How to drive $\LaTeX$ with flair*

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Abstract

In this report we prove that

$$\frac{(n_1 + n_2 + \cdots + n_m)!}{n_1!\,n_2!\ldots n_m!} = \binom{n_1+n_2}{n_2}\binom{n_1+n_2+n_3}{n_3}\cdots\binom{n_1+n_2+\cdots+n_m}{n_m}. \quad (1)$$

Note the thin space after the '!' in $n_1!$ and before n_2 starts. Also notice the quotation marks: it is not '!'. Similarly, for double quotes, always type "hello," not "hello". Note that punctuations such as colon, comma, and semicolon are placed *inside* the quotations. For fine points of typsetting, see the TEXbook [1], but do not refer to Lawrence *et al* [2].

1 Introduction

Our goal is to prove equality (1) given on page 1. Do not use hardwired numbers for any cross reference. Instead use the `\label{}`, `\ref{}` and `\pageref{}` commands.

1.1 Some tabular material

You can inline small tables in your document as follows:

Item	Price
Carrots	Rs 5
Peas	Rs 3

. This will look gross in general, so you should use the `table` environment to make a floating table, as shown in Table 1. Similarly, you can typeset figures using the `figure` environment.

Item	Price
Carrots	Rs 5
Peas	Rs 3

Table 1: Consumer price index.

1.2 More math

It is harder than equation (1) to typeset the following displayed equations, using the `eqnarray` environment:

$$\prod_{k\geq 0} \frac{1}{(1-q_k z)} = \sum_{n\geq 0} z^n \Bigg/ \prod_{1\leq k\leq n} (1-q^k) \quad (2)$$

*This is a homework to make you familiar with $\LaTeX$ typesetting.

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$$
\begin{aligned}
\left(\int_{-\infty}^{\infty} e^{-x^2} dx\right)^2 &= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} e^{-(x^2+y^2)} dx\, dy \\
&= \int_0^{2\pi}\int_0^{\infty} e^{-r^2} r\, dr\, d\theta \\
&= \int\limits_0^{2\pi} \left(-\frac{e^{-r^2}}{2} \bigg|_{r=0}^{r=\infty} \right) d\theta \\
&= \pi. \qquad (3)
\end{aligned}
$$

Notice that in the second last line the limits of the integral look different. Also note the space between x and dx. Do not feel tempted to use $math\ italic$ where you should be using *text italic*. Use the `\emph{}` command for this purpose. They are $different$ (which one was used in this case?).

Even vectors require some care to typeset: say $\vec{x} = (x_1, \ldots, x_d)$, not $\vec{x} = (x_1, ..., x_d)$ or $\vec{x} = (x_1, \cdots, x_d)$. You can get more fancy and say $(\overbrace{x_1, \ldots, x_d}^{d \text{ numbers}})$ if you need to. Arrays can be typeset inline, such as $\left(\begin{array}{cc} x_{11} & x_{12} \\ x_{21} & x_{22} \end{array}\right)$, or in a display as shown below.

$$
A = \left(\begin{array}{cccc}
a_{11} & a_{12} & \ldots & a_{1n} \\
a_{21} & a_{22} & \ldots & a_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
a_{m1} & a_{m2} & \ldots & a_{mn}
\end{array}\right) \qquad (4)
$$

Arrays can also be used to typeset conditional formulae such as the following.

$$
f(x) = \left\{ \begin{array}{ll}
1/3 & \text{if } 0 \le x \le 1; \\
2/3 & \text{if } 3 \le x \le 4; \\
0 & \text{elsewhere.}
\end{array}\right. \qquad (5)
$$

1.3 Typesetting pseudocode using `tabbing`

Use the `tabbing` environment to typeset the following in a box that is 0.8 times the width of the printable area. Notice the reduced font size (`\footnotesize`).

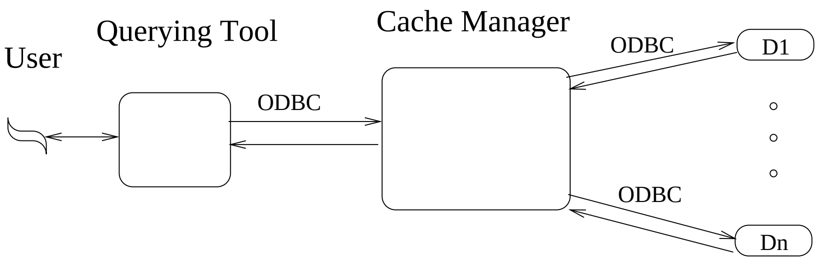
for $j := 2$ **step** 1 **until** n **do**
  begin[a] $accum := A[j]$; $k := j - 1$; $A[0] := accum$;
  while $A[k] > accum$ **do**
    begin $A[k+1] := A[k]$; $k := k - 1$;
    end
  $A[k+1] := accum$;
  end.

[a] Note the footnote in the `minipage` environment.

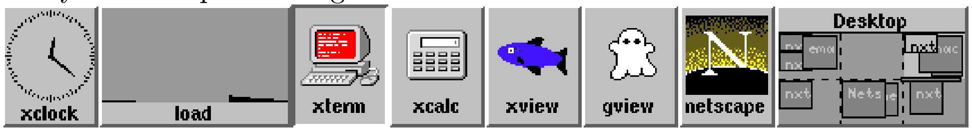
2 Including pictures

Use the `\includegraphics{}` command to include `.eps` files. These can be produced by:

1. Line-drawing as with `xfig`:



2. Or by screen-capture using `xwd` and `xv`:



References

[1] D. E. Knuth and A. Ego. *The TEXbook*. Addison-Wesley, 1996.

[2] S. Lawrence and C. Lee Giles. Accessibility of information on the Web. *Nature*, 400:107–109, July 1999.