

GUIDELINES FOR TYPOGRAPHY IN NBCS

THIS document is intended as a brief checklist for writers. Its target is reports, documentation, and other documents that are primarily text. There are additional considerations for “design-intensive” documents such as newsletters, with multiple columns, side-bars, and other complexities. For the web, this document applies to reports and other material that is primarily read from beginning to end. There are other issues with pages that are primarily links (i.e. top-level pages) or that look more like advertising than like a book.

Of course there are in-between cases. For example, a lot of computer documentation follows the principles described here, but has examples of user interaction or screen shots as well as text. These sometimes require a document that has a bit more structure to it than just a single column of text.

This is not a complete textbook on typography. Rather, it’s an attempt to summarize some of the most important points. If you are interested in learning more, I strongly recommend Robert Bringhurst’s book *The Elements of Typographical Style*. A lot of the material here is based on that book.

* * *

The purpose of typography is to get your point across. While documents can be beautiful or ugly, most of us aren’t creating great art – we’re trying to convince someone or present information. Thus the starting points are to do everything possible to make the document comprehensible, and to avoid distraction. In general a well typeset document will have a fairly even overall look. It will mark sections in the least disruptive way that makes the structure clear. It’s possible to do fine typesetting with a single font in a single size – although you would most likely use caps, small caps, and italics in that size.

When laying out a document, start by looking at what it is trying to communicate. Your goal should be to clarify the document. Headings should show the structure. The progression from major to minor heads should be clear. Typographical devices should emphasize the things that actually need emphasis.

Look carefully at the elements to which your eye is drawn. They shouldn’t be typographical devices such as bullets or bold items, except when you actually want people to see these things first. For example, in a dictionary the words being defined are commonly in bold, because you want them to stand out.

Overall Page Design

In well-set material, the width of a line is normally from 45 to 75 characters. Anything more, and it’s hard to read a line at a time. This is why magazines and newspapers tend to use multiple columns: their paper is wide enough that a single column would be too wide.

This means that for typical University reports and documents, we start with a handicap: 8.5 by 11 paper is really too wide for one column of text. But two columns strikes most people as looking odd in a memo or report. Thus we normally use one column anyway. This means that you want to use as wide margins as you can get away with, and fairly large fonts. This particular document has around 85 characters in a line. The left and right margins are 1.55 inches. That's about the best I can do without using unusually large fonts or margins. In general I recommend margins of 1.55 inches at the left and right, 1 inch at the top, and 1.25 inch at the bottom. I have chosen the numbers so as to make the block of text a golden section. That is a ratio of 1.618 in height to width.

Of course margins have uses other than keeping line lengths in bounds. White space is an important element of the overall design of the page. If there is too little white space, the page looks cramped.

There are similar considerations online. Very wide lines are still a readability problem, and white space is still important. In many web pages, a combination of tables and css are used to generate margins around the main text, and to limit the width of the text to an amount that is readable. However this is controversial. Many users believe that if they set up their window to be wide, you should use the width they set.

If you are willing to depend upon css, the simplest approach is to use a <blockquote> around the main text. If you want to limit the line length to something readable, I recommend <blockquote style="margin-left: 5%; width: 55ex">. If you simply want to set up reasonable margins, I recommend <blockquote style="margin-left: 5%; margin-right: 5%">. You can also use tables to get similar effects. The "55 ex" means that the line length should be about 55 characters. With a variable width font (which is normal) this is not exact. In fact Netscape will use a somewhat longer line than you might expect. But a value of 55 ex seems to work reasonably. The reason for using 55 ex rather than a width in pixels is to allow for users who need large fonts. You want the width to scale as the user increases font size. I personally am of the school that you should use the user's width. So I normally use "margin-left: 5%; margin-right: 5%."

There has been a bit of research on readability. Three of the most consistent results are as follows:

- The most readable fonts are straight-forward serifed fonts. (Serifs are the little crossbars at the end of strokes.) These include fonts such as Times New Roman, New Century Schoolbook, and Palatino. This document is set in Janson Text. Sans serif fonts don't have the serifs. The most common are Arial and Helvetica. Fonts that are good for printing may not necessarily be good online. Most displays have so little resolution that serifs don't come out well. Thus many people believe sans serif fonts work better online. I disagree. For low-resolution screen display, I prefer serifed fonts with fairly "blunt" forms, such as Georgia.

- Proper spacing is critical. This includes spacing of all kinds: the space between lines, between words, and within words. I will have more to say about this below.
- Text should be black on white or off-white. Tinted backgrounds will kill readability if the tint is more than about 10%. Even that is used primarily for advertising copy. However many documents look better on paper that is slightly off-white. (This depends somewhat on the font and page design.) Most professionally-prepared web pages set the background to white and use black text. Again, a very light tint can actually be helpful. However if you do this, make sure you use a color that will display consistently in all browsers.

For more information about readability, I suggest Colin Wheildon, *Type and Layout*. This presents a number of very interesting studies about readability, including what features will cause people to read or not read a given piece of text.

* * *

Make sure you specify the author, date, and organization. The date is needed because documents often are revised. The reader needs to know which version he has. Any official document from Rutgers should include the identification Rutgers, the State University of New Jersey. Where possible it should have the logo. Often the department is also helpful.

For this document the identification is at the bottom of the first page. If you have a title page it would go there. It's often useful to include the document title and date at the top or bottom of each page, in case the pages don't stay stapled.

Line Spacing

As I mentioned above, spacing is critical. It affects the readability of text, and the overall look of the document. It is important to allow enough space between lines. Some readability research shows that people are more likely to read documents that have generous (but not excessive) spacing.

If line spacing is too small, your eye may end up on the wrong line when you go from the end of one line to the beginning of the next.

Of course you can carry this too far. If you put in too much space, lines lose their connection with each other, and the document becomes unreadable. Double-spacing is an extreme example of this – text should never be double-spaced if you expect anyone to read it.

Before going on with this discussion, I need to define some units. The most common unit in dealing with type is the “point”. Historically there were two slightly different “point” measures, British and continental. Computer typography seems to have standardized on a point that is exactly $\frac{1}{72}$ inch.

Typographers commonly use the terms “en” and “em” as units of length. One em is equal to the font size. I.e. for 12 point type one em is 12 points. The term “em”

comes from the fact that generally this is about the width of an “m”. An en is half an em, i.e. about the width of an “n”. So for a 12 point font, one en would be 6 points.

There’s one other common unit: the pica. A pica is 12 points. I.e. for computer typography it is 1/6 inch. Traditionally points are used for smallish quantities, such as type size and line spacing, which picas are used for larger features, such as line length. However for computer users, the pica doesn’t seem important. Software normally uses inches or cm to refer to items for which picas were traditionally used.

Now, to continue with the discussion of line spacing: This document is set 10.75/14.25 (read “10.75 on 14.25”). That means that it is a 10.75 point font, with 14.25 points between the baselines of two successive lines. Thus there are 3.5 points of additional space between lines. Traditionally the extra space between lines is called “lead” or “leading.” When books were set by hand, spacing was introduced with lead strips. Based on this derivation, “leading” ought to refer to the additional space, i.e. 3.5 points here. However it is also used for the total line spacing, i.e. 14.25 points here. To avoid confusion, I recommend the term “line spacing” for that.

The minimum amount of leading I would consider with most fonts is 2 points of additional space. This is close to what word processors do if you tell them to single space. However this is almost always too little.

You need more leading as lines get longer. With 8.5 by 11 paper, you’ll generally find that you need 2.5 to 5 points of additional space. To set this in Word, use the Paragraph menu, the Indents and Spacing tab. I recommend setting Line Spacing to “Exactly” and then setting the desired line spacing in points, e.g. 14.25.

The exact amount of leading required also depends upon the font. There are two major issues. The first is that there’s not a precise definition of how to measure point size of a font. Some fonts are “big on their body.” That is, they look larger than other fonts at the same size. For that reason, they must be set in a smaller size than usual, and need more leading. The second issue is differences in “x height.” Here are three examples to show the effects of x height.

Example
Adobe Garamond

Example
Janson Text

Example
Georgia

These samples are all set in 24 point type. However Garamond looks the smallest, and Georgia the largest. The reason is that the main portion of the lower case is larger in Georgia. This is called the “x height,” since it’s the height of the letter “x.” The portions of letters that go above or below this, such as the projections on “l” and “p,” are called “extenders.” So in typographical terms, one can say either that Swift has a greater x height than Garamond, or that Garamond has longer extenders. Either way, for a given point size, Georgia looks larger. Typically you would use a smaller point size for Georgia, and more leading.

The tendency has been for x heights to grow over time. An extreme x height is often considered inelegant, although there are certainly fine fonts with large x heights. Current Garamonds are actually somewhat modernized from the type Garamond

designed in the 16th Century. One of the changes is an increase in x height. In Garamond's actual type, the ascenders and particularly the descenders are longer than in Adobe Garamond and other modern interpretations.

Justification and Word Spacing

It is traditional to “justify” text, i.e. to produce an even right margin. To do this, the software needs to adjust spacing between words and to hyphenate. Colin Wheildon's comprehension tests show that readers find justified text much easier to read. However there are dangers: If the software that does the justification isn't very good, you can end up with very uneven spacing. That can make the text harder to read. In the worst case it produces visible “rivers” of white space going through the middle of the text.

You should look at the amount of space between words. Because of justification, there will be a range. This commonly goes from 0.2 em to 0.5 em. For most fonts the desired average is about 0.25 em. Of course the actual spacing may be greater or less than this, depending upon where words can be broken by hyphens.

There are often various parameters you can set in your word processor that affect hyphenation. Bringhurst recommends requiring a minimum of 2 characters before the hyphen and 3 after. No more than 3 lines in a row should end in a hyphen. The last word on a page should not be hyphenated, and probably not the last word in a paragraph.

A comment about the 3 lines rule: I agree that too many hyphenated lines in a row can be a bit unsightly. However this rule may tempt you to set your word processor to “limit consecutive hyphens to 3.” (This is Word's terminology.) So what happens when 4 consecutive lines need hyphens? If you tell your word processor not to do it, you will normally get white blotches in the 4th line. These are more distracting than an extra hyphenated line. In my opinion you're better off not to tell your word processor about the 3 line limit. For documents whose appearance is important, you should look for more than 3 consecutive hyphens, and repair them by hand. This may mean readjusting hyphenation parameters for that paragraph, or even doing minor rewording as needed to change the hyphenation. Professional typographers do regularly change wording to improve line and page breaks. (This should not be an issue with TeX, InDesign, or other software that justifies paragraphs as a whole.)

With classical fonts, it is extremely important to get hyphenation working properly. Extra white space between words will have a disastrous effect on the appearance and readability of documents.

Most word processors have a special kind of space that won't be used as a line break (a “non-breaking space”). Use this for things you don't want to get separated, e.g. around the equal sign in a short equation: $a = b$.

Before printing a final copy, look over your text carefully, looking for bad line breaks and page breaks. To fix them you may need to add non-breaking spaces, or

adjust the handling of widows and orphans for a specific paragraph. In some cases you even need to do slight rewording of the text.

There's another kind of spacing you need to be aware of – spacing within a word. Generally you do not want to change the spacing between letters within a word, except for sequences of capital letters, long strings of digits, and other things that aren't normal text. (Such adjustment is called “letterspacing.”) Some word processors automatically expand and condense words as part of the process of justification. This is a terrible idea. It produces an unevenness that is much more serious than varying word spaces. You should be able to turn this off.

Should you ever have occasion to set text ragged right (i.e. without justification), look carefully at what your word processor does. I've seen a word processor continue to hyphenate and adjust the spacing between words. The main argument for using ragged right is that it produces more even word spacing. So you certainly want to disable space adjustments if you are doing ragged right. You probably want to disable hyphenation as well.

While you don't want letter spacing to vary from word to word, in some circumstances it is appropriate to make small, uniform changes to spacing throughout the document. Some fonts come with tighter spacing between letters than others. Furthermore, the ideal spacing depends to some extent upon both the type size and line length. In general spacing should be looser for very small sizes – conversely, for large headings or type on slides you may want to tighten spacing slightly. This document is set with letter spacing about 1% greater than the default for this font.

Of course the advice against letterspacing applies only to normal text. It is certainly appropriate to letterspace text that is in all caps. Because of the design of capital letters, they are a lot more readable when letterspaced.

Special Characters

Avoid underlining, except for URLs. Underlining was used with old-style mechanical typewriters, because italics and bold were not available. Historically, underlining was the way you indicated that you wanted italics when your document was typeset. Titles of books should be done in italics. If you need to emphasize something, I would use italics for most purposes. Normally you want to emphasize a word or phrase when someone is reading the sentence it's contained in. Italics will do that. Bold will do more: With many fonts it causes the word to stand out. It will tend to be the first thing you see when you look at the page. Don't use bold unless you want this effect.

Use the right kind of quotes. Typewriters have only vertical quotes: ". In most cases you should use real open and close quotes: “. Many word processors will do this automatically.

Quotes

Use the right kind of dashes. Typewriters have only one, which is actually a hyphen. It is intended to go in the middle of two-part words, as in this sentence. There are at least three other kinds: – (en dash), — (em dash), and - (minus). The en dash is the most common. It is used to separate phrases – as in this example. It is also used

Dashes

for ranges, as in 1999–2000. A space is used around the dash when it sets off a phrase, but not in a range. Some typographers use an em dash without spaces rather than the en dash—like this, however I accept Bringhurst’s recommendation that the en dash looks better. The minus sign is used in numbers, e.g. $-1 \dots +1$. (Note that the ellipsis in the previous example is a separate character, not three periods.) The minus is normally the same width as the plus.

By default, Word will replace two hyphens with an en dash. This is a great convenience for typing, since en dashes are fairly common. Make sure this substitution actually happens – you don’t want two hyphens left in your document. If your word processor doesn’t do this substitution, make sure to use real en dashes where they are needed.

There are also two different slashes. The normal one (called the “virgule”) is used with words, e.g. *sc/osf*. A slightly different slash is called the “solidus” or fraction bar. It is used in constructing fractions: $\frac{1}{2}$.

Slashes

The centered dot or period (called the “midpoint”) \cdot is used to separate things, e.g. page numbers in a table of contents: “Introduction \cdot 2” or items in an address: “110 Frelinghuysen \cdot Piscataway, NJ.” Bullets are too dark for this use. They are really intended for use in bulleted lists. See page 29 for more examples.

I confess that a couple of these special characters are probably unnecessary for most purposes. It’s common to use an en dash with a thin space after it rather than a minus. The solidus has to be used with small figures, such as $\frac{12}{34}$. Some fonts have special small figures intended for building fractions. Commercial versions of Janson do not. However this document uses special figures that I have prepared. For fractions made with normal figures, the virgule is used: $12/23$. Most people find it easier to use normal figures with the virgule. Most fonts have some prebuilt fractions: $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$. You’ll probably want to use them where possible.

I have one other piece of advice about special characters: Look carefully at dashes, bullets, and other non-alphabetic characters. In some fonts they are not properly positioned. In this font, *SC/OSF* is acceptable, but the slash in *sc/osf* is not well aligned. In the rest of this document, I’m using a slash that has been fixed.

You should also look at hyphens. You need a different alignment for normal text and upper case, e.g. *first-class*, *FIRST-CLASS*, *FIRST-CLASS*. In this font the hyphen is properly aligned for the lowercase letters. It has to be raised slightly for use with uppercase letters.

In some fonts the vertical alignment of some symbols is different in the normal font and the *sc/osf* font, because of the way they are normally used: *+2 +2 RUTGERS \cdot PISCATAWAY* Rutgers \cdot Piscataway. In this case I have adjusted the position manually.

While it’s not exactly a character, there are several kinds of space as well. The normal space is called a “word space,” i.e. the space between words. There’s a “thin space.” It’s used when you need a slight adjustment but don’t want a visible space, e.g. between an en dash and a number: -3 , or after initials other than the last, for example J.R.R. Tolkien. A word space is used after the last initial. The “en space” is useful

where you need roughly the same amount of separation as a comma but want to do it just with space. The items from +2 to Piscataway above are separated by en spaces. An “em space” is wide enough that it’s used only in special situations. The one I’ve run into is separating the page number in a table of contents or index. See page 29.

Showing Examples, etc.

This paper primarily covers simple documents: one column of straightforward text. However sometimes you need a bit more complexity. In computer documentation the major issue is showing examples of user interaction, or screen shots.

The simplest approach is to include these examples at the appropriate place in the text. In many cases that is all you need. Often you should use a different font for such examples.

However there are times when pictures or examples aren’t part of the normal text flow. That is, you refer to them in the text, but they’re not part of the text. In that case it is common to make them into a figure. Figures are often delayed to the top of the next page or even placed on a separate page. Unless they are right in the text flow (and often even then), figures should have a caption. In some cases it may be necessary to number them in order to refer to them.

In some cases material like this should be put in a margin. The Rutgers toolkit, <http://toolkit.rutgers.edu>, has some good examples of how to use the margin.

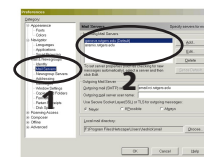
Margins are also useful for notes, and sometimes even headings. Marginal notes are often a good alternative to footnotes, because they are right there where you need them.

Other things I’ve seen margins used for are examples of user interaction – where you don’t want to include it in the text, and keywords or phrases to make it easy for the user to find things.

As an example of keywords: In a Unix introduction you might put the names of commands and other technical terms in the margin as they are defined, to make it easy to find them. Page 6 shows some examples of this.

This page shows screen shots from a mythical discussion about configuring email in Netscape. If you were really going to use the margin for screen shots, you would probably use wider margins. But it’s amazing what you can do with an inch.

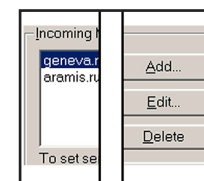
I recommend using a contrasting font for marginal notes, captions, and examples. In this document I’m using Linotype Syntax (the new version from 2000). It is important for the font you use for these purposes to be reasonably compatible with the text font in style, or the margin and similar material will draw attention away from the text. Rather than a completely separate font, you can use the main text font in a contrasting form, e.g. a significantly smaller size or italics. When Syntax is set in smaller sizes (e.g. in notes and margins), I use the medium weight (slightly darker than regular). If you want to buy Syntax, I suggest getting the CD with the full set of Syntax sans fonts, for around \$100. If you buy individual weights it will be much more expensive. (There is now a matching serif font. I don’t have it.)



Preferences



Step 1. Select Mail Servers



Step 2. If your server exists, select Edit. Otherwise, Add.

Paragraphs

There are two major choices for paragraphs: indent the first line, or separate paragraphs with a blank line. This is a matter of taste. I prefer indenting the first line. This is the “traditional” choice, particularly for longer documents.

You should choose one approach or the other. If you indent the first line, there is no need to add extra space between paragraphs. Doing so disturbs the even flow of the text. If you want to put space between your paragraphs, use a whole blank line. Then there is no need to indent.

If you use indentation, there is no need to indent the first paragraph after a heading. The reader already knows it’s a new paragraph. Adding indentation there prevents the heading from lining up properly with the text after it.

Don’t use excessive indentation. Common choices are 1 em or the value of the line spacing. This document is set 10.75/14.25. So common settings for indentation would be 10.75 points or 14.25 points. However documents you work on are likely to have wide columns, because they will be on 8.5 by 11 paper. In this case 2 to 3 em is acceptable. I normally use 0.25 inch, which is about 18 points. With this font, that’s about 1.7 em.

Note that typographical experts recommend using a single space after periods or colons. If you add more space, you are emphasizing the sentence break unnecessarily. You will find some authorities that still recommend two spaces. However consensus among typographers is strong. Some word processors will report more than one space as a spelling error.

When paragraphs are split across a page, you can end up with bad splits. There are various possible rules. But the one I suggest is to look at the top of each page. If you find a single line left over from a paragraph on a previous page, do something to fix it. (This isolated line is called a “widow.”) Some authorities also consider a single line at the bottom of a page to be a problem. (This is called an “orphan.”) However I believe the current consensus is that it is OK.

Headings, etc.

The major temptation with headings is to overdo them. It is common to see documents where chapter and section headings are in larger than normal type, bold, and underlined. This disrupts the “clean” appearance of the document, for no good reason. In general you should change as few parameters as possible. For example, if you move to all caps, there’s no reason to go to a larger size or bold. (There’s never an excuse for underlining.)

There are two major approaches to designing headings:

- Levels of heading are differentiated by devices such as all caps, small caps, italics, and centering. In many cases it is unnecessary to use different sizes.

- Levels of heading are differentiated by size. Many scientific documents are done using various sizes of bold, often in a contrasting font.

Either approach is OK, as long as you use a clear and consistent pattern within a given document. Of course it is possible to mix them. That is, you might follow a pattern where the highest level title is in a larger size, and then for the next level of heading you go to caps or small caps in the text size. In general if you use a larger size you should probably not use bold or caps. The size alone will differentiate it. That is, normally you shouldn't change anything more than you need to in order to make the structure clear.

Many readers are now accustomed to thinking of bold as normal for headings. Historically, caps and small caps were used for titles, on title pages as well as chapters and sections. Often these were the same size as the text, particularly during the Renaissance. My personal preference is for caps and italics rather than bold, because they lead to a more even appearance.

If you use bold headings, look carefully at the font. Many bold fonts don't look very good. You are often better off using a contrasting font that has a good bold, such as Bodoni, Galliard, Palatino, or Perpetua, or even a sans serif. I would not use all caps with bold, except possibly for the highest levels in the hierarchy. With bold, you don't need caps to set off titles, and bold caps are often not very readable.

If you're going to use caps for headings, make sure you have a font with good-looking caps. Many modern fonts don't have them. Classical fonts were designed with the understanding that the caps were to be used for titling, or they came with associated titling fonts. Of the standard Laserwriter fonts, Palatino has the best-looking caps and italics. (In fact Palatino was originally intended as a titling font.) I don't think much of Times and New Century Schoolbook caps. This document uses Janson. Its capitals follow classic models, but I don't think they look as good as some other fonts. If I wanted to use a larger size for a title page, I would consider using a separate titling face, such as Adobe Trajan or Palatino.

* * *

Two typical patterns of headings appear below (page 12). These are just examples of the kinds of things you can do. There is no need for every document to follow either of these patterns. The first pattern is one I often use. It is intended to produce a fairly uniform look. It uses caps and italics to differentiate the levels of heading. This does enough that bold is not needed.

This document uses a variant, with italics for section headings rather than small caps. Both the main title and section headings are also slightly larger than the text (12 pt vs 10.75). Janson has particularly handsome italics, which I want to show off.

The second pattern produces more contrasts. It uses size to differentiate the title and a bold sans serif font for other levels. The size and font change are enough to differentiate the titles, so it is not necessary to use all caps. I have used a pattern similar for web pages. Of course many patterns are possible.

Following the second pattern, I show an example of using the margin for headings. I haven't given a whole pattern of headings here, but just one level. This is very common for corporate annual reports and similar documents.

Heading level 2 in the first pattern is in small caps. This only works if you have a small caps font. Many word processors have a "small caps" setting that you can use with normal fonts. This setting simply reduces the size of normal capital letters.

There's a problem with faking small caps this way: When you make a font smaller, it appears to be lighter. Thus small caps produced this way are noticeably lighter than the rest of the text. For many fonts they are also too large. Thus these fake small caps are considered very bad form. Real small caps are a separate font, like italics or bold. They are designed to match the regular caps in weight, and their size is appropriate for the lowercase. Unfortunately small caps don't come free with any common software, so most people don't have them. If you don't have a real small caps font, do something else. Don't fake it. If I didn't have small caps, I'd probably use italic caps for heading level 2.

This document isn't complex enough to need all those levels. I've used only a main title and heading level 2. A heading in all caps is fairly imposing. When only a few levels of heading are needed, it makes sense to use all caps only for the main title and chapters (if any).

In addition to headings, another common device for structuring documents is shown after this paragraph. This is used when there is a change in topic, but you don't want to add a heading. You can think of it as a "super-paragraph." Some authors simply use a blank line. However this creates ambiguity when the break occurs at the end of a page. Thus the asterisks are recommended. When the break occurs at a page boundary, the asterisks should go at the bottom of the first page. A short rule (i.e. horizontal line) is sometimes used instead, although asterisks are more common. I think they are less obtrusive.

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I have added extra spacing between the letters for the caps and small caps. This is called "letterspacing". Caps and small caps are a lot more readable if you letterspace them. Most word processors let you do this. In Word, it's called "character spacing" in the Font menu. Normally I letterspace caps by 5 to 20%. This document uses 11.2% letterspacing for caps and 7.5% for small caps in headings, with 5% for both in the text. Some fonts have extra space built-in for the small caps. In such fonts you may not need letterspacing, or you may not need as much as otherwise.

In the examples I've put a full blank line above and below the headings. Typographers normally try to maintain an even pattern of vertical spacing. If they have to interrupt the text with something like a heading or a picture, they will see to it that the total amount of interruption is an even multiple of the interline spacing. The easiest approach is one blank line above and below. However some typographers put less space after the heading and more before it. This makes it clear that the title

The following pattern gives a rather uniform look to the document

DOCUMENT OR CHAPTER TITLE

HEADING LEVEL 1

HEADING LEVEL 2

Heading level 3

Run-in heading. A run-in heading is one that is put at the beginning of the paragraph, rather than on a separate line.

The following pattern gives more contrast

Document or Chapter Title

Heading Level 1

Heading Level 2

Heading Level 3

Run-in Heading. A run-in heading is one that is put at the beginning of the paragraph, rather than on a separate line.

Example of putting a heading in the margin

the core business of the University. The telecommunications division supports University-wide voice and data networking connectivity throughout Rutgers.

Executive Summary

This report summarizes the activities and accomplishments of Rutgers University Computing Services (RUCS) for Fiscal Year 97/98 and plans and goals for Fiscal Year 98/99. As the

Examples of headings for printed documents

is associated with the section following it. In this document I've done that. I've put more white space above the headings than below.

The second pattern of headings shows one more thing: As type gets larger, it appears to be darker. To counteract that, the smaller sans serif headings are set in a heavier weight than the larger one. Because Syntax bold is fairly light, I am using bold for the larger headings and heavy (one weight darker than bold) for the smaller ones. In other fonts I would use semibold or medium for the larger headings and bold for the smaller ones.

The start of this document follows a pattern that was fairly common in the Renaissance, although more elaborate approaches were common as well: title in capitals in the same size as the text, large initial capital, and the first phrase or line in all caps or small caps. (Actually, a slightly larger size is used for the title here. A 10.75 pt title seems too small to me.) Of course in the Renaissance the initial capital would have been illuminated. That seems overly elaborate for this document.

It's still common to start chapters or other major sections with the first phrase in caps or small caps. Large initial capitals are also fairly common. You'll see both approaches even in paperback novels.

I have two cautions about headings, from Colin Wheildon's research in reading comprehension:

- Headings and titles should not end in a period. His tests show that a surprising number of people don't read the article when the headline ends in a period.
- People read from top to bottom and left to right. Sometimes you'll see clever arrangements that put a headline at the bottom of a page, centered in the middle in large type, etc. All of these things greatly decrease reading comprehension (or the number of people who bother to read the document). Everything in your document should occur in the natural order.

On-line Documents

In general, the same guidelines apply to web pages as print documents. Note that I'm talking about web versions of substantial documents, not to web pages that are primarily links.

In general I recommend using HTML tags that reflect the structure of your document. That is, your top-level headings should be `<h1>`, not `<i>`. You should use HTML's bullets, indent using `<blockquote>`, etc. Style should be added by using style sheets.

For many documents you can get the effect you want by defining styles for H1, H2, etc. Where you need more different styles than there are HTML tags, use class names. For example if I were doing this document as a web page, both this paragraph and the first one in this section would use the normal paragraph tag, `<p>`. However I'd define two different styles, one with indentation and one without. Thus the first

paragraph in the section would use a normal `<p>` and this one would be `<p class="indent">`.

There are two reasons for sticking with standard HTML tags. First, it makes it easier for people with disabilities. They often use non-standard browser software. It may need to ignore your formatting completely. However it will attempt to do something sensible with standard tags such as headers. Second, it allows software that understands HTML tags to analyze the structure of your document. If you use `<i>` to define your headings rather than `<h2>`, software has no way to know that they are headings.

The only exception I make is for the beginning and ending of the document. Older browsers don't understand style sheets. If someone is using an older browser, I'm willing for him to see the main text of the document using the default HTML format. However I normally want the banner at the beginning and the section at the end to look right even on old browsers.

* * *

By default, word processing packages will try to produce web pages that look exactly like the printed document. This is normally a mistake. For example, you do not want to specify the font name or size for a web document. The user will choose a font and size that works well on his screen. If he has a visual handicap, he will not thank you for changing the font to 10 point Palatino if his normal font is 40 point Helvetica. Furthermore, there are differences in styles appropriate for print and the web. Web documents normally have more contrasts, but simpler design. Thus carrying over the style of the printed document to the web format will probably not give the best results.

For headings you may need to specify a font size. However this should be relative to the size the user has set. For example, if you want a heading to be big, you should use a specification such as "font-size: 150%" in your style sheet. That gives you 150% of the user's size. You wouldn't say "font-size: 20 pt."

You should not define the font name for the main body of the text. That is, you should allow the font chosen by the user to be used. However it is acceptable (and often looks good) to define the font for headings, banners, etc.

With web pages the design considerations are somewhat different than print. While the normal goal for a printed document is a uniform appearance, web pages are expected to have contrasts. Thus it makes sense to use bold for some or all headings. Color is also available. However small caps normally are not. Even full caps aren't all that useful in practice, because Netscape doesn't implement letterspacing. Caps really need to be letterspaced to be readable. This is particularly important for bold caps.

The example below shows one reasonable pattern of headings for web pages, with a CSS style sheet to implement it. As with the discussion on print documents, this is not intended to be the only possible way to do headings. It shows one approach. It uses larger sizes rather than all caps, since that's more readable. However

I try to avoid using more than two sizes – normal text size and something large. I am dubious about readers’ ability to tell the difference between a number of slightly different sizes.

This pattern uses color for the italic. However you want to make sure you never depend entirely on color to differentiate headings. Too many people are color-blind. The initial reason I used color was to lighten the italic headings, and make it clear that they are at a lower level than the others. However I also find that web pages look better with a bit of color. The color #003366 is a grayed blue. In a complex document I have used variants of H3 in black, #003366, and #660033 (a grayed maroon).

Some of the css attributes probably don’t need to be specified, as they are the defaults. I specify several of the parameters just to make sure I override whatever formatting the browser has predefined for headings.

The example has a font-family specification using the standard pair of sans fonts, Arial and Helvetica. These are the only sans fonts you can depend upon everyone having. You need to specify both, since some types of system tend to have Arial and others tend to have Helvetica.

Print version

Web version

DOCUMENT OR
CHAPTER TITLE

H1: **Document or
Chapter Title**

HEADING LEVEL 1

H2: **Heading Level 1**

HEADING LEVEL 2

H3: **Heading Level 2**

Heading Level 3

H4: *Heading Level 3*

Run-in head. Starts a labelled item.

B: *Run-in head.* Starts a labelled item.

H1 {text-align: center; font-size: 150%; font-weight: bold; font-style: regular; text-transform: none; font-family: arial, helvetica, sans-serif;}

H2 {font-size: 150%; font-weight: bold; font-style: regular; text-transform: none; font-family: arial, helvetica, sans-serif;}

H3 {font-size: 100%; font-weight: bold; font-style: regular; color: #660033; text-transform: none; font-family: arial, helvetica, sans-serif;}

H4 {font-size: 100%; font-weight: bold; font-style: italic; color: #003366; text-transform: none; font-family: arial, helvetica, sans-serif;}

B {font-weight: bold; font-style: italic; color: #003366; text-transform: none; font-family: arial, helvetica, sans-serif;}

Example pattern of headings for the web, with a css style sheet

The example css assumes isn't being used for anything else. If it is, you will want to define a separate class for this use.

For shorter documents, you would probably not use chapter titles or run-in heads. You might also eliminate one of the header levels.

Here is a minimal css specification for normal body text:

```
P {margin-top: Opt; margin-bottom: Opt;}
P.indent {text-indent: 2em; margin-top: Opt; margin-bottom: Opt;}
```

By default, HTML puts blank lines between paragraphs. These styles turn that off. They allow you to use <p class="indent"> for a paragraph where the first line is indented.

Fonts

Fonts are to a large extent a matter of judgment. There is no one font that is perfect for all uses. Of the fonts that everyone has access to, I encourage you to look at New Century Schoolbook and Palatino. (Microsoft includes a font called Book Antiqua with some of their products. It is actually Palatino.) If your word processor supplies extra fonts, look for Baskerville, Galliard, or Janson (sometimes called Kis).

On page 17 I've included a sampling of fonts. These illustrate some of the more important historical periods and approaches.

But I'd like to caution you: Many of those fonts will not be very useful for normal office use. There are several differences between an office laser printer and a book or magazine. First, text for books and magazines is set using very high resolution image setters. Second, the process of printing with ink seems to change the look of a font. The ink spreads slightly, so that fonts look somewhat darker in books than when coming from a laser printer. Fonts that have been optimized for print often look weak or uneven when coming from a laser printer.

You can improve the situation if you make sure that your printer is set for its best output. Printers often default to light output in order to save on toner or ink. Ink jet printers often use a "draft mode" to speed output.

Some of the problem with book fonts also appears to be due to paper. The paper used in offices tends to be very reflective. It often produces a glare, which will obscure details of the font and make text hard to read. In contrast, book paper is normally rougher, and often is somewhat off-white. Unfortunately the problem is hard to assess when looking at a paper sample. The effects aren't obvious unless you know just what to look for. The cost of the paper isn't a reliable criterion. The expensive cotton-content paper – known around Rutgers as "thesis paper" – is wonderful. But aside from this, my favorite is a paper that is fairly inexpensive.

* * *

No one font is perfect for all uses. I have chosen Janson Text for this document. It is a

Renaissance: ca. 1450–1600. Low contrast, long extenders, axis consistently sloped: $\text{O} \text{P}$

abceefghijop 123 AO *abceefghijop*

Adobe Garamond (Claude Garamond, 1540; italics from Robert Granjon, late 16th Cent; digital version Robert Slimbach, 1989). Original had longer ascenders and descenders.

Baroque: ca. 1600–1740. More contrast, shorter extenders, axis varies, terminals (a, c) larger. Renaissance and baroque together are often called "old style."

abceefghijop 123 AO *abceefghijop*

Janson Text (Miklós Kis, 1685; Linotype version, Hermann Zapf and Linotype staff, 1954; digital version, Adrian Frutiger with Linotype and Adobe staff, 1985)

Neoclassical: ca. 1740–1790. More contrast, axis vertical, looks more drawn than written, new style of italic, more "delicate." These fonts are often called "transitional."

abceefghijop 123 AO *abceefghijop*

ITC New Baskerville (John Baskerville, 1762; Linotype version, George Jones, 1930, bolds added by Matthew Carter, 1978; ITC version 1982). Original had longer ascenders.

Romantic: ca. 1790–1815. More contrast, larger "ball" terminals. This style is often referred to as "modern." Thus the term "modern" in typography commonly means a specific style, not a time period.

abceefghijop 123 AO *abceefghijop*

ITC Bodoni 12 (Giambattista Bodoni, 1803–1812; digital version Sumner Stone et al, 1994). This is by far the best version of Bodoni. Most others have exaggerated contrast, and look very harsh.

Modern period: 1850 on. The modern period has had many schools of design. Only a few examples are shown.

abceefghijop 123 AO *abceefghijop*

Century Expanded. Various Century variants were done 1895–1913, by many people, but primarily Morris Fuller Benton. I've heard it said that this is America's most distinctive contribution to type design. Note the similarity to Bodoni.

abceefghijop 123 AO *abceefghijop*

Palatino (Hermann Zapf, 1948). A "neohumanist" font, i.e. a font based on Renaissance forms. There are many distinguished fonts of this type.

abceefghijop 123 AO *abceefghijop*

PMN Caecilia (Peter M. Noordzij, 1991). This is a "slab serif": strokes are uniform width, serifs are plain rectangles. This is a neohumanist slab serif. There can be slab serifs based on any style.

abceefghijop 123 AO *abceefghijop*

ITC Officina Serif (Erik Spiekermann, 1990). Bringhurst calls this a "geometric postmodern" design. It is a slab serif. There is also a sans serif version.

A sample of fonts from some major historical periods and schools

good general-purpose font, which is widely used in book and magazine. It would not be out of place in any academic publication. Another good choice is Palatino, a widely used font with a more modern appearance. Different fonts might also be appropriate for documents from computing services as opposed to the history department. For computing services, many people choose a modern font such as Palatino. For history I would be more inclined to use a classical font (e.g. Adobe Garamond, or my personal favorite, Simoncini Garamond – preferably using the Scangraphic version from www.fonthaus.com, because it comes with small caps and text figures). For scientific subjects and theology Baskerville is often used, although Robert Slimbach created Kepler specifically for this purpose. (There are many versions of Baskerville. For technical subjects I would probably use `ITC` New Baskerville from www.adobe.com.)

Font choice also depends upon the impression you are trying to create. For example, a major University document such as an annual report could be done in a modern font such as Palatino (or `ITC` Century, in the case of Rutgers) or in a dignified classical font such as Adobe Garamond. Each would create a different impression. Very different document designs would probably be associated with each choice.

This doesn't mean that you need a million fonts. Most people would be better off with one or two well-chosen fonts, complete with small caps and expert sets, than with a disk full of fonts of dubious quality.

* * *

Before I describe a few fonts, I'd like to make some comments on buying fonts. First, good text fonts are not free. Sometimes applications such as office packages or operating systems come with a large number of fonts. Some of those fonts are usable. However normally they are missing small caps and text figures. (One reasonable way to start is to buy the `sc/osf` set for a font that you already have as part of your office package.) When you go to buy fonts separately, many people are surprised to find that they cost from \$25 to \$50 per weight (i.e. regular, bold, or italic). You can easily spend several hundred dollars to buy a full font family. I have a larger investment in fonts than in computer hardware. Fortunately, the fonts last longer.

Be aware that many people distribute stolen fonts on web pages and in newsgroups such as `alt.fonts`. It is a violation of Rutgers policy – and unfair to the designers – to use fonts that are not properly licensed. Unfortunately fonts may not always be labelled. You should assume that most fonts posted to `alt.fonts` are in violation of copyright or license, and that most people offering to “trade” fonts are trading fonts that are not properly licensed. Almost all high-quality text fonts are commercial products, which you must either buy or which come bundled with other software. Decorative and novelty fonts are often available free or as shareware. But if you see a copy of Janson Text or Minion available free, you can be certain that it is stolen. Often illegitimate copies have been renamed, so it is sometimes hard to know what is legitimate. Fonts should come with information about the source. Be suspicious if you find one with no copyright notice or other information, or if you find free fonts with copyright notices from font houses such as Adobe.

Most high-quality commercial fonts come in Adobe Type 1 format. Unix (actually X), Windows 2000, OS X and OS/2 support Type 1 fonts. If you are using a Macintosh with version 8 or 9 or a version of Windows previous to 2000, you will need a copy of Adobe Type Manager (ATM) in order to use Type 1 fonts. A “light” version of ATM is now available from Adobe’s web site, www.adobe.com, without charge.

The major alternatives to Type 1 are OpenType and TrueType. OpenType is actually a special wrapper around either a Type 1 or TrueType font. So most of them still require a copy of ATM (at least version 4.5 for the Mac or 4.1 for Windows). TrueType support comes as part of Windows and MacOS. It is available for some versions of Unix. Because TrueType is built in, some people wonder if it wouldn’t be easier to get fonts in TrueType format rather than Type 1. There’s no reason that good fonts can’t be done using TrueType. Unfortunately most have not been. So in general if you want to buy fonts you should expect to end up with Type 1 or OpenType. Even when the same font is available in both formats, the Type 1 version often looks better.

* * *

This document uses Janson Text. This is a fairly authentic recreation of a 17th Century font by Miklós (or Nicholas) Kis. Kis was a well-known Hungarian reformer and typographer. He studied in Holland, and spent much of his life working there. Thus Kis’ fonts are probably best thought of as part of the Dutch typographical tradition. The name Janson is an error. At one time the design was incorrectly attributed to Anton Janson.

Janson is typical of Baroque fonts. It starts with the basic letter forms from the Renaissance, but modifies them to have greater contrasts, sharper edges, and an increased x height. These features produce a type that looks “brighter.” The sharpness isn’t fully visible in Kis’ own printing. 17th Century printing technology could not reproduce fine details. Thus the original printing was darker and did not show the sharpness implicit in the type. Digital versions such as Janson Text reproduce the appearance of Kis’ type when it is printed with modern presses and paper.

Times New Roman shares many of these features. However they are exaggerated, because Times was intended for newspaper work. (In newspapers, details tend to be lost, due to low-quality paper and very fast presses.) I would recommend using Janson in place of Times for most University documents. Janson is widely used, for everything from paperback novels to fine books, as well as periodicals and newsletters.

It is my “house font.”

There are many different fonts based on Kis’ original designs. The best known are Janson Text, Monotype Janson, and Monotype Ehrhardt. There are several less known versions as well. This digital font – Janson Text LT Std – is an OpenType version of a font created under the supervision of Adrian Frutiger. It is based on an earlier metal font for the Linotype by Hermann Zapf. Janson Text LT Std is available from www.adobe.com.

I have a private version of Janson Text with additional ligatures, and various

other minor adjustments. However this document uses the unmodified Adobe OpenType version except as otherwise noted.

I think Janson Text has particularly good-looking italics. I tend to use italics for headings with Janson when I might use all caps or small caps with other fonts. Janson Text has very tight letter spacing. In some case (as in this document) I prefer to add a percent or so of additional spacing between the letters. (When spacing is increased throughout the document in this way, it is often called “tracking” rather than letter-spacing.)

Among fonts with a more modern look, I’m going to show two, Palatino and Minion. Both are available from www.adobe.com. As neohumanist fonts, both are based at least loosely on designs from the Renaissance. However they have taken somewhat different approaches to representing that style in a modern type. Palatino is the most widely used neohumanist font of the 20th Century. It was created in 1948 by Hermann Zapf. An unauthorized clone of Palatino – called Book Antiqua – comes with many Microsoft products. Note that Zapf strongly objects to this and other pirated versions of his work. More recent Microsoft products include a new version of Palatino, called Palatino Linotype, done under Zapf’s supervision. Unlike the original, it includes the Cyrillic alphabet, as well as classical and modern Greek.

Palatino
11 pt

Minion is another neohumanist font, created in 1989 by Robert Slimbach, Adobe’s primary designer of text fonts. Like Palatino, it has been modernized somewhat, with increased x height and somewhat regularized forms. However it has not been modernized as much as Palatino.

Minion
11.5 pt

The University tends to use ITC Century and ITC Century Light (available from www.adobe.com or www.fonthaus.com) for much of its publicity. If you are doing brochures or PR items, you should look at some of the better University PR brochures intended for recruiting students. Pay attention to the font and color choices, as well as the general design approach. They try to produce a bright and up-beat appearance. (Compare with Century Expanded, on page 17. ITC Century is a substantially new font, created in 1975 by Tony Stan. It is lighter and “brighter” than the original Century family.)

ITC Century
10.5 pt

Everybody has Times New Roman. Times was originally intended for newspapers. It has an extreme x height, and the features are exaggerated so they will come through in low-quality printing on newsprint. It is condensed, to fit as much text as possible in narrow columns. These properties are not appropriate for office use with modern computer printers. With 8.5 by 11 paper there is already a problem of lines being too long. The last thing we want is a condensed font, which gets even more characters on a line.

Times
New Roman
11.25 pt

Furthermore, you probably have the wrong version. The usual fonts called Times or Times New Roman are digital versions of a Times font intended for larger sizes. It doesn’t look as good for text. There is a version for text, called “Times Ten,” i.e. a version of Times intended for sizes around 10 points. It is not as condensed, and the features are less exaggerated. To see this, compare the previous paragraph (done in Times)

Times Ten
10.5 pt

with this one. The heights of the letters are matched. Times New Roman looks smaller because it is condensed. That is, the letters are narrower.

If you have Corel graphics software, or a recent version of Wordperfect, you may already have Times Ten under a different name – Dutch 801. Dutch 801 is often called a clone of Times. Actually it’s a clone of Times Ten. If you have it, I strongly recommend using it in place of Times (assuming you want to use Times). This software also includes versions of Janson and Sabon, called Kis and Classical Garamond, respectively. Unfortunately it does not include the small caps and text figures. These are essential for Janson, and strongly recommended for Sabon.

Typographical Refinements I: Text Figures

If you’re serious about document preparation, you’ll want to get a sc/osf or expert font corresponding to the font you normally use. This has real small caps, as well as text figures.

Unfortunately the terminology for the two kinds of figures varies, as shown below. The preferred terms are probably “text” and “lining,” but text figures are most commonly called “old-style figures,” and abbreviated osf

Text, fixed width:	o123456789
Text, variable width:	o123456789
	called text, lowercase, hanging, or old-style figures
Lining, fixed width:	0123456789
	called lining, titling, or ranging figures

Originally, text figures were the normal ones. In historical fonts, they were normally variable width, just as letters are. They were designed to go with the lowercase letters. In the 19th Century, lining figures came to be normal. Today most fonts have lining figures in the basic font. To get text figures you have to switch to a special expert or sc/osf font.

I recommend text figures for normal text. Lining figures are appropriate in all-caps titles. In this document I use text figures throughout in normal text. However I use lining figures for titles and also for HTML and other code. Because most people are used to seeing code in fonts such as Courier, text figures look a bit odd.

For tables you often want figures that are fixed width, in order to get the numbers to line up properly. In fonts where the text figures are variable width, this may mean that the lining figures are better for tables. If the font has fixed-width text figures, I would use them for tables.

Janson Text normally comes with fixed-width text figures. Variable-width text figures are actually present in the non-OpenType version, but most software can’t access them. They are shown above. This document uses the fixed-width text figures, although I actually prefer the variable-width ones.

An increasing number of people are demanding support for text figures. Thus

recent designs are starting to include a special `osf` font. This is the version you would want to use for normal text. It's a normal text font, but with text figures. This lets you use text figures without having to change to the `sc/osf` or expert font every time you want to type a number.

Typographical Refinements II: Small Caps and Letterspacing

Small caps are really useful. I've already discussed using them in headings. They are also appropriate for acronyms and abbreviations. In a computer center, documents tend to be littered with acronyms. If they are set with `NORMAL CAPS`, they stand out. When you look at a page the first thing you see is all those acronyms. When you set them in `SMALL CAPS`, they become a normal part of the text.

The rule suggested by Bringhurst is that small caps should be used for all acronyms and abbreviations except for personal names and two-letter geographical acronyms. Thus we have `URL` but `CLH` (my initials) and `C.L. Hedrick`. Even the two-letter geographical exception is questionable. He reports that many typographers set all postal abbreviations in small caps, even those with two letters. Furthermore, if you have a document with lots of acronyms in small caps, setting a few geographical abbreviations in full caps will look odd. In that case you should opt for consistency and do all abbreviations and acronyms in small caps, except for personal names.

Small caps are a separate design, much like italics. Normally they are present in a font called "`sc/osf`" or "expert." In this font the small caps will be located where the lowercase letters would be otherwise. I strongly advise against using your word processor's "small caps" setting. Except with certain specialized software, this doesn't use real small caps. Instead, it takes normal caps and makes them smaller. The result isn't the same. `THIS IS SET WITH REAL SMALL CAPS`. `THIS IS SET WITH REGULAR CAPS MADE SMALLER`. The fake small caps are too light and too narrow. To make the problem less visible, word processors normally don't make them as small. `THIS IS SET WITH INDESIGN'S "SMALL CAPS" SETTING`. Since they aren't as small, they also aren't as light. But the problem is still visible, and the resulting "small caps" are too large.

Whether use you small caps or full caps, acronyms and all other sequences of capital letters should be letterspaced. `THIS IS NORMAL`. `THIS IS LETTERSPACED`. Because of the design of uppercase letters, they are more readable when letterspaced. Long string of digits (e.g. in tables) are also more readable if you letterspace them. I've seen suggestions to letterspace `URL's`. Without letterspacing: `http://rucs.rutgers.edu`. With: `http://rucs.rutgers.edu`. The claimed rule is this: You want to letterspace sequences when they are read as sequences of letters or digits, rather than as words. I wouldn't want to say there's a consensus on this, but it sounds reasonable.

Typographical Refinements III: Ligatures and the Long S

Certain fonts should be used with “ligatures.” A ligature is a single character in the font that combines two or more letters. Ligatures are used where the normal letters don’t fit together properly, or for stylistic reasons. Here is an example:



The “separate” example is done with individual letters. Each of the sequences in the “ligatures” examples is a single character (technically, a “glyph”) combining two or three letters. The ligatures shown here are needed because of the way the letter “f” overlaps the following letters. These are the traditional 5 Latin ligatures. In some fonts a ligature is also available for “fj.” It is needed for words such as “fjord.” These do not occur in Latin, so this is not one of the traditional ligatures. For “period” typesetting, you may also want decorative ligatures for combinations such as st and ct.

Most fonts have the “fi” and “fl” ligatures, though for fonts that don’t need ligatures they may not look any different than the two separate letters. The full 5 Latin ligatures are present only in a few fonts, typically in an “expert” or “alternates” font. Additional decorative ligatures are even less common. However an increasing number of new fonts based on historical models include a full set of “f” ligatures as well as additional decorative ligatures.

The long s has the same need for ligatures as the f. Most Americans seem to think of the long s as being associated with Colonial documents. In fact, it was used throughout Europe into the 18th Century. (Note that the long s is properly used for all s’s except at the end of a word.) The original metal versions of fonts such as Janson and Garamond had the long s and several of its ligatures, e.g. fi, fl, ff, and ft. Unfortunately neither the decorative st and ct, nor the long s and its ligatures ended up in the digital versions of most fonts. If you are doing the sort of historical typesetting that requires them, you’ll need to choose a font such as Adobe Caslon. It has a few decorative ligatures, and full support for the long s. (This paragraph is set in Adobe Caslon Pro.)

Not all fonts require ligatures. It depends upon the exact design of the letters. Typographers often think of ligatures as part of historical typography, which was lost during the 19th and 20th Centuries. Thus it is interesting to note that some of the 16th Century examples of Garamond’s work do not use ligatures. Many of his fonts were designed so that they were not required. The dot on the i was placed to the right, to prevent collisions with f. Furthermore, some modern fonts, such as New Century Schoolbook, do require ligatures. Here are examples that show the range:

ff fi fj fl
Times New Roman

ff fi fj fl
New Century Schoolbook

ff fi fj fl
Palatino

As you can see, some fonts are designed so that they do not require ligatures. Palatino is one example. However if you don't use ligatures, New Century Schoolbook has a fairly serious "collision" in "fi" and "fj". Times is in between. It is better with ligatures, but it doesn't have the sort of collision that New Century Schoolbook does. Janson Text really should be used with ligatures. This document is set with the usual fi and fl ligatures, but not the ones involving ff's. That is because commercial versions of Janson Text only have fi and fl (although I've drawn the others for my private version).

Some experts prefer to avoid ligatures where possible. They tend to decrease the articulation of the letters. For example, in the Adobe Garamond sample, the "fl" sequence looks almost more like a mutant "A" than like "fl". In contrast, the Janson Text ligatures have better articulation. Thus I have no reservations about using ligatures with Janson Text.

Unfortunately most word processors don't make ligatures easy to use. While most fonts have the "fi" and "fl" ligatures, it is difficult to access them in Windows. For that reason, fonts intended for professional use commonly have associated "expert" fonts with the ligatures and other special items (e.g. small caps and text figures).

If you use a font that requires ligatures, either you need to find a word processor that will insert them automatically, or you'll have to switch to the expert font and enter them yourself. I have written a plug-in for Framemaker that inserts ligatures automatically. InDesign handles them properly.

Typographical Refinements IV: Kerning

There's a detail of spacing that is worth looking at: kerning. Certain pairs of letters need adjustment. A classic example is "We." (This example is not kerned.) Because of the shape of the letters, this looks better if the e is "tucked under" the W. The close quote can also benefit by being brought partly over the period. Here is the result: "We." This kind of adjustment is called "kerning." Most word processing software can do this automatically, based on the "kerning tables" that are built into most fonts. Indeed many programs kern by default.

Kerning is most important with capital letters, and at larger sizes. Historically, normal text was not kerned. In the days of metal type, kerning required someone to modify the type with a file. Thus kerning was reserved for places where it really mattered: typically titles set in all caps, particularly in large sizes. With modern software, it becomes practical to kern everything. Indeed some software does it by default. But you should check to see whether the result is an improvement or not. In my opinion most fonts look good with kerning. But a few do not. For example, I think Swift looks better with kerning off in normal text. Its kerning is so tight that it makes the text

look crowded. You're better off not kerning than kerning too much or using questionable kerning tables.

You may end up deciding not to do anything about kerning. But you should at least know how your combination of software and fonts behave. The easiest way is to check some of the more obvious combinations, e.g. AV and We. It should be easy to see whether they are being kerned or not. Sometimes kerning depends upon a combination of factors. For example, Microsoft Word knows about kerning, but it doesn't work when running under certain versions of Windows. Adobe Framemaker has a bug that causes it to lose kerning for certain fonts. There are also fonts that have either not enough kerning or too much.

I suggest that you have two decisions to make about kerning:

- If your software implements it, do you want to turn it on? Normally I would say yes, but if your font has too much kerning or inconsistent kerning, you might not. Try a sample page both ways. See if the kerned version looks too tight or inconsistent. Look particularly at combinations such as “even,” to see whether the kerning around the “v” is too tight. You might also consider turning kerning on for all caps, but off otherwise.
- If your software doesn't implement kerning, do you want to adjust spacing by hand? Normally you would do this only for title pages or other places where capital letters are particularly large or prominent. You'll probably only worry about combinations that are particularly noticeable, e.g. AVA or WAT.

Sans Serif Fonts

So far I've dealt only with serified fonts of fairly classical design. I believe these are best for most longer documents. However for one-page handouts, slides, etc., I often use sans serif fonts. Page 27 shows two examples of this type of design. In general I find that sans serif fonts work best when I am doing something that is going to have lots of contrasts. Their simpler forms are a better match for a geometrical design with boxes and lines.

In some cases a slab serif font may also be useful for this kind of design. As an example, see the `RUCS` services brochure. It is set in a *Officina*, a family of fonts that includes both a slab serif and sans serif version. The serified version is shown on page 17. The *Officina* family is available from www.itcfonts.com. (It is also available from www.adobe.com, but Adobe doesn't have the `sc/osf` font.)

There are just as many kinds of sans serif fonts as serified fonts. However there are two major approaches: geometrical sans serif and humanist sans serif. The following examples are geometrical (*Avant Garde*) or nearly so (*Helvetica*):

abcefghijop 123 AO *abcefghijop*

Avant Garde (Herb Lubalin, 1970)

abcefghijop 123 AO *abcefghijop*

Helvetica (Max Miedinger, 1957)

A geometrical font is made of fairly pure circles and lines. The “italic” is simply a sloped version of the base font. Avant Garde is more purely geometrical than Helvetica.

At the other end of the spectrum we have the humanist sans fonts. These fonts are modeled after Renaissance letter forms, but without the serifs. Garamond is shown for comparison, because it is the prototypical humanist font.

Gill Sans and Syntax are among the earliest true humanist sans fonts. They have obvious similarities to Garamond, except that the italic is somewhere between a sloped roman and a true italic. (Italic is not just about slope. A true italic has a more cursive design.) The version of Syntax used here is a redesign, done in 2000. The new version adds more weights, small caps, and text figures. The italic is also somewhat more cursive than in the original. Syntax is one of the best sans fonts for text. However it’s also perfectly usable for display (e.g. signs and slides). For display I suggest using the medium weight.

In the last few decades there have been a number of new humanist sans designed. However in my opinion, Syntax remains a classic, particularly for readability in extended text.

abcefghijop 123 AO *abcefghijop*

Syntax (Hans Eduard Meier, 1969, redesigned and expanded 2000)

abcefghijop 123 AO *abcefghijop*

Adobe Garamond (Robert Slimbach, 1989)

abcefghijop 123 AO *abcefghijop*

Syntax, medium weight

abcefghijop 123 AO *abcefghijop*

Gill Sans (Eric Gill, 1928)

There is a spectrum of designs between these two extremes. In general I use humanist sans fonts when I need a complementary font for a document written with Garamond or neohumanist text fonts. However when I’m doing a document such as those on page 27, I normally want something more geometrical. There are several sans fonts that fall between the geometrical and humanist approach. They are geometrical enough to work with a bold page design, but they have enough humanist

Example 1. Slide from new employee orientation program. Myriad

NBCS: Organization

- Central services & Unix
 - Systems and Operations (7 systems, 10 ops: Hill)
 - Network Services (6: Hill)
 - Open Systems Support (2: Hill)
- User and departmental services & PC's
 - User Services (8: Hill)
 - Education and Documentation (2: LSH)
 - Microcomputer Support Services (10: LSH, 1: Old Queens)
 - Computer Store and Computer Repair (4: Records Hall, 7: 4051)
- Labs: Campus Computing Facilities (8: Hill; 9: campuses)
- Director and support staff (4: Hill; 1: LSH)
- Departmental computing facilities
 - LCSR (Comp Sci), ECS (Eng), HPC (High Perf Computing)

Example 2. Top half of flyer. Some data has been removed. Arial

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PC	Standard Desktop or minitower General Word Processing, Spreadsheets, Databases, Email, Internet Access	Intel Pentium III 450 MHz, 128 MB RAM, 8.4 GB Disk, 32x CD-ROM, 1.44 MB floppy, Windows 98, 17" display, keyboard, mouse, Integrated sound, speakers, 4 MB VRAM, 10/100 baseT Ethernet, 100 MB Zip, 3 year limited on-site warranty for parts and labor	Dell Optiplex GX1/T • \$xxxx Gateway 6P6 450 • \$xxxx IBM PC 300 PL • \$xxxx
PC	Performance Desktop or minitower Word Processing, Spreadsheets, Databases, Graphics, Email, Scientific Applications, Internet Access	Intel Pentium III 550 MHz, 256 MB RAM, 10 GB Disk, 32x CD-ROM, 1.44 MB floppy, Windows 98, 17" display, keyboard, mouse, Integrated sound, speakers, 4 MB VRAM, 10/100 baseT Ethernet, 100 MB Zip, 3 year limited on-site warranty for parts and labor. NEW! All DELL 550 MHz configurations will have xxxxxxx.	Dell Optiplex GX1/T • \$xxxx Gateway 6P7 550 (13 GB HD) • \$xxxx IBM PC 300 GL (13 GB HD) • \$xxxx
Apple	Standard General Word Processing, Spreadsheets, Databases, Email, Internet Access	Apple G4 Minitower:350 MHz, 1MB L2 cache, 128 MB RAM, 10 GB HD, CD-ROM, Zip drive, UltraSCSI PCI card and cable adapter;17" display, USB keyboard, mouse, 10/100baseT Ethernet, Rage 128 AGP graphics card with 16 Mb SDRAM, 56K internal modem, 3 year on-site warranty for CPU,carry-in for display	Apple • \$xxxx
Apple	Performance Word Processing, Spreadsheets, Databases, Graphics, Email, Scientific Applications, Internet Access	Apple G4 Minitower 450 MHz, 1MB L2 cache, 256 MB RAM, 20 GB HD, DVD-ROM with DVD video,Ultra SCSI PCI card and cable adapter, Zip drive, Rage 128 AGP Graphics Card w/16 MB SDRAM, 17" display, USB keyboard, mouse, 10/100baseT Ethernet, 3 year on-site warranty for CPU, carry-in for display	Apple • \$xxxx
Unix	Dell On Dell systems, Red Hat Linux can be preinstalled in place of Windows, on request.	Sun & SGI Sun pricing will be sent by email to everyone who has expressed interest. If you don't get it send a request to xxxxxx. SGI is being handled on a special request basis. Please contact xxxxxx.	

Examples of designs using sans serif type

influence to be more readable than a purely geometrical font. Here are two that I like:

abcefghijop 123 AO abcefghijop

Myriad (Robert Slimbach and Carol Twombly, 1991)

abcefghijop 123 AO abcefghijop

Frutiger (Adrian Frutiger, 1975).

Note that Myriad has a real italic, rather than a sloped Roman. There are three different versions of Myriad: Myriad, Myriad MM, and Myriad Pro. Myriad MM is particularly useful, because it uses “multi master” technology. This allows you to adjust the weight and width of the characters as desired. Myriad Pro is the OpenType version. OpenType is a new technology that can put Greek, Cyrillic, small caps, and other special features in the same file as the normal font. Myriad is available at www.adobe.com.

While I like these fonts, sometimes I need to do a document that will be edited by staff who don't have access to any special fonts. In that case I normally use Helvetica or its near look-alike Arial when I need a sans serif font. Either Arial or Helvetica is on most computers today. Often both are. The two fonts are very close. Indeed, printing software (and Adobe Acrobat) tends to replace one with the other, so it's hard to be sure which font you're actually going to see. Because this paper has been processed by Acrobat all uses of Arial and Helvetica will probably be shown in the same font. Which one is chosen depends upon the operating system and the version of Acrobat.

Avoid Deeply Nested Structures

Computer programmers are accustomed to deeply nested structures. In many programs, indentation for conditionals, loops, and other things combine to push the text off the right side of the page. While compilers can make sense of this, people cannot. People have a hard time remembering where they are in complex structures, particularly if everything doesn't fit on one page.

If you want people to make sense out of your documents, you should avoid nesting structures. I strongly advise not nesting lists and bulleted items at all, if you can avoid it. If you can't, all but the outer level should occur within a single page. Indeed lists tend to lose their usefulness if they are spread over multiple pages. Rather than a 10 page bulleted list, you're better off producing a short bulleted list that summarizes the items, and then putting the details in individual sections after the list.

Design Tables So People Can Read Them

If you have tabular information, try to think of a presentation that makes the structure clear. Avoid any design that requires people to put a ruler over the page so they can see what goes with what. A line of dots is almost as bad: It doesn't make people find their own ruler, but it's still a confession of failure.

One common example is the table of contents:

Introduction	2
Completely interminable argument	3
Conclusion	200

What in the world is accomplished by putting the page numbers over on the right, and making people follow all those dots? Unless you think someone is going to take the average of all the page numbers, there's no need to line them up in one column. The obvious approach is to use white space – in this example, an em space:

Introduction	2
Completely interminable argument	3
Conclusion	200

If you feel that you need a bit more separation, you can use midpoints (centered periods), as in the example below. Bullets would be too dark.

Introduction	· 2
Completely interminable argument	· 3
Conclusion	· 200

I also avoid using lines wherever possible. The following table is all too clear.

Year	Number of Congregations	Reported Membership	Mean Number of Members per Congregation	Percent Change in Membership
1998	11,260	2,587,674	230	-0.83
1997	11,295	2,609,191	231	-0.85
1996	11,328	2,631,466	232	-1.3
1995	11,361	2,665,276	235	-1.2
1994	11,399	2,698,262	237	-1.6
1993	11,416	2,742,192	240	-1.4

Membership change in the Presbyterian Church (USA), 1993–1998

I have used Syntax for the table, because I have been consistently using it for examples and other insertions. I've used lining figures (with kerning disabled) because the text figures are variable width, and thus don't line up as well. Using a contrasting font does help separate the table from the text. However in a simpler document it could well be appropriate to use the normal text font.

Long strings of digits are more readable if you letterspace them. In the table above, the numbers are letterspaced by 5%.

You should normally provide a caption for tables and similar insertions.

Look what happens when we use lines around all the cells and spread the table over the whole width of the page, as in Word's default table format:

Year	Number of Congregations	Reported Membership	Mean Number of Members per Congregation	Percent Change in Membership
1998	11,260	2,587,674	230	-0.83
1997	11,295	2,609,191	231	-0.85
1996	11,328	2,631,466	232	-1.3
1995	11,361	2,665,276	235	-1.2
1994	11,399	2,698,262	237	-1.6
1993	11,416	2,742,192	240	-1.4

I do not believe this clarifies the structure of the table. Rather, it tends to draw your attention away from the contents to the lines. In particular, I think the lines make it harder to look at a whole column in a glance.

How This Document Was Produced

This document was produced using Adobe InDesign 2, running under Macintosh OS X 10.2.3.

The main text uses Janson Text LT Std, from Adobe. This is an OpenType version of Linotype's Janson Text. It is set 10.75/14.25 in a text frame that is 5.4 in wide and 8.85 in high, 1 in from the top. The text is set with ligatures, text figures and small caps where appropriate.

Linotype Syntax, a sans serif font, is used as a companion.

A. A BAD EXAMPLE

For your amusement, I'm including an example of how not to format a document. This is taken from several different RUCS documents that I've seen. No one document was quite this bad.

1. Problems with the Headings

a. The first heading

The title at the top of the page has at least four problems:

- It uses fake small caps. Notice that the full caps appear to be darker than small caps.
- It uses underlining. There's no need for that. It's already in a larger size, bold, and in caps. In fact that's already at least one too many special effects.
- It doesn't use letterspacing. That should be used for all caps or small caps.
- This heading, like all the rest, has an extra 6 points of space below it. Recall that headings should generally be surrounded by blank space equal to a full line spacing. The result is a crowded appearance.

b. The rest of the headings

The rest of the headings are similar: underlining, and changing more parameters than necessary. In addition, note that most of the headings are indented. While that's not completely unheard of, it's unusual.

I'm guessing that they indented the headings to match the indentation of the text that comes after it. Of course the correct approach is not to indent the first paragraph that comes after a heading.

Yes, some of the headings weren't even indented the same amount, as in headings a and b above. In the example I'm looking at, all headings of a certain type are indented more than the standard paragraph indentation and the rest of the headings.

2. Problems with the text

- The font is Times New Roman 10, single spaced. Some lines have over 120 characters. That's entirely too long to be readable. If you were going to do such a thing, you would certainly want to add extra spacing between lines, and not do single spacing. Actually, I consider the use of Times to be a black mark in any case – but 10 points???
- The margins are 1 inch all around. That's not enough. Also, making all your margins the same amount, no matter what it is, tends to lead to a boring look.
- The paragraphs all add an extra 6 points of space after them. Recall that in general you should choose between indenting paragraphs and adding extra space after them. You don't need to (and shouldn't) do both.
- Note the bullets above in section 1a. Yes, I've really seen these things, though not all together.
 - It's pretty common to see two different sizes of bullets for first-level lists. I've seen different sizes in two lists right next to each other. However the example above has different sizes of bullets in the same list. I've only seen that once.
 - I've definitely seen bulleted lists where the bullets are that far from the start of the text.
 - You want the bullets to be fairly close, say 1 em or a bit more. These are too far from the text.
 - You want the text to be indented, so the bullets stick out at the left. Yes, I've seen them that way.
- Note the bullets in this section. Yes, I've seen the pattern of three nested bullets that occurs just above. Generally when I notice that coming on, I do something like the following:
 - Make the items at top level separate paragraphs rather than bulleted items.
 - Make the items at this level normal bullets
 - Make the items at the next level indented but without the bullet