trees.sty: A Macro for Drawing Binary or Ternary Trees

Peter Vanroose
Peter.Vanroose@esat.kuleuven.ac.be

18 april 1990

The following macros let you draw a (binary or ternary) tree of any size. For each "internal node", you only have to specify which are the descending nodes, with a \branch command (\tbranch for ternary node). To this end, nodes are given a label (only used internally!). These macros will give you some ideas on designing similar things for, e.g., digital circuits.

Trees are constructed with labels on the branches (default 0 and 1), and with text (e.g., its name or value) on the nodes. The first parameter to \branch (0, 1, 2 or 3) determines the steepness of the branches.

Example:
\begin{picture}(100,100)(-50,10)
\unitlength=2mm
\branchlabels ABC % 012 is the default
\root(2,10) 0. % root at absolute coordinate (2,10)
% its (internally used) label is 0
% the space before the 0 is obligatory
\branch2{16} 0:1,2. % node 0 (i.e., the root) has children 1 and 2
% the text "1.00" is written above it
% space is optional, :, are obligatory
\leaf{4}{$u_1$} 1. % node 1 is a leaf
% "0.45" written above, "$u_1$" to the right
\branch2{12} 2:3,7. % branch to node 3 goes up, and has label A
\tbranch2(9) 3:4,5,6.
\leaf{4}{$u_3$} 4. % the symbols 0--7 can be replaced by anything
\leaf{3}{$u_4$} 5.
\leaf{2}{$u_5$} 6.
\leaf{3}{$u_2$} 7.
\end{picture}

will typeset something like:

\begin{center}
\begin{tikzpicture}
\node (root) at (0,0) [circle, draw, fill=black] {$u_0$};
\node (a) at (-2,-1) [circle, draw, fill=black] {$u_1$};
\node (b) at (2,-1) [circle, draw, fill=black] {$u_2$};
\node (c) at (0,-2) [circle, draw, fill=black] {$u_3$};
\node (d) at (-3,-3) [circle, draw, fill=black] {$u_4$};
\node (e) at (3,-3) [circle, draw, fill=black] {$u_5$};
\node (f) at (0,-4) [circle, draw, fill=black] {$u_6$};
\node (g) at (-2,-5) [circle, draw, fill=black] {$u_7$};
\node (h) at (2,-5) [circle, draw, fill=black] {$u_8$};
\node (i) at (0,-6) [circle, draw, fill=black] {$u_9$};
\node (j) at (-3,-7) [circle, draw, fill=black] {$u_{10}$};
\node (k) at (3,-7) [circle, draw, fill=black] {$u_{11}$};
\draw (root) -- (a);
\draw (root) -- (b);
\draw (a) -- (d);
\draw (a) -- (e);
\draw (b) -- (f);
\draw (b) -- (g);
\draw (c) -- (h);
\draw (c) -- (i);
\draw (i) -- (j);
\draw (i) -- (k);
\end{tikzpicture}
\end{center}