

Include this line somewhere in the latex preamble:

```
\usepackage{ccg-latex}
```

I will show examples with increasingly high-level `ccg-latex` code.

Examples with the `\cgex{n}{derivations}` command:

$$\begin{array}{c}
 \text{John} \qquad \text{likes} \qquad \text{Mary} \\
 \hline
 \frac{S/(S \backslash NP) \quad (S \backslash NP_{3s})/NP \quad (S \backslash NP) \backslash ((S \backslash NP)/NP)}{\lambda p.p \text{john}' : \lambda x \lambda y. \text{like}' xy \quad : \lambda p.p \text{mary}'} \\
 \xrightarrow{\hspace{10em}} \\
 \frac{\hspace{10em}}{S \backslash NP : \lambda y. \text{like}' \text{mary}' y} \\
 \xrightarrow{\hspace{10em}} \\
 S : \text{like}' \text{mary}' \text{john}'
 \end{array}$$

The `ccg-latex` code is:

```
\cgex{3}{John & likes & Mary\\
\cglines{3}\\
\cgf{S\fs(S\bs NP)} & \cgf{(S\bs\cgs{NP}{3s})\fs NP}
& \cgf{(S\bs NP)\bs((S\bs NP)\fs NP)}\\
\lf{\lambda p.p\,\so{john}}
& \lf{\lambda x \lambda y.\so{like}xy} & \lf{\lambda p.p\,\so{mary}}\\
& \cgline{2}{\cgba}\\
& \cgres{2}{S\bs NP \lf{\lambda y.\so{like}\so{mary}y}}\\
% note that \cgres is by default in \cgf font
\cgline{3}{\cgfa}\\
\cgres{3}{S \lf{\so{like}\so{mary}\so{john}}}
}
```

Same example with lower-level ccg-latex commands for lexical assumption lines, and with shorthanded type-raising notation:

$$\begin{array}{c}
 \text{John} \qquad \text{likes} \qquad \text{Mary} \\
 \hline
 NP_{3s}^{\uparrow} \quad (S \backslash NP_{3s}) / NP \quad S \backslash (S / NP) \\
 : \lambda p.p.john' : \lambda x \lambda y.like'_{xy} : \lambda p.p.mary' \\
 \hline
 S / NP : \lambda x.like'_{xjohn'} \xrightarrow{B} \\
 \hline
 S : like'_{mary'john'} \longrightarrow
 \end{array}$$

The ccg-latex code is:

```

\\cgex{3}{John & likes & Mary\\
% uses the alias \cat rather than \cgf above--same result
\cgul & \cgul & \cgul\\
% manually repeats the columns for comparison with \cglines above
\cat{\cgss{NP}{3s}{\uparrow}}
& \cat{(S\bs\cgs{NP}{3s})\fs NP} & \cat{S\bs(S\fs NP)}\\
\lf{\lambda p.p,\so{john}}
& \lf{\lambda x \lambda y.\so{like}_{xy}} & \lf{\lambda p.p,\so{mary}}\\
\cgline{2}{\cgfc}\\
\cgres{2}{S\fs NP \lf{\lambda x.\so{like}_x\so{john}}}\
% note that \cgres is by default in \cgf font
\cgline{3}{\cgfa}\\
\cgres{3}{\cat{S} \lf{\so{like}\so{mary}\so{john}}}\
% using \cat inside \cgres is nae problem
}

```

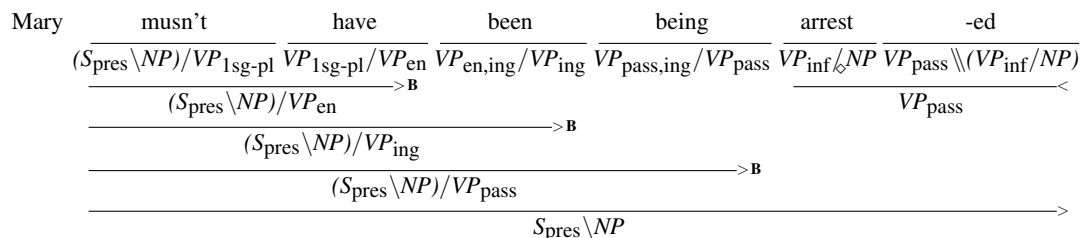
An example with double slashes (for morphology, etc.)

$$\frac{\text{dismiss} \quad \text{-ed}}{VP_{\text{inf}}/NP: \lambda x \lambda y. \text{dismiss}' xy \ ((S \backslash NP_{\text{agr}})/NP) \backslash (VP_{\text{inf}}/NP): \lambda p \lambda x \lambda y. \text{past}'(Pxy)} \\ \frac{}{(S \backslash NP_{\text{agr}})/NP: \lambda x \lambda y. \text{past}'(\text{dismiss}' xy)} <$$

cgg-latex code (using \cgg instead of \cat, which do the same, and native latex math for LF, which does the same as \lf{..}). NB. empty subscripts, if you feel like it, or if you keep changing the categories as I do).

```
\cgex{3}{dismiss& -ed\\
\cglines{2}\\
\cgf{\cgs{VP}{inf}\fs\cgs{NP}{}}
$:\lambda x\lambda y.\so{dismiss}\,x\,y$}&
\cgf{((\cgs{S}{}\bs\cgs{NP}{agr})\fs NP)\bss(\cgs{VP}{inf}\fs NP)
$:\lambda p\lambda x\lambda y.\so{past}(P\,xy)$}\\
\cgline{2}{\cgba}\\
\cgres{2}{\cgf{(\cgs{S}{}\bs\cgs{NP}{agr})\fs\cgs{NP}{}}
$:\lambda x\lambda y.\so{past}(\so{dismiss}\,x\,y)$}}
}
```

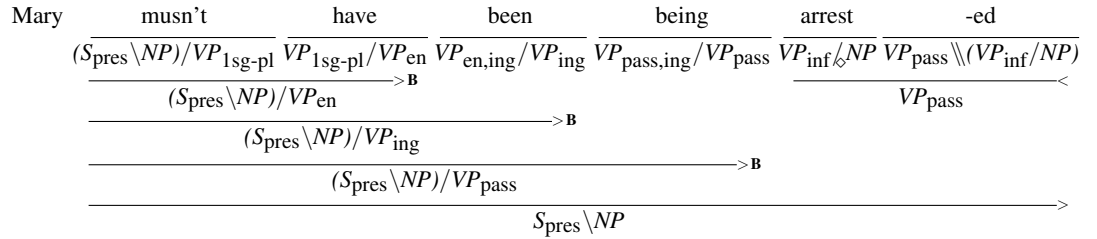
Here is one example with features galore, from Emmon Bach:



cgg-latex code:

```
{\footnotesize
Mary \cgex{6}{musn't & have & been & being & arrest & -ed\\
  \cglines{6}\\
  \cgf{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{1sg-pl}}
  & \cgf{\cgs{VP}{1sg-pl}\fs\cgs{VP}{en}}
  & \cgf{\cgs{VP}{en,ing}\fs\cgs{VP}{ing}}
  & \cgf{\cgs{VP}{pass,ing}\fs\cgs{VP}{pass}}
  & \cgf{\cgs{VP}{inf}\fds NP}
  & \cgf{\cgs{VP}{pass}\lds(\cgs{VP}{inf}\fs NP)}\\
  \cglines{2}{\cgfc} &&& \cglines{2}{\cgba}\\
  \cgres{2}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{en}}
  &&& \cgres{2}{\cgs{VP}{pass}}\\
  \cglines{3}{\cgfc}\\
  \cgres{3}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{ing}}\\
  \cglines{4}{\cgfc}\\
  \cgres{4}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{pass}}\\
  \cglines{6}{\cgfa}\\
  \cgres{6}{\cgs{S}{pres}\bs NP}
}}
```

Same example with `\begin{ccg}{n}{data}{derivations}\end{ccg}`.  
No gloss line on top, and lexical assumption lines are drawn by default.



ccg-latex code:

```
{\footnotesize
Mary
\begin{ccg}{6}{musn't & have & been & being & arrest & -ed}
{
  \cgf{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{1sg-pl}}
  & \cgf{\cgs{VP}{1sg-pl}\fs\cgs{VP}{en}}
  & \cgf{\cgs{VP}{en,ing}\fs\cgs{VP}{ing}}
  & \cgf{\cgs{VP}{pass,ing}\fs\cgs{VP}{pass}}
  & \cgf{\cgs{VP}{inf}\fds NP}
  & \cgf{\cgs{VP}{pass}\lds(\cgs{VP}{inf}\fs NP)}\
  \cglines{2}{\cgfc} && \cglines{2}{\cgba}\
  \cgres{2}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{en}}
  && \cgres{2}{\cgs{VP}{pass}}\
  \cglines{3}{\cgfc}\
  \cgres{3}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{ing}}\
  \cglines{4}{\cgfc}\
  \cgres{4}{(\cgs{S}{pres}\bs NP)\fs\cgs{VP}{pass}}\
  \cglines{6}{\cgfa}\
  \cgres{6}{\cgs{S}{pres}\bs NP}
}
\end{ccg}
}
```

Another example, to show glossing in the beginning. The end gloss is typeset by `\mc`, for multi-column, centered.

It uses `\begin{ccgg}{n}{data}{gloss}{derivations}\end{ccgg}`.

ver-dir give-caus	-t -caus	-ti. -past
$\frac{VP_{\text{inf}} \backslash NP_{\text{dat}} \backslash NP_{\text{dat}} \backslash NP_{\text{acc}}}{: \lambda x \lambda y \lambda z. \text{give}'_{xyz}}$	$\frac{(S \backslash NP_{\text{nom}} \backslash NP_{\text{case}}) \backslash VP_{\text{inf}}}{: \lambda p \lambda x \lambda y. \text{cause}'(px)y}$	
$\frac{\quad}{S \backslash NP_{\text{nom}} \backslash NP_{\text{dat}} \backslash NP_{\text{dat}} \backslash NP_{\text{dat}} \backslash NP_{\text{acc}}}$		
$: \lambda x_1 \lambda x_2 \lambda x_3 \lambda x_4 \lambda x_5. \text{cause}'(\text{cause}'(\text{give}'_{x_1 x_2 x_3})x_4)x_5$		
‘made to let give’, from Turkish		

ccg-latex code:

```
\begin{ccgg}{3}{ver-dir & -t & -ti.}{give{-caus} & {-caus} & {-past}}
{
\cgf{\cgs{VP}{inf}\bs\cgs{NP}{dat}\bs\cgs{NP}{dat}\bs\cgs{NP}{acc}}
& \cgf{(S\bs\cgs{NP}{nom}\bs\cgs{NP}{case})\bs\cgs{VP}{inf}}\
\lf{\lambda x\lambda y\lambda z.\so{give}_{xyz}}
& \lf{\lambda p\lambda x\lambda y.\so{cause}(px)y}\
\cglines{2}{\cgb{3}}\
\cgres{2}{S\bs\cgs{NP}{nom}\bs\cgs{NP}{dat}\bs\cgs{NP}{dat}}
\bs\cgs{NP}{dat}\bs\cgs{NP}{acc}}\
\cgres{2}{\lf{\lambda x_1\lambda x_2\lambda x_3\lambda x_4\lambda x_5.
\so{cause}(\so{cause}(\so{give}_{x_1x_2x_3})x_4)x_5}}\[1ex]
\mc{3}{‘made to let give’, from Turkish}
}
\end{ccgg}
```