Typesetting Math

There's a lot to go over relating to typesetting math.

Subscripts and superscripts

You should already know about subscripts, like x_i, and superscripts, like 2^n. You don't need to put curly braces around the subscript or superscript if it's just one character. If it's more than one character, then you need to put braces: $2^m n$ is not the same as 2^{mn}.

You can have subscripts in subscripts (x_{i_j}), subscripts in superscripts (2^{n_i}), superscripts in superscripts (2^{2^n}), and superscripts in subscripts (x_{2^i}).

Fractions

In running text, try to avoid the `\frac` command. Typeset a/b rather than $\frac{a}{b}$.

For more complicated fractions, you might have to use parentheses to make things clear. For example, $(m+1)/n$; you wouldn't need the parentheses if you used `\frac`: $\frac{m+1}{n}$.

Interestingly, I just got into a little brouhaha with a reader of CLRS, who complained about the expression n/ab in equations (3.4) and (3.5). He thought that it meant $(n/a) \cdot b$, when we intended it to mean $n/(ab)$. To avoid any misinterpretation, we should have either put in the parentheses or, since the fraction appears in a math display, used the `\frac` form.

It's OK to use `\frac` in math displays. Unless I explicitly say otherwise, include environments like eqnarray in the category of math displays. So, we could have written equation (3.4) as

$$\left\lceil \frac{\lceil n/a \rceil}{b} \right\rceil = \left\lceil \frac{n}{ab} \right\rceil .$$

Notice, however, that it looks funny to have the two autosized delimiter pairs be of different sizes. What happened is that the ceiling symbol in the numerator of the left-hand side is just an ooch bigger than the numerator of the right-hand side. If we put a ***strut***—a rule of zero width, which makes it invisible—in the right-hand side's numerator, then we can even out the delimiters:

$$\left\lceil \frac{\lceil n/a \rceil}{b} \right\rceil = \left\lceil \frac{\mathstrut n}{ab} \right\rceil .$$

Here, I have used a `\mathstrut`, which is defined in plain TEX as a strut whose height is that of a regular left parenthesis. That was what I wanted, since it needed to match the height of the ceiling symbol, which is close enough to the height of the ceiling symbol for gummint work.

You can have fractions within fractions:

$$a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + \frac{1}{a_4}}}} .$$

If you want the fractions within fractions to be taller, put in full struts and explicitly say that all but the outermost fraction are to be displayed in "display style":

$$a_0 + \frac{1}{\displaystyle a_1 + \frac{1}{\displaystyle a_2 + \frac{1}{\displaystyle a_3 + \frac{1}{a_4}}}} .$$

The `\strut` command is also from plain TeX.