Drawing Tree with Tikz Package

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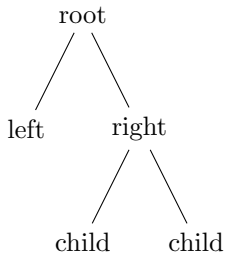
Contents

1 Introduction to the Child Operation:

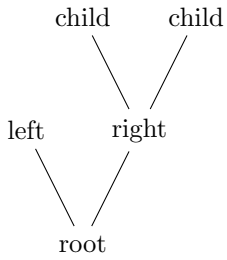
1.1 Basic Tree(Downward):

```
\begin{tikzpicture}
  \node {root}
    child {node{left}}
    child {node {right}
      child {node {child}}
      child {node{child}}
    };
\end{tikzpicture}
```



1.2 Basic Tree(Upward):

```
    \begin{tikzpicture}
        \node {root} [grow'=up]
            child {node {left}}
            child {node {right}
              child {node {child}}
              child {node {child}}
          };
    \end{tikzpicture}
```



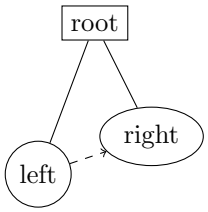
1.3 Using foreach and specified distance:

```
\begin{tikzpicture}[level distance = 4mm, level/.style={sibling
    distance=8mm/#1}]
  \coordinate
    child foreach \x in {0,1}
      {child foreach \y in {0,1}
        {child foreach \z in {0,1}}};
\end{tikzpicture}
```

2 Child Paths and Child Nodes

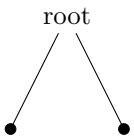
2.1 Different Node Shapes:

```
\begin{tikzpicture}[sibling distance = 15mm]
  \node[rectangle,draw] {root}
    child {node[circle,draw, yshift=-5mm](left node) {left}}
    child {node[ellipse,draw] (right node) {right}};
  \draw[dashed,->] (left node) -- (right node);
\end{tikzpicture}
```



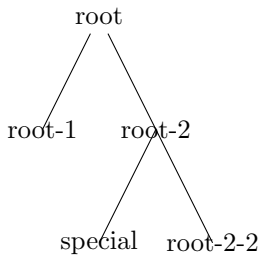
2.2 Dot Child:

```
\begin{tikzpicture}
    \node {root}
      child {[fill] circle(2pt)}
      child {[fill] circle(2pt)};
\end{tikzpicture}
```



3 Naming Child Nodes:

```
\begin{tikzpicture}
  \node(root){root}
    child
    child{
      child{coordinate(special)}
      child
    };

  \node at (root-1){root-1};
  \node at (root-2) {root-2};
    \node at (special) {special};
    \node at (root-2-2) {root-2-2};
\end{tikzpicture}
```

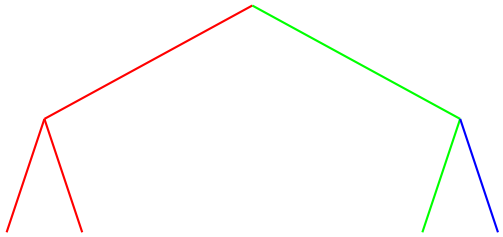


4 Specifying Options for Trees and Children:

```
\begin{tikzpicture}
  \scoped
    [...]               % Options apply to the whole tree
    \node[...] {root}   % Options apply to the root node only
       [...]            % Options apply to all children
       child[...]       % Options apply to this child and all its
           children
       {
         node[...] {}   % Options apply to the child node only
         ...
       }
       child[...]       % Options apply to this child and all its
           children
    ;
\end{tikzpicture}
```

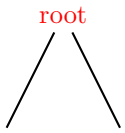
4.1 Branch colors:

```
\begin{tikzpicture}[thick,level 1/.style={sibling distance=55mm},
    level 2/.style={sibling distance=10mm}]
  %\node {}
  \coordinate
  child[red] {child child}
  child[green]{child child[blue]};
\end{tikzpicture}
```



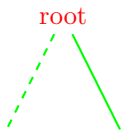
4.2 Node Colors:

```
\begin{tikzpicture}[thick]
    \node [red] {root}
        child
      child;
\end{tikzpicture}
```



4.3 Node and Edge Colors:

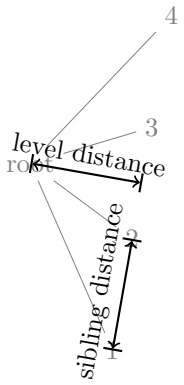
```
\begin{tikzpicture}[thick]
    \node [red] {root}
      [green] % option applies to all children
      child[dashed]
      child;
\end{tikzpicture}
```



5 Default Growth Function:

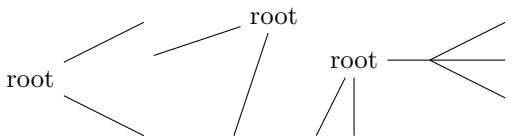
5.1 Distances:

```
\begin{tikzpicture}[sibling distance=15mm, level distance=15mm]
    \path [help lines]
      node (root) {root}
      [grow=-10]
      child {node {1}}
        child {node {2}}
        child {node {3}}
        child {node {4}};

    \draw[|<->|,thick] (root-1.center)
        -- node[above,sloped] {sibling distance} (root-2.center);

  \draw[|<->|,thick] (root.center)
        -- node[above,sloped] {level distance} +(-10:\
            tikzleveldistance);
\end{tikzpicture}
```



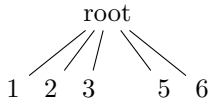
5.2 Growth Values:

```
tikz \node {root} [grow=right] child child;
\tikz \node {root} [grow=south west] child child;
\begin{tikzpicture}[level distance=10mm,sibling distance=5mm]
  \node {root}
    [grow=down]
    child
    child
    child[grow=right] {
      child child child
    };
\end{tikzpicture}
```



6 Missing Children:

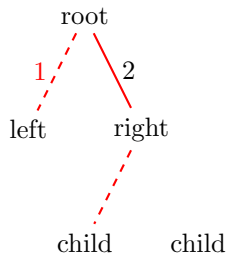
```
\begin{tikzpicture}[level distance=10mm,sibling distance=5mm]
  \node {root} [grow=down]
      child          { node {1} }
      child          { node {2} }
      child          { node {3} }
      child[missing] { node {4} }
      child          { node {5} }
      child          { node {6} };
\end{tikzpicture}
```



7 Edges From the Parent Node:

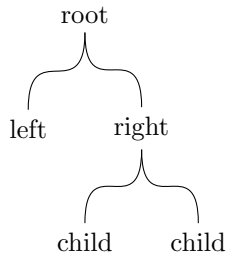
7.1 Straight Edge Variations:

```
\begin{tikzpicture}[edge from parent/.style={draw,red,thick}]
  \node {root}
    child[dashed] { node {left} edge from parent[dashed] node[left
        ]{1}}
    child {node {right}
          child[dashed] {node {child}}
          child {node {child} edge from parent[draw=none]}
        edge from parent node[black,right]{2}
           };
\end{tikzpicture}
```



7.2 Curved Edge:

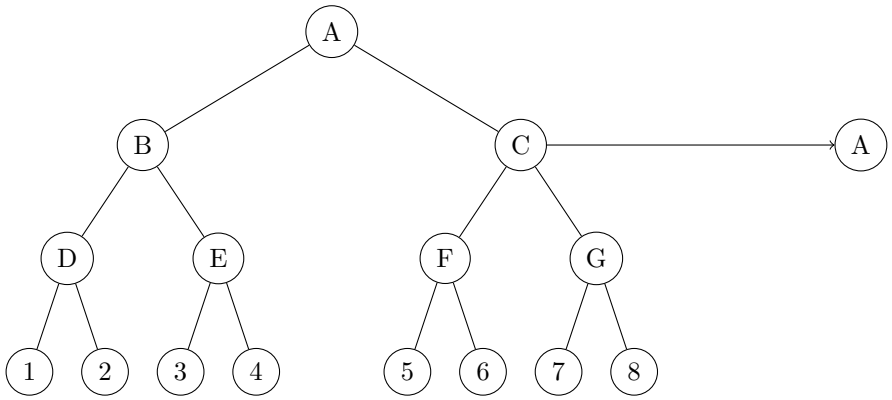
```
\begin{tikzpicture}[level distance=15mm, sibling distance=15mm,
  edge from parent path=
{(\tikzparentnode.south) .. controls +(0,-1) and +(0,1)
                         .. (\tikzchildnode.north)}]
  \node {root}
    child {node {left}}
    child {node {right}
      child {node {child}}
      child {node {child}}
    };
\end{tikzpicture}
```



8 Practice

8.1 Practice 01:

```
\begin{tikzpicture}
  [every node/.style={circle,draw},
  level 1/.style={sibling distance=50mm},
  level 2/.style={sibling distance=20mm},
  level 3/.style={sibling distance=10mm}]
    \node{A}
      child {node {B}
        child{node{D}
          child{node{1}}
          child{node{2}}
        }
        child{node {E}
          child{node{3}}
          child{node{4}}
        }
      }
      child {node(1) {C}
        child{node{F}
          child{node{5}}
          child{node{6}}
        }
        child{node{G}
          child{node{7}}
          child{node{8}}
        }
      };
      \node(2) at (7,-1.5){A};
      \draw[->](1) to (2);
  \end{tikzpicture}
```



8.2 Practice 02:

```
\begin{tikzpicture}
    [level distance=10mm,
    every node/.style={fill=red!60,circle,inner sep=1pt},
    level 1/.style={sibling distance=20mm,nodes={fill=red!45}},
    level 2/.style={sibling distance=10mm,nodes={fill=red!30}},
  level 3/.style={sibling distance=5mm,nodes={fill=red!25}}]
    \node {31}
      child {node {30}
          child {node {20}
                child {node {5}}
            child {node {4}}
          }
          child {node {10}
            child {node {9}}
            child {node {1}}
          }
        }
      child {node {20}
          child {node {19}
            child {node {1}}
          child[missing]
          }
          child {node {18}}
      };
\end{tikzpicture}
```