When the bussproofs.sty code was first written, the only documention for the bussproofs style was in the comments at the beginning of the style file bussproofs.sty. But recently (July 2004), Peter Smith has written an excellent exposition of bussproofs.sty, presently available at

http://www.phil.cam.ac.uk/teaching_staff/Smith/LaTeX/nd.html

The present document is a sample LaTeX file that was created for testing purposes while writing the bussproofs code and you might find that it useful as an example of how to use special features of the style.

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Here is some text.

$$\text{eigenvariable } x\ \dfrac{\cdot\ \dfrac{\text{Weakening}\ \dfrac{\Gamma'\longrightarrow\Delta, A, A}{\neg A, \Gamma'\longrightarrow\Delta, A}}{\neg A, \neg A, \Gamma'\longrightarrow\Delta}\ \lor\text{:right}}{\Gamma\longrightarrow\Delta}\ \forall\text{:right}$$

Here is more text.

$$\dfrac{\dfrac{\Delta\longrightarrow\Pi \qquad \dfrac{\dfrac{\dfrac{\Gamma'\longrightarrow\Delta, A}{\neg A, \Gamma'\longrightarrow\Delta}}{\neg A, \neg A, \Gamma'\longrightarrow\Delta}}{\Gamma\longrightarrow\Delta}}{\Gamma, \Pi, A\longrightarrow\Delta, \Delta, B} \qquad \longrightarrow\text{Hi there}}{\Gamma\longrightarrow\Delta}$$

$$\dfrac{\cdot\ \dfrac{\Delta\longrightarrow\Pi \qquad \dfrac{\dfrac{\dfrac{\Gamma'\longrightarrow\Delta, A}{\neg A, \Gamma'\longrightarrow\Delta}}{\neg A, \neg A, \Gamma'\longrightarrow\Delta}}{\Gamma\longrightarrow\Delta}}{\Gamma, \Pi, A\longrightarrow\Delta, \Delta, B}\ \lor\text{:left} \qquad \text{Hi there}}{\Gamma\longrightarrow\Delta}$$

The above examples show ‘displayed’ proofs. On the other hand, for putting proofs inline instead of displayed, it is also permissable to put proofs into text rather than into centered environments. For example, one can write a proof right here: $\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\Gamma'\longrightarrow\Delta, A}{\neg A, \Gamma'\longrightarrow\Delta}}{\neg A, \neg A, \Gamma'\longrightarrow\Delta}}{\Gamma\longrightarrow\Delta} \ \Delta\longrightarrow\Pi}{\Gamma, \Pi, A\longrightarrow\Delta, \Delta, B} \qquad \longrightarrow\text{Hi there}}{\Gamma\longrightarrow\Delta}$ although of course the proof is quite big compared to the text. There is no reason you could not add `\subscriptstyle` or `\small` commands to the lines of the proofs to shrink things down. The previous proof looks strange because it is illustrated the usage of `\kernHyps` and `\insertBetweenHyps`. Finally a 3-ary inference with a usage of `\noLine` is:

$$\dfrac{A \vee B \qquad \begin{array}{c}[A]\\ C\end{array} \qquad \begin{array}{c}[B]\\ C\end{array}}{C}$$

Two more examples:

$$\dfrac{\dfrac{\text{A,B} \qquad \text{C}}{\text{A-B-C}} \qquad \dfrac{\text{good} \qquad \text{bad}}{\frac{\textit{good}}{\textit{bad}}\text{A}}}{\text{done}}$$

$$\dfrac{\dfrac{\longrightarrow A, B \qquad \longrightarrow C}{\longrightarrow A - B - C} \qquad \dfrac{\longrightarrow good \qquad \longrightarrow bad}{\longrightarrow \frac{good}{bad} A}}{\longrightarrow done}$$

Small labels can be created as in the third proof below:

$$\dfrac{\text{A}}{\bot}\,1 \qquad \dfrac{\text{A}}{\bot}\,(2) \qquad \dfrac{\text{A}}{\bot}\,{\scriptstyle (3)} \qquad (4)\,\dfrac{\text{A}}{\bot}$$

Arnold's example of inline proof: The figure $\dfrac{\ldots\Gamma_\iota\ldots(\iota\in I)}{\Gamma}\,I$ is called ...

**Upside down proofs** Proofs can be rendered upside down. For instance the proof above with a 3-ary inference can be made upside down by giving the command `\rootAtTop`. This is useful if you want your proof trees to have their root at the top.

$$\begin{array}{c} C \\ \hline A \vee B \qquad \begin{array}{c} C\\ [A]\end{array} \qquad \begin{array}{c} C\\ [B]\end{array}\end{array}$$

To make the change permanent for the rest of your document, use the command `\alwaysRootAtTop`

Another upside-down example, from Alex Hertel:

$$\begin{array}{c}
\forall x\exists y\forall z(((\neg x\wedge\neg y)\vee z)\vee((x\wedge y)\vee z)) \\
[0/x]\ \overline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}\ [1/x]
\end{array}$$

$$\dfrac{\dfrac{\dfrac{\exists y\forall z(((1\wedge\neg y)\vee z)\vee((0\wedge y)\vee z))}{\exists y\forall z(((1\wedge\neg y)\vee z)\vee((0\wedge y)\vee z))}[0/y]}{\forall z(((1\wedge 1)\vee z)\vee((0\wedge 0)\vee z))}[0/y]}{\underset{=1}{(((1\wedge 1)\vee 0)\vee((0\wedge 0)\vee 0))}\qquad \underset{=1}{(((1\wedge 1)\vee 1)\vee((0\wedge 0)\vee 1))}}\ {}^{[0/z]\ [1/z]}$$

$$\dfrac{\dfrac{\exists y\forall z(((0\wedge\neg y)\vee z)\vee((1\wedge y)\vee z))}{\forall z(((0\wedge 0)\vee z)\vee((1\wedge 1)\vee z))}[1/y]}{\underset{=1}{(((0\wedge 0)\vee 0)\vee((1\wedge 1)\vee 0))}\qquad \underset{=1}{(((0\wedge 0)\vee 1)\vee((1\wedge 1)\vee 1))}}\ {}^{[0/z]\ [1/z]}$$

Testing of quaternary and quinary inferences (a bit scrunched due a use of `\insertBetweenHyps`):

$$\dfrac{\dfrac{\dfrac{A^B A_B\longrightarrow A_{B_C}A^B\longrightarrow A^{B^C}A^{B^C}\longrightarrow A^{B^{C^D}}A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A^{B^{C^{D^E}}}}{X\longrightarrow XXXXX}}{YYYY\longrightarrow Y}\qquad A^B\longrightarrow A^{B^C}A^{B^C}\longrightarrow A^{B^{C^D}}A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A}{\dfrac{X\longrightarrow XXXXX}{YYYY\longrightarrow Y}}$$

Testing of quaternary and quinary inferences (a bit scrunched due a use of `\insertBetweenHyps`):

$$\dfrac{\dfrac{YYYY\longrightarrow Y}{X\longrightarrow XXXXX}}{\dfrac{\dfrac{YYYY\longrightarrow Y}{X\longrightarrow XXXXX}}{A^B A_B\longrightarrow A_{B_C}A^B\longrightarrow A^{B^C}A^{B^C}\longrightarrow A^{B^{C^D}}A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A^{B^{C^{D^E}}}}\qquad A^B\longrightarrow A^{B^C}A^{B^C}\longrightarrow A^{B^{C^D}}A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A}$$

$$\dfrac{X\longrightarrow XXXXX}{A^B\longrightarrow A^{B^C}A^{B^C}\longrightarrow A^{B^{C^D}}A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A^{B^{C^{D^E}}}}$$

$$\dfrac{X\longrightarrow XXXXX}{A^{B^C}\longrightarrow A^{B^{C^D}}\qquad A^{B^{C^D}}\longrightarrow A^{B^{C^{D^E}}}\ A^{B^{C^{D^E}}}}$$

This last sentence has nothing to do with proof trees, but shows my macros for Gödel number delimeters: $\ulcorner A\urcorner$,$\ulcorner B\urcorner$ $\ulcorner s\urcorner$