An Example of Using the psfrag Package

To produce Figure 4.3 on page 77 from CLRS, we had to use the psfrag package. Take a look at the same figure from the first edition (Figure 4.3 on page 67). The math looks horrible. Figure 1 shows the same figure from the second edition, first with psfrag in effect and then without psfrag.

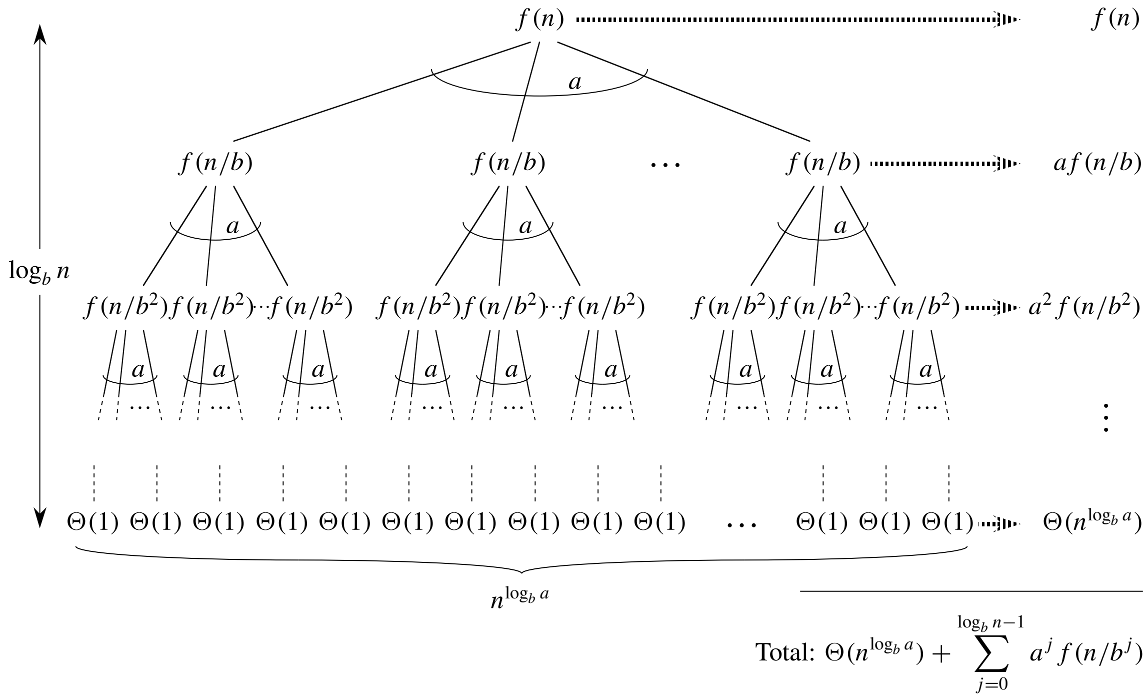
Here are the `\psfrag` commands that I used:

```
\psfrag{Zfn}[Bc][Bc][0.9]{$f(n)$}
\psfrag{ZfnR}[Br][Br][0.9]{$f(n)$}
\psfrag{Za}[Bc][Bc][0.9]{$a$}
\psfrag{Zfnb}[Bc][Bc][0.9]{$f(n/b)$}
\psfrag{Zfnb2}[Bc][Bc][0.9]{$f(n/b^2)$}
\psfrag{ZafnbR}[Br][Br][0.9]{$a f(n/b)$}
\psfrag{Za2fnb2R}[Br][Br][0.9]{$a^2 f(n/b^2)$}
\psfrag{Zlogbn}[Bc][Bc][0.9]{$\log_b n$}
\psfrag{Znlogba}[Bc][Bc][0.9]{$n^{\log_b a}$}
\psfrag{ZT1}[Bc][Bc][0.9]{$\Theta(1)$}
\psfrag{ZTnlogbaR}[Br][Br][0.9]{$\Theta(n^{\log_b a})$}
\psfrag{ZTotalR}[Br][Br][0.9]{Total: $\displaystyle\Theta(n^{\log_b a}) +
\sum_{j=0}^{\log_b n-1} a^j f(n/b^j)$}
```

Things to note:

- Beware the admonition that the string appearing in the PostScript file must be a single word, with no funny stuff in it. My convention is that I begin all text to be replaced with “Z”. There’s no reason in particular that I chose “Z”, but it has worked well for me so far.
- I have chosen all reference points to be on the baseline. Some are horizontally in the center, and some are horizontally on the right. In other figures, I use some reference points on the left.
- Just to make sure I knew what was going on, I ended the name of anything right-aligned by “R”.
- I have scaled the text by 0.9. When I created the drawing in MacDraw Pro, I used 12-point text, but I scaled it to 75% when creating the .eps file. That takes it down to 9-point text. The book is set in 10-point, and so scaling the replacement text by 0.9 takes it, too, down to 9-point.
- Note the complicated replacement text for ZTotalR. It includes a summation in `\displaystyle`.

There is one other thing you have to be careful about when using psfrag. The bounding box in your .eps file might not be the actual bounding box of the graphic after psfrag has replaced text. That happened with the above file. I had to edit the bounding box in the .eps file to adjust it to the text that was going to be added. The “Zlogbn” text changed its horizontal extent, and the “ZtotalR” text changed its vertical extent.



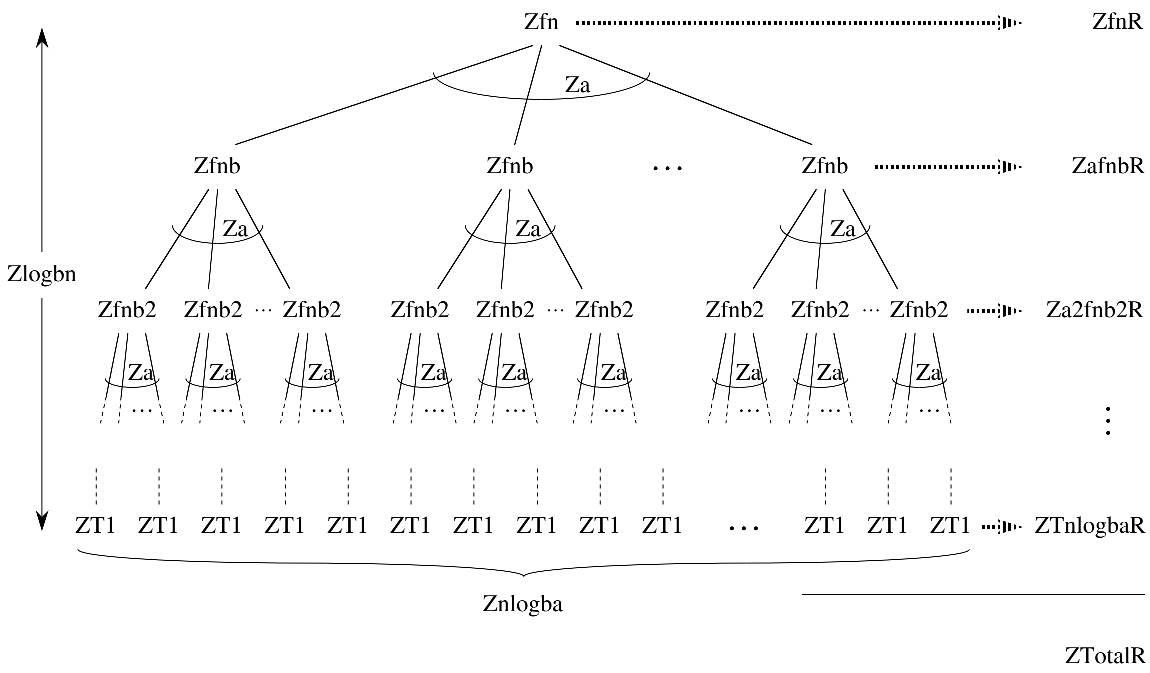


Figure 1: Figure 4.3 with (top) and without (bottom) the `psfrag` commands.

I adjusted the bounding boxes by a purely manual process. I used gv on the original .eps, without psfrag replacement, to create the tentative bounding box. Then I used gv to view the result of psfrag replacement. I determined the differences in text positioning and manually adjusted the box in the .eps file.