vbError,%
7110          vbExclamation,vbFirstFourDays,vbFirstFullWeek,vbFirstJan1,%
7111          vbFormFeed,vbFriday,vbGeneralDate,vbGreen,vbInformation,%
7112          vbInteger,vbLf,vbLong,vbLongDate,vbLongTime,vbMagenta,vbMonday,%
7113          vbNewLine,vbNull,vbNullChar,vbNullString,vbOKC,ancel,vbOKOnly,%
7114          vbObject,vbObjectError,vbQuestion,vbRed,vbRetryCancel,vbSaturday,%
7115          vbShortDate,vbShortTime,vbSingle,vbString,vbSunday,vbSystemModal,%
7116          vbTab,vbTextCompare,vbThursday,vbTuesday,vbUseSystem,%
7117          vbUseSystemDayOfWeek,vbVariant,vbVerticalTab,vbWednesday,vbWhite,%
7118          vbYellow,vbYesNo,vbYesNoCancel},%
7119      sensitive=f,%
7120      morecomment=[l]',%
7121      morestring=[d]"%
7122    }[keywords,comments,strings]

7123 ⟨/lang2⟩
```

## 2.81 Verilog

Thanks to Cameron H. G. Wright for providing the definition. After a bug report by George M. Georgiou I changed the declaration of directives to use normal keywords.

```
7124 ⟨∗lang3⟩

7125 %%
7126 %% Verilog definition (c) 2003 Cameron H. G. Wright <c.h.g.wright@ieee.org>
7127 %% Based on the IEEE 1364-2001 Verilog HDL standard
7128 %% Ref: S. Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis,"
7129 %%      Prentice Hall, 2003. ISBN: 0-13-044911-3
7130 %%
7131 \lst@definelanguage{Verilog}%
7132    {morekeywords={% reserved keywords
7133          always,and,assign,automatic,begin,buf,bufif0,bufif1,case,casex,%
7134          casez,cell,cmos,config,deassign,default,defparam,design,disable,%
7135          edge,else,end,endcase,endconfig,endfunction,endgenerate,%
7136          endmodule,endprimitive,endspecify,endtable,endtask,event,for,%
7137          force,forever,fork,function,generate,genvar,highz0,highz1,if,%
```

```
7138        ifnone,incdir,include,initial,inout,input,instance,integer,join,%
7139        large,liblist,library,localparam,macromodule,medium,module,nand,%
7140        negedge,nmos,nor,noshowcancelled,not,notif0,notif1,or,output,%
7141        parameter,pmos,posedge,primitive,pull0,pull1,pulldown,pullup,%
7142        pulsestyle_onevent,pulsestyle_ondetect,rcmos,real,realtime,reg,%
7143        release,repeat,rnmos,rpmos,rtran,rtranif0,rtranif1,scalared,%
7144        showcancelled,signed,small,specify,specparam,strong0,strong1,%
7145        supply0,supply1,table,task,time,tran,tranif0,tranif1,tri,tri0,%
7146        tri1,triand,trior,trireg,unsigned,use,vectored,wait,wand,weak0,%
7147        weak1,while,wire,wor,xnor,xor},%
7148     morekeywords=[2]{% system tasks and functions
7149        $bitstoreal,$countdrivers,$display,$fclose,$fdisplay,$fmonitor,%
7150        $fopen,$fstrobe,$fwrite,$finish,$getpattern,$history,$incsave,%
7151        $input,$itor,$key,$list,$log,$monitor,$monitoroff,$monitoron,%
7152        $nokey},%
7153     morekeywords=[3]{% compiler directives
7154        `accelerate,`autoexpand_vectornets,`celldefine,`default_nettype,%
7155        `define,`else,`elsif,`endcelldefine,`endif,`endprotect,%
7156        `endprotected,`expand_vectornets,`ifdef,`ifndef,`include,%
7157        `no_accelerate,`noexpand_vectornets,`noremove_gatenames,%
7158        `nounconnected_drive,`protect,`protected,`remove_gatenames,%
7159        `remove_netnames,`resetall,`timescale,`unconnected_drive},%
7160     alsoletter=\`,%
7161     sensitive,%
7162     morecomment=[s]{/*}{*/},%
7163     morecomment=[l]//,% nonstandard
7164     morestring=[b]"%
7165   }[keywords,comments,strings]
7166 ⟨/lang3⟩
```

## 2.82   VHDL

This language is due to Kai WollenweberVHDL. I've done conversion to version
0.19 only.  Gaurav Aggarwal reported that VHDL is case insensitive and Ar-
naud Tisseranddded three keywords.

```
7167 ⟨∗lang1⟩

7168 %%
7169 %% VHDL definition (c) 1997 Kai Wollenweber
7170 %%
7171 \lst@definelanguage{VHDL}%
7172   {morekeywords={ALL,ARCHITECTURE,ABS,AND,ASSERT,ARRAY,AFTER,ALIAS,%
7173        ACCESS,ATTRIBUTE,BEGIN,BODY,BUS,BLOCK,BUFFER,CONSTANT,CASE,%
7174        COMPONENT,CONFIGURATION,DOWNTO,ELSE,ELSIF,END,ENTITY,EXIT,%
7175        FUNCTION,FOR,FILE,GENERIC,GENERATE,GUARDED,GROUP,IF,IN,INOUT,IS,%
7176        INERTIAL,IMPURE,LIBRARY,LOOP,LABEL,LITERAL,LINKAGE,MAP,MOD,NOT,%
7177        NOR,NAND,NULL,NEXT,NEW,OUT,OF,OR,OTHERS,ON,OPEN,PROCESS,PORT,%
7178        PACKAGE,PURE,PROCEDURE,POSTPONED,RANGE,REM,ROL,ROR,REPORT,RECORD,%
7179        RETURN,REGISTER,REJECT,SIGNAL,SUBTYPE,SLL,SRL,SLA,SRA,SEVERITY,%
```

```
7180        SELECT,THEN,TYPE,TRANSPORT,TO,USE,UNITS,UNTIL,VARIABLE,WHEN,WAIT,%
7181        WHILE,XOR,XNOR,%
7182        DISCONNECT,ELIF,WITH},% Arnaud Tisserand
7183     sensitive=f,% 1998 Gaurav Aggarwal
7184     morecomment=[l]--,%
7185     morestring=[d]{"}%
7186   }[keywords,comments,strings]
```

The VHDL-AMS dialect has been added by Steffen Klupsch.

```
7187 %%
7188 %% VHDL-AMS definition (c) Steffen Klupsch
7189 %%
7190 \lst@definelanguage[AMS]{VHDL}[]{VHDL}%
7191   {morekeywords={ACROSS,ARRAY,BREAK,DISCONNECT,NATURE,NOISE,PORT,%
7192        PROCEDURAL,QUANTITY,SHARED,SPECTRUM,SUBNATURE,TERMINAL,THROUGH,%
7193        TOLERANCE,UNAFFACTED,UNITS}}
```

7194 ⟨/lang1⟩


## 2.83   VRML

This language is due to Oliver BaumVRML.

7195 ⟨∗lang2⟩

```
7196 %%
7197 %% VRML definition (c) 2001 Oliver Baum
7198 %%
7199 \lst@definelanguage[97]{VRML}{%
7200   morekeywords={DEF, EXTERNPROTO, FALSE, IS, NULL, PROTO, ROUTE, TO, TRUE,%
7201     USE, eventIn, eventOut, exposedField, field, Introduction, Anchor,%
7202     Appearance, AudioClip, Background, Billboard, Box, Collision, Color,%
7203     ColorInterpolator, Cone, Coordinate, CoordinateInterpolator, Cylinder,%
7204     CylinderSensor, DirectionalLight, ElevationGrid, Extrusion, Fog,%
7205     FontStyle, Group, ImageTexture, IndexedFaceSet, IndexedLineSet, Inline,%
7206     LOD, Material, MovieTexture, NavigationInfo, Normal,%
7207     NormalInterpolator, OrientationInterpolator, PixelTexture, PlaneSensor,%
7208     PointLight, PointSet, PositionInterpolator, ProximitySensor,%
7209     ScalarInterpolator, Script, Shape, Sound, Sphere, SphereSensor,%
7210     SpotLight, Switch, Text, TextureCoordinate, TextureTransform,%
7211     TimeSensor, TouchSensor, Transform, Viewpoint, VisibilitySensor,%
7212     WorldInfo},%
7213   morecomment=[l]\#,% bug: starts comment in the first column
7214   morestring=[b]"%
7215 }[keywords,comments,strings]
```

7216 ⟨/lang2⟩


## 2.84   XML et al

Bernhard Walle provided the following two definitions.

7217 ⟨∗lang1⟩

```
7218 \lst@definelanguage{XSLT}[]{XML}%
7219   {morekeywords={%
7220       % main elements
7221       xsl:stylesheet, xsl:transform,%
7222       % childs of the main element
7223       xsl:apply-imports, xsl:attribute-set, xsl:decimal-format, xsl:import,%
7224       xsl:include, xsl:key, xsl:namespace-alias, xsl:output, xsl:param,%
7225       xsl:preserve-space, xsl:strip-space, xsl:template, xsl:variable,%
7226       % 21 directives
7227       xsl:apply-imports, xsl:apply-templates, xsl:attribute,%
7228       xsl:call-template, xsl:choose, xsl:comment, xsl:copy, xsl:copy-of,%
7229       xsl:element, xsl:fallback, xsl:for-each, xsl:if, xsl:message,%
7230       xsl:number, xsl:otherwise, xsl:processing-instruction, xsl:text,%
7231       xsl:value-of, xsl:variable, xsl:when, xsl:with-param},%
7232     alsodigit={-},%
7233   }%
7234 \lst@definelanguage{Ant}[]{XML}{%
7235   morekeywords={%
7236     project, target, patternset, include, exclude, excludesfile,%
7237     includesfile, filterset, filter, filtersfile, libfileset, custom,%
7238     classpath, fileset, none, depend, mapper, filename, not, date,%
7239     contains, selector, depth, or, and, present, majority, size, dirset,%
7240     filelist, pathelement, path, param, filterreader, extension,%
7241     filterchain, linecontainsregexp, regexp, classconstants, headfilter,%
7242     tabstospaces, striplinebreaks, tailfilter, stripjavacomments,%
7243     expandproperties, linecontains, replacetokens, token,%
7244     striplinecomments, comment, prefixlines, classfileset, rootfileset,%
7245     root, description, xmlcatalog, entity, dtd, substitution, extensionSet,%
7246     propertyfile, entry, vsscheckin, sql, transaction, cvspass, csc,%
7247     dirname, wlrun, wlclasspath, p4label, replaceregexp, get, jjtree,%
7248     sleep, jarlib, dependset, targetfileset, srcfileset, srcfilelist,%
7249     targetfilelist, zip, zipgroupfileset, zipfileset, patch, jspc, webapp,%
7250     style, test, arg, jvmarg, sysproperty, testlet, env, tstamp, format,%
7251     unwar, vsshistory, icontract, cvschangelog, user, p4submit, ccmcheckin,%
7252     p4change, bzip2, vssadd, javadoc, bottom, source, doctitle, header,%
7253     excludepackage, bootclasspath, doclet, taglet, packageset, sourcepath,%
7254     link, footer, package, group, title, tag, translate, signjar, vajload,%
7255     vajproject, jarlib, extensionset, WsdlToDotnet, buildnumber,%
7256     jpcovmerge, tomcat, ejbjar, weblogictoplink, jboss, borland, weblogic,%
7257     iplanet, jonas, support, websphere, wasclasspath, war, manifest,%
7258     attribute, section, metainf, lib, classes, webinf, rename, sequential,%
7259     serverdeploy, generic, property, move, copydir, cccheckin, wljspc,%
7260     fixcrlf, sosget, pathconvert, map, record, p4sync, exec, p4edit,%
7261     maudit, rulespath, searchpath, antlr, netrexxc, jpcovreport, reference,%
7262     filters, coveragepath, execon, targetfile, srcfile, ccmcheckout, ant,%
7263     xmlvalidate, xslt, iplanet, ccmcheckintask, gzip, native2ascii,%
7264     starteam, ear, archives, input, rmic, extdirs, compilerarg, checksum,%
7265     mail, bcc, message, cc, to, from, loadfile, vsscheckout, stylebook,%
7266     soscheckin, mimemail, stlabel, gunzip, concat, cab, touch, parallel,%
```

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```
7267    splash, antcall, cccheckout, typedef, p4have, xmlproperty, copy,%
7268    tomcat, antstructure, ccmcreatetask, rpm, delete, replace,%
7269    replacefilter, replacetoken, replacevalue, mmetrics, waitfor, isfalse,%
7270    equals, available, filepath, os, filesmatch, istrue, isset, socket,%
7271    http, uptodate, srcfiles, untar, loadproperties, echoproperties,%
7272    vajexport, stcheckout, bunzip2, copyfile, vsscreate, ejbc, unjar,%
7273    tomcat, wsdltodotnet, mkdir, condition, cvs, commandline, marker,%
7274    argument, tempfile, junitreport, report, taskdef, echo, ccupdate, java,%
7275    renameext, vsslabel, basename, javadoc2, vsscp, tar, tarfileset,%
7276    tomcat, vajimport, setproxy, wlstop, p4counter, ilasm, soscheckout,%
7277    apply, ccuncheckout, jarlib, location, url, cvstagdiff, jlink,%
7278    mergefiles, addfiles, javacc, pvcs, pvcsproject, jarlib, options,%
7279    depends, chmod, jar, sound, fail, success, mparse, blgenclient, genkey,%
7280    dname, javah, class, ccmreconfigure, unzip, javac, src, p4add,%
7281    soslabel, jpcoverage, triggers, method, vssget, deltree, ddcreator},%
7282  deletekeywords={default},%
7283 }
```

7284 ⟨/lang1⟩

This is my first attempt to support XML. It is from 2000/07/18.

7285 ⟨∗lang1⟩

```
7286 \lst@definelanguage{XML}%
7287   {keywords={,CDATA,DOCTYPE,ATTLIST,termdef,ELEMENT,EMPTY,ANY,ID,%
7288       IDREF,IDREFS,ENTITY,ENTITIES,NMTOKEN,NMTOKENS,NOTATION,%
7289       INCLUDE,IGNORE,SYSTEM,PUBLIC,NDATA,PUBLIC,%
7290       PCDATA,REQUIRED,IMPLIED,FIXED,%%% preceded by #
7291       xml,xml:space,xml:lang,version,standalone,default,preserve},%
7292    alsoother=$,%
7293    alsoletter=:,%
7294    tag=**[s]<>,%
7295    morestring=[d]",% ??? doubled
7296    morestring=[d]',% ??? doubled
7297    MoreSelectCharTable=%
7298       \lst@CArgX--\relax\lst@DefDelimB{}{}%
7299           {\ifnum\lst@mode=\lst@tagmode\else
7300               \expandafter\@gobblethree
7301            \fi}%
7302           \lst@BeginComment\lst@commentmode{{\lst@commentstyle}}%
7303       \lst@CArgX--\relax\lst@DefDelimE{}{}{}%
7304           \lst@EndComment\lst@commentmode
7305       \lst@CArgX[CDATA[\relax\lst@CDef{}%
7306           {\ifnum\lst@mode=\lst@tagmode
7307               \expandafter\lst@BeginCDATA
7308            \else \expandafter\lst@CArgEmpty
7309            \fi}%
7310           \@empty
7311       \lst@CArgX]]\relax\lst@CDef{}%
7312           {\ifnum\lst@mode=\lst@GPmode
7313               \expandafter\lst@EndComment
```

```
7314              \else \expandafter\lst@CArgEmpty
7315                 \fi}%
7316             \@empty
7317   }[keywords,comments,strings,html]%
```

And after receiving a bug report from Michael Niedermair I converted the version 0.21 contents of `MoreSelectCharTable` to version 1.0.

```
7318 ⟨/lang1⟩
```