Mini `tikz` tutorial

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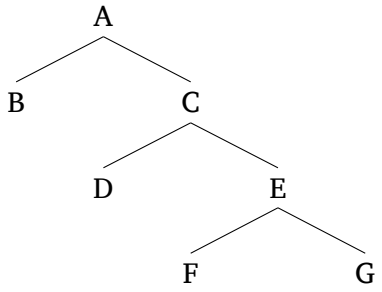
In this short tutorial, I list some basic trees and some basic decorations like different types of arrows. I learned a lot from this phenomenal tutorial by Dr. James Crippen: `https://lingbuzz.net/lingbuzz/003379`. **Most of the code in this tutorial comes from this manual**. Things I learned over the years from `https://tex.stackexchange.com/` are impossible to list and credit.

I claim no credit nor novelty in this tutorial. It just conveniently lists codes that are frequently used. It also provides a guide for students taking syntax courses who may want to learn how to draw trees with `tikz` without having to spend too much time learning its syntax.

Trees and arrows

1. A basic head-initial tree

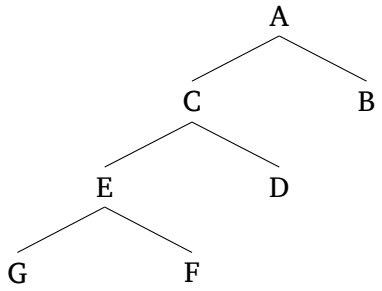
```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
    child {node {B}}
    child {node {C}
        child {node {D}}
        child {node {E}
            child {node {F}}
            child {node {G}}}}
    ;
\end{tikzpicture}
```



Adjust the vertical distance between nodes with `level distance=2.25em` and the horizontal distance with `sibling distance=2.25em`.

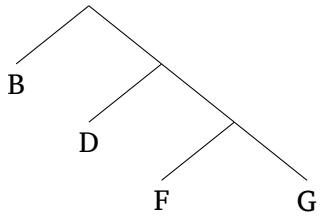
2. A basic head-final tree

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
    child {node {C}
        child {node {E}
            child {node {G}}
            child {node {F}}}
        child {node {D}}}
    child {node {B}}
    ;
\end{tikzpicture}
```



3. A tree without labels in branching nodes:

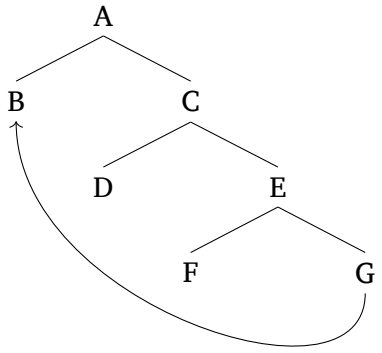
```
\begin{tikzpicture}
    [parent anchor=center,
    align=center,
    level distance=2em,
    anchor=north,
    sibling distance=5em,
    child anchor=north]
    \node {}
    child {node {B}}
    child {
        child {node {D}}
        child {
            child {node {F}}
            child {node {G}}}}
    ;
\end{tikzpicture}
```



Key specification: `parent anchor=center` (instead of 'south'). Then delete `node {}` in a branching node (cf. the tree with labels in branching nodes).

4. A curved arrow connecting nodes G and B

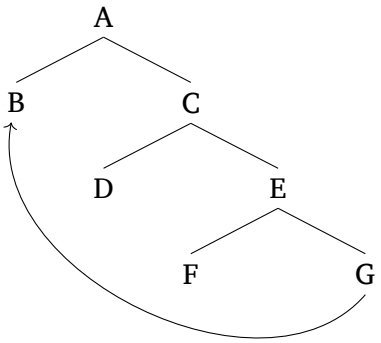
```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b) .. controls +(south:7em) and +(south:5em) .. (g);
\end{tikzpicture}
```



Add labels to the nodes you want to connect with an arrow (e.g. `(b)` and `(g)`).

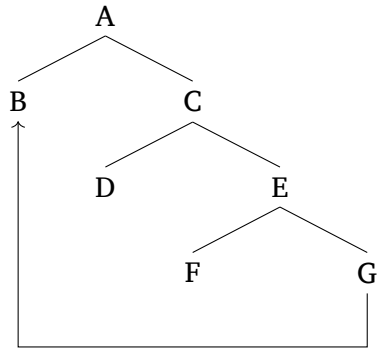
5. Another code for a curved arrow

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b) to [bend right=75] (g.south);
\end{tikzpicture}
```



6. An angled arrow connecting B and G

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b.south)--+(0,-85pt)-|(g.south);
\end{tikzpicture}
```



7. Other arrow tips and useful commands to be used in `draw[…]`:

   (a) `*-*` (filed circles)

   (b) `o-o` (circle lines)

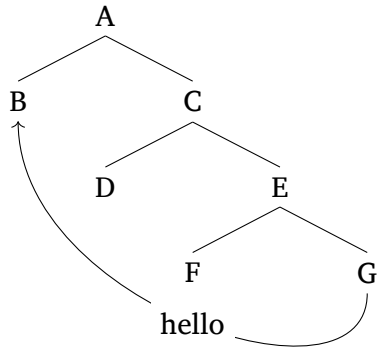
   (c) `latex-` (different arrow style)

   (d) `rounded corners=.25em` (rounded corners for angled arrow)

   (e) `dashed` (dashed line instead of solid line)

8. Annotation *hello* added to curved arrow

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b) .. controls +(south:7em) and +(south:5em) .. (g)
     node [anchor=center,pos=0.5,fill=white] {hello};
\end{tikzpicture}
```



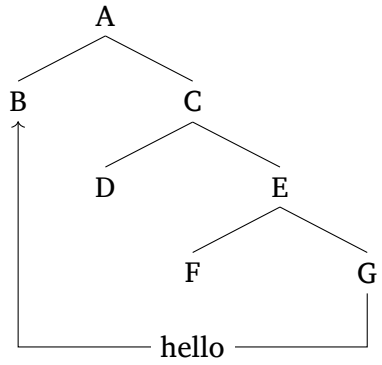
Instead of *hello*, you can use a symbol like ✗. You will need this package in the preamble:

Here is a comprehensive list of LaTeX symbols: `https://tug.ctan.org/info/symbols/comprehensive/symbols-a4.pdf`.

```
\usepackage{pifont}
```

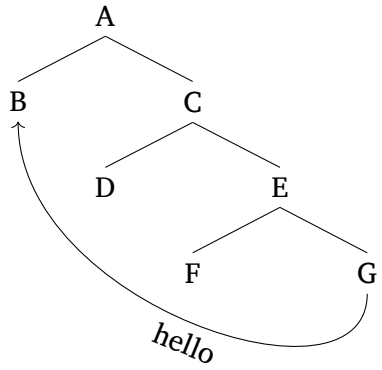
9. Annotation *hello* added to angled arrow

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b.south)--+(0,-85pt)-|(g.south)
     node [anchor=center,pos=0.25,fill=white] {hello};
\end{tikzpicture}
```

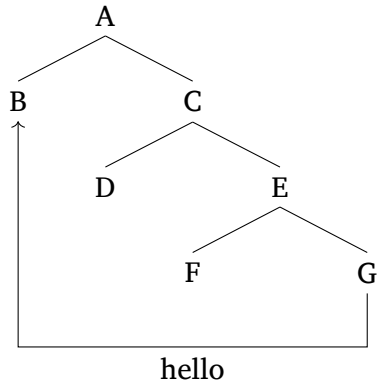


10. Annotation *hello* added beside curved arrow

```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b) .. controls +(south:7em) and +(south:5em) .. (g)
     node[sloped,midway] {hello};
\end{tikzpicture}
```

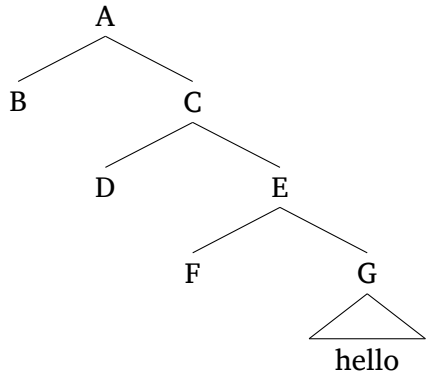


11. Annotation *hello* added below angled arrow




```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
     child {node (b) {B}}
     child {node {C}
         child {node {D}}
         child {node {E}
             child {node {F}}
             child {node (g) {G}}}}
     ;
     \draw[<-] (b.south)--+(0,-85pt)-|(g.south)
     node [anchor=north,pos=0.25] {hello};
\end{tikzpicture}
```

12. Triangle




```
\begin{tikzpicture}
    [parent anchor=south,
    align=center,
    level distance=2.25em,
    anchor=north,
    sibling distance=6em,
    child anchor=north]
    \node {A}
    child {node {B}}
    child {node {C}
        child {node {D}}
        child {node {E}
            child {node {F}}
            child {node {G}
            [sibling distance=2em]
            child {coordinate (sideleft)}
            child {node {hello} edge from parent[draw=none]}
            child {coordinate (sideright)}}}}
    ;
    \draw (sideleft) -- (sideright);
\end{tikzpicture}
```

- Identify the node where you want your triangle, e.g. G:

```
child {node {G}}
```

- Add the code below right before the closing bracket `}`:

```
child {coordinate (sideleft)}
child {node {TEXT} edge from parent[draw=none]}
child {coordinate (sideright)}
```

- You can control the size of the triangle with `[sibling distance=2em]`.
- Add the following code after the tree to draw a horizontal line as the base of the triangle:

```
\draw (sideleft) -- (sideright);
```

13. Linear representation with arrows

```
\tikzstyle{every picture}+=[remember picture, inner sep=0pt, baseline, anchor=base]%

{}[stuff \tikz\node(b){B}; [more stuff [even more stuff \tikz\node(g){G};]]]

\begin{tikzpicture}[overlay]
    \draw[<-]([yshift=-.5em]b.south)--+(0,-1.5em)-|
    ([yshift=-.5em]g.south);
    \end{tikzpicture}
```

[stuff B [more stuff [even more stuff G]]]

- The element E in the linear representation you want to connect with an arrow must be placed in this code below. Note the label `(e)` and the semicolon `;` at the end.

```
\tikz\node(e){E};
```

- The code below places the arrow lower down the elements it connects (i.e. it creates vertical space. Use `+` and `-` to shift the arrow to the right and left, respectively.

```
[yshift=-.5em]
```

- The code below creates horizontal space. This is particularly useful when the same node is connected by two arrows:

```
[xshift=-.5em]
```

Other useful resources

1. Lining up top of tree with number for numbered exampled: use the following code before the tree:

   ```
   \leavevmode\vadjust{\vspace{-\baselineskip}}\newline
   ```

   For example, using `gb4e` to number examples:

   ```
   \begin{exe}
       \ex{\leavevmode\vadjust{\vspace{-\baselineskip}}\newline
       \begin{tikzpicture}
       [parent anchor=south,
       align=center,
       level distance=2.25em,
       anchor=north,
       sibling distance=6em,
       child anchor=north]
       \node {A}
       child {node {B}}
       child {node {C}}
       ;
       \end{tikzpicture}}
   \end{exe}
   ```

2. Introducing symbols and special characters: this document uses a `fontspec` font. It allows one to input symbols like IPA symbols directly, e.g. [ɸβθðʃʒʂʐ].

   - This is a useful IPA keyboard: `https://westonruter.github.io/ipa-chart/keyboard/`.
   - This website has symbols used in few different writing systems, e.g. Portuguese: `https://portuguese.typeit.org/`.

   Compile your file with XeLaTeX!

3. Multiple columns with `minipage`:

   ```
   \begin{minipage}[t]{.5\textwidth}
       STUFF IN FIRST COLUMN
   \end{minipage}%
   \begin{minipage}[t]{.5\textwidth}
       STUFF IN SECOND COLUMN
   \end{minipage}%
   ```