Some Typesetting Conventions

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One of the major advantages of TEX is that it makes it possible for authors to typeset their own work. However, this new found power has not been automatically associated with a knowledge of typesetting and typographic design and so some very *unreadable* documents have ensued. This is further exacerbated by authors believing they do know something about typesetting ("Doesn't everyone?") and ignoring all attempts to lead them in the right direction, e.g., LATEX.

Although TEX users are less prone to fall into this trap as compared to your average WYSIWYG user there are still some fundamental typographic lessons to be learned. These principles are so fundamental that even a computing consultant, such as myself, is able to learn, and possibly even more importantly, understand *why* we have them.

Readability not legibility

Legibility refers to whether it is *possible* to read a document. With the advent of cheap laser printers this is almost always attained. Readability, on the other hand, refers to how *comfortable* a document is to read. A document may therefore be legible (even very legible) but difficult to read. Typesetting aims to make a document more readable both by laying out the text so it is less wearisome on the eye and in providing clues as to how the document should be read (and therefore understood).

Also, there is much emphasis on *visual* design in our world of desk-top publishing:

> Most authors mistakenly believe that typographic design is primarily a question of aesthetics — if the document looks good from an artistic viewpoint, then it is well designed. However, documents are meant to be read, not hung in museums, so the primary function of design is to make the document easier to read, not prettier. *Leslie Lamport* [1]

So it is apparent that the emphasis needs to be shifted away from making a document "prettier" to making it easier to read. Marshall Lee in *Bookmaking* [2] lists nine factors affecting the readability of the page:

- typeface,
- size of type,
- length of line,
- leading,
- page pattern (which includes "margins"),
- contrast of type and paper (which includes colour),
- texture of paper,
- typographic relationships (heads, folios, etc.), and
- suitability to contents

Not all these factors are equal in their effect on readability nor are all the factors within your control but it is possible to use some of the above factors to make your documents more readable.

Typeface and size of type

There are two broad classes of fonts: serif ("serifs" are the finishing strokes at the end of letters) and sans-serif (without serifs, e.g., fonts such as Helvetica). Of the two, serif fonts (such as Computer Modern, and Times-Roman) are easier to read for large quantities of text, "because it has been shown that we read our own language not letter by letter but by recognizing the shapes of words ..." [3]. The serifs tend to help in this "shape recognition". For example try to decipher the following two lines (they don't form words):

Even if you were able work out the letters of the top line (the sans-serif font) the second line is undoubtedly easier to read (the line was "a c l m n p q g o"). The same test can be applied for upper- and lower-case letters — lower-case letters are found to be easier to read.

From this it is possible to establish two rules of typographic legibility for *continuous* reading:

- Sans-serif type is intrinsically less legible than seriffed type.
- Well designed roman upper- and lower-case type is easier to read than its variants, e.g., italic, bold, caps, expanded or condensed versions.

These rules are from *The Thames and Hudson Manual of Typography* [3]. Small doses of the variant fonts are used for *emphasis*.

For normal documents the body of the text should be set in a 10 pt serif font. If your reader is particularly young (i.e., just learning how to read) or suffers from poor eyesight then the size of the type should be increased but probably to no greater than 12 pt. The kind of document also affects the type face and type size used but most of the documents can be handled well by a 10 pt serif font.

The length of the line

One of the fundamental errors is to make the the length of line far too long. This is done more out of habit rather than because of any fore-thought.

> Tests have shown many disadvantages in long lines: (a) the eye must blink at intervals during reading. Af-

One of the most discernible differences of type is their degree of masculinity or femininity. Some are definitely strong and rugged, some are definitely light and delicate, some are, of course, in between. Here, as in other areas of classification by character, there will be differences of opinion due to varying subjective reaction.

It is reasonably safe to say that almost everyone would find Caledonia, Times Roman, and Monticello masculine; Granjon, Weiss and Bodoni Book feminine; but even with borderline faces, a certain amount of the feeling conveyed depends on the way the type is used. [2]

Figure 1: Comparative text widths

ter each blink, an optical adjustment and refocus of vision takes place. The longer the line, the more frequently blinks occur within, rather than at the end of the line; (b) there is the time and visual effort lost in travelling back to the beginning of the line; (c) when the measure is too wide, there is momentary difficulty in determining which *is* the next line (sometimes the wrong one is selected). Each interruption — the blink, the trip back, and the search for the right line — causes loss of reading efficiency, or poor readability. [2, page 92]

At the normal book-reading distance — about 40 cm — the maximum comfortable span of vision is about 12.7 cm. This suggests a *maximum* of 70 characters[1] per line in a page of average size. Fewer characters is better but any less than 50 tends to make it hard to set justified lines without excessive hyphenation of words and irregular word-spacing — both of which reduce readability. See figure 1 for a comparison of text widths.

Leading and space between words

The term *leading* is derived from the practice of inserting thin strips of lead between lines of type (and hence is pronounced "led-ing") to introduce "white-space" between the lines. For example, many books are set using a 10 pt font with 2 pt of leading, i.e., the baselines of two adjacent text lines are 12 pt apart. In text setting:

> Words should be set close to each other (about as far apart as the width of the letter "i"); and there should be more space between the lines than the words. [3]

If the gap between the words becomes too large it may be larger than the space between the lines thus tempting the eye to jump to the next line rather than the next word. For this reason, if the system you are using does not allow for easy hyphenation then it is best to set the text "ragged-right", i.e., without attempting to justify the text at the right-hand-side. This is not a problem with TEX.

In general, the larger the type size or the longer the length of the line the more leading is required. This is true up to a point:

When there is too much space between the lines, there is a loss of efficiency (readability) because the reader expects to find the next line at the customary distance. His eye goes first to this point and then makes the adjustment. When the adjustment is small, the loss of efficiency is probably not significant. Where the leading is very large — say 8 pts. — the disturbance is probably considerable and may persist throughout the reading of the book. [2]

One-and-a-half or double spacing is therefore not desirable.

Small sizes, such as 8 and 9 pt, require proportionally more leading to compensate for their lower readability. If the line is short, however, then very little leading, if any, is required as the line becomes easier to read.

And there is more

The best idea is to talk to someone who knows about typesetting, or devour large quantities of books on the subject — or both. Until you have gained the requisite experience why not use LATEX — the styles are designed to take care of typesetting and typographic design for you. Don't let your document design degenerate into mere whims or "what looks good" but use design in a logical and consistent way to help your reader understand your document. Just as the *text* of your document should be purposeful so should the *design* and typesetting promote understanding in the reader.

There are obviously a lot more subjects to cover than I have addressed in this article. Topics such as treatment of headings, running headlines, hyphenation and justification, etc. are just begging to be addressed but unfortunately there is only a limited amount of space available in TUGBOAT. Maybe a column on typesetting and design should become a regular feature where experts can discuss the "dos" and "don'ts". I for one would be very interested in such a column.

Finally, there seems to be an eternal battle raging in the pages of TEXhax over whether paragraphs should be indented after headings. The Chicago Manual of Style would seem to support LATEX's suppression of indentation after headings [4, page 575]. This is because such

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[1] Spaces are not counted as characters. Combinations of letters, e.g., the fi ligature count as one character.

suppression draws attention to the first paragraph after the heading which is supposed to be an important paragraph. The only argument I have read against indentation suppression is that it looks "ugly" (or even worse "UGLY") which only proves the point that, on the whole, people are woefully ignorant of the purpose of typesetting.

References

[1] Leslie Lamport. *LaTeX: A Document Preparation System*. Addison-Wesley, Reading, Massachusetts, 1986.

[2] Marshall Lee. *Bookmaking: The illustrated guide to design/production/editing*. R. R. Bowker Company, New York, second edition, 1979.

[3] Ruari McLean. *The Thames and Hudson Manual of Typography*. Thames and Hudson Ltd, London, 1980.

[4] University of Chicago Press. *The Chicago Manual of Style*. The University of Chicago Press, Chicago, thirteenth edition, 1982.

Software

Software-Ergonomics on the ST

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The Atari-ST is a typically mouse-directed machine. Most of the available programs are embedded into GEM (Graphics Environment Manager), which supports an easy and quick data-access. Pull-down-menus and interactive dialogue-boxes enable a self-evident software-handling, which often makes manuals superfluous. The spoiled user — confronted with the gigantic TeX-System — misses this comfort. Nevertheless, in my opinion there wouldn't be much sense in an interactive solution (see Leslie LAMPORT, *TUGboat* Vol. 9, No. 1, 1988). But as a good compromise, an interactive TeX-Shell was developed, which reduces mouse- and key-hacking to a minimum. The concentration of the user can be fixed on the important parts of the hacking-session.

How it works: The very special effect is to link the three-step-system edit-TeX-DVI together (develop), so that a two-step-system results. Upon leaving the editor, TEX.TTP and then DVI.PRG are called automatically. There is no need to wait until TEX.TTP is loaded (2 sec.) and to react at the prompt of the two asterisks, where I often made typing errors in former times. Naturally, all parts of the system can be called separately with only one click. The (mouse-)selected source-file and the respective format are saved in a current storage. The name of your own format-files (generated with INITEX) can be fed into a dialogue-box. Additionally the default values may be set in the environment-file. For that purpose there are three additional variables: mytext, myformat, and myeditor. Last but not least, the input-files are rarely immediately error-free (...). The error-menu of TeX offers the possibilities 'e=edit' and 'x=exit'. So long as this feature is not implemented in ST-TeX, you will be sent back to the editor by the Shell. This loop can be interrupted by an error-free TeX-Run or by pressing ⟨CTRL-C⟩.

Sample: The turn-around-time for a complete cycle edit-TeX-DVI-edit for a short text "\nopagenumbers This is TeX. \bye" is only 20 seconds, including the preview or the output on the printer and the recall of the editor with the source-file for further modifications.

Outlook: I have a running TeX-METAFONT-Shell, but up to now it is only adequate for my individual configuration. METAFONT is useful for avoiding the problems with missing fonts or with *overfull* hard disks. Recalling Don Knuth's words: METAFONT and TeX are designed to be "good friends and to live together for a long time" (*The METAFONTbook*).