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# Layouts in context

## Colofon

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This manual is typeset with ConT<sub>E</sub>Xt and METAPOST. No special tricks are used and everything you see in here, is available for ConT<sub>E</sub>Xt users. The text is typeset in Linux Libertine and Latin Modern Typewriter. We used LuaT<sub>E</sub>X as T<sub>E</sub>X processing engine.

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# Introduction

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ConTeXt is a document markup language and document preparation system based on the TeX typesetting system. It was designed with the same general-purpose aims as L<sup>A</sup>TeX: providing an easy to use interface to the high quality typesetting engine TeX. However, while L<sup>A</sup>TeX insulates the writer from typographical details, ConTeXt takes a complementary approach by providing structured interfaces for handling typography, including extensive support for colors, backgrounds, hyperlinks, presentations, figure/text integration, and conditional compilation. It gives the user extensive control over formatting while making it easy to create new layouts and styles without learning the TeX macro language.

The current development version of ConTeXt is labeled ‘MKIV’, and runs on the TeX-derived typesetting engine called LuaTeX. For this version, many parts of ConTeXt have been redesigned from scratch making extensive use of the Lua programming language. And that is besides the heavy use of LuaTeX features like support for OpenType and TrueType fonts and support for Unicode input.

Over the past years, a number of articles have been published by Hans Hagen about various parts of ConTeXt MKIV, we have combined these existing articles with lots of new text to create this book. We did our best to make sure that on the one hand all information that is needed is actually given while at the other hand attempting to stay away from the nitty-gritty details. ConTeXt MKIV is still a work in progress, and sometimes things change, especially at the lowest level of detail.

This book is about layouts in ConTeXt, and it assumes that some knowledge about ConTeXt itself is already present. No attempt is made to explain the basics of creating input files or running ConTeXt: if you are completely new to ConTeXt, it makes sense to study ‘ConTeXt, an excursion’ first. You can download ‘ConTeXt, an excursion’ from the Pragma ADE website at <http://www.pragma-ade.com>, or find it using the excellent ConTeXt community wiki at <http://wiki.contextgarden.net>. The latter is also a very good starting point for learning about other ConTeXt-related topics.

This book could not have been written within a reasonable time frame without the already existing articles by Hans Hagen, the articles on the wiki, and the replies on the ConTeXt mailing list to fall back upon. We want to extend a very heartfelt ‘thank you!’ to all contributors that we somewhat sneakily stole text from. And if there are any errors in this book, blame us. Better still: tell us about them, so that they can be fixed in a future update.

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# 1 Designing a page layout

## 1.1 Introduction

Designing a layout for a document, and specially for a book, is not an easy task. Many discussions have been dedicated to the 'best' typographical approach. There are different schools, and therefore different opinions, concerning correct page design, e.g. Ph. Taylor [5] and J. Tschichold [6]. The following sections explain what one might take into account to achieve an appealing, harmonic result based on the work of Jan Tschichold [6].

## 1.2 Paper sizes

In earlier times the most common ratio of height to width of paper from the factory was 3 : 4. A sheet of paper which is folded once is called *folio*. Adding another fold will result in a *quarto* which turns into an *octavo* after the next fold. When starting with a 3 : 4 sheet the proportions in the folded format will become consecutively: 2 : 3 and 3 : 4 again. The *octavo*, which is a section with 16 pages, would have the proportion 2 : 3.

Nowadays in Europe the ISO-216 formats are used. The characteristic of these formats is that the proportion between height and width is  $1:\sqrt{2}$  – which is approximately 1 : 1.414. When folding such paper sheets the ratio always remains  $1:\sqrt{2}$ . The ISO formats begin with the base size of A<sub>0</sub> which has a surface of 1 m<sup>2</sup>. The index number rises with each time the sheet is cut in half – see figure 1.1.

## 1.3 Grain of paper

When designing a document, it is important to know the grain of the paper. Handmade paper has no grain because its fibers settle down in random directions, so it makes no difference which direction the paper is folded. This is not the case for paper produced in a continuous process. Due to the (fast) movement in the production direction, many paper fibers get arranged in the direction of the production process. The result is that paper so produced folds easier in one direction. This effect is called the grain of paper. In order to have a book which opens easily and where the pages turn softly, it is important to have the grain of the paper in the direction of the spine of the book. Concerning the ISO-formats even numbers have commonly the grain in the height/length of the sheet.

## 1.4 Choosing a format for the book

When designing a book one should keep in mind how the book will be used. The format of a book that is read while held in the hand is different from the format of a book that is read

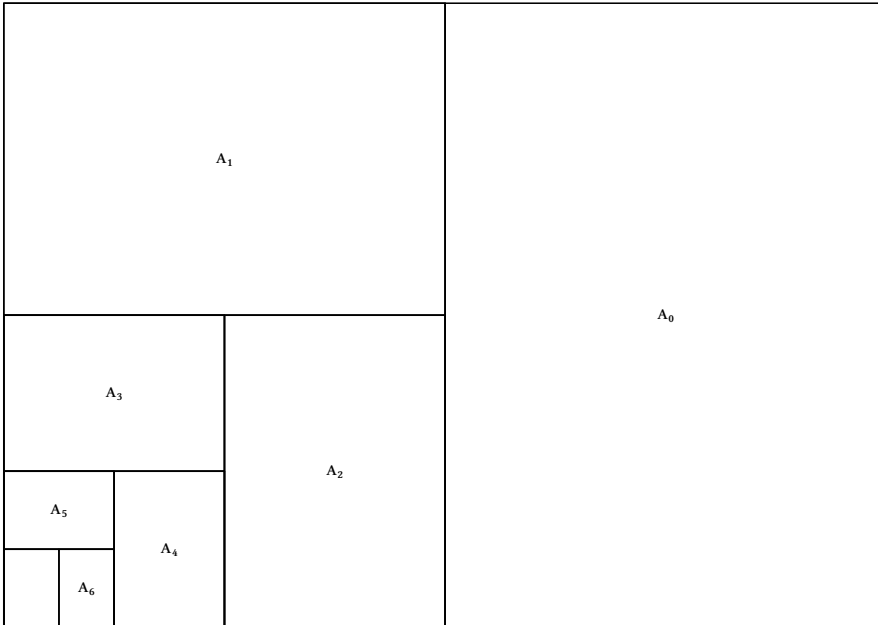


Figure 1.1 From  $A_0$  to  $A_6$

while laying open on a table. Hand-held books should be taller than they are wide. Two traditional page formats (width : height) for tall books are: 21 : 34 (golden ratio) and 2 : 3. For very small books, ratios of 1 : 1.732 ( $1 : \sqrt{3}$ ) or 3 : 5 are fine. Bad proportions of the page are 3 : 4 or 1 : 1.414 ( $1 : \sqrt{2}$ ) – just try it yourself! Take an  $A_5$  book and read it while holding it in your free hand. . . .

Conversely, large books that are studied while laying open on a table can have a page proportion of 3 : 4 without any problem. Oblong books, where the height is less than the width, can also be read laid open on a table.

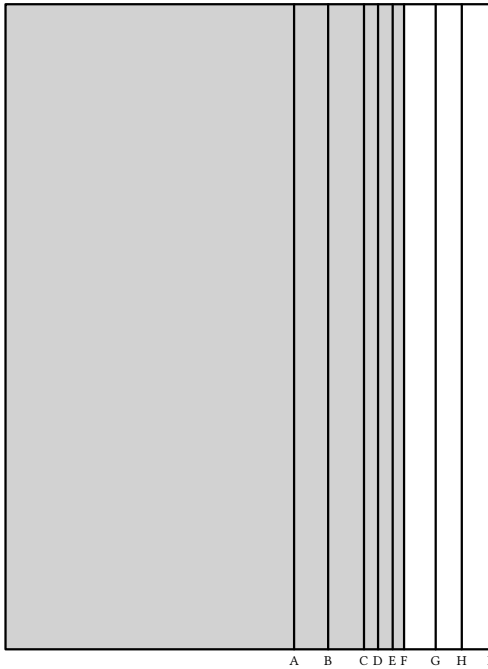
Figure 1.2 shows different page proportions.

## 1.5 Managing readability

In order to make life easier for the reader, one should try to make the average line length some 40 to 70 characters long – including spaces. The optimum is close to 70 characters including spaces. This ‘70 character rule’ is applicable for different European languages such as English, Dutch and German.

But in addition to the number of characters, the number of words in one line should also be considered. For example for the German language, a line consisting of 8 to 12 words is optimal.





The characters in figure 1.2 indicate the following ratios between width and height of the page:

- A :  $1 : \sqrt{5}$
- B :  $1 : 2$
- C :  $5 : 9$
- D :  $1 : \sqrt{3}$
- E :  $3 : 5$
- F :  $21 : 34$  (golden ratio)
- G :  $2 : 3$
- H :  $1 : \sqrt{2}$
- I :  $3 : 4$

**Figure 1.2** Page proportions (the gray area indicates the golden ratio)

Care should be taken when choosing the font. There are, of course, discussions on whether or not to use sans-serif fonts for the main text. The important points are that one should restrict the number of fonts used, and that the fonts should contrast well. The fewer decorative elements a font has, the more legible it will be. One should avoid setting running texts in calligraphic or italic fonts.

In order to fit close to 70 characters on a line, one can choose fonts which run narrower or broader. Compare texts typeset in Times Roman, which is a narrow-running font developed for the Times newspaper, to the same text typeset in Bookman or Garamond.

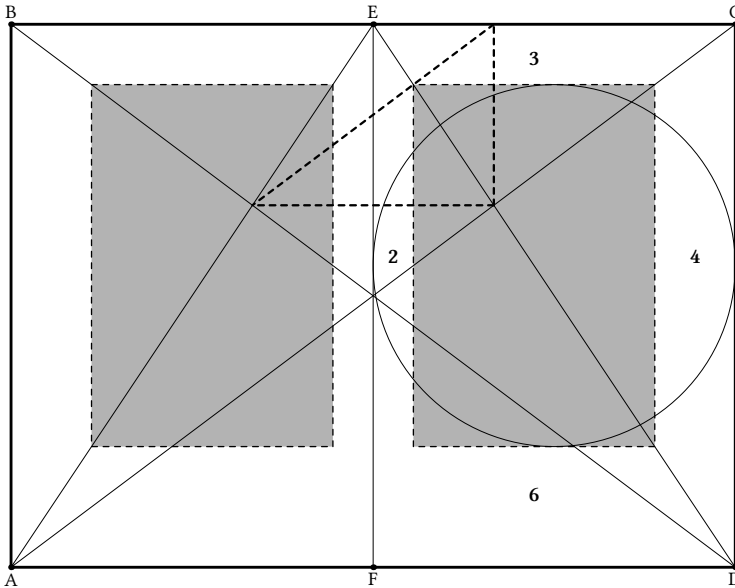
Some example text typeset in Times New Roman  
 Some example text typeset in Bookman

Another possibility to fit the line length requirement is to change the font size, but bear in mind that font sizes less than 8pts make the text harder to read for most people.

## 1.6 Placement of the typesetting area on the paper

Now then, where to place the typesetting area on the page? Typographers did and still do differ in opinion on this subject. It is interesting to know that Tschichold in his young years

was a promoter of the asymmetrical style of typography associated with the modernist and Bauhaus movements. Later on he started to study medieval manuscripts and printed documents from the middle ages, and completely reversed his opinion. His credo became the harmony of the spread and the page with the printed area. By measuring countless documents he discovered that often the proportions for the size of the margins (inner, top, outer, and bottom) were: 2, 3, 4, and 6 respectively. Furthermore he discovered that a page with a ratio of 2 : 3 permits a typesetting area whose height is equal to the width of the page – see figure 1.4.



**Figure 1.4** Page proportion 2 : 3, the text block height is equal to the page width.

These principles of book design formed a ‘canon’ that was used by such early printers as Gutenberg and Schöffer.

In order to design a typesetting area that meets the requirements mentioned above, one needs to be able to divide the page width and height into ninths, since the inner top corner of each text block is one-ninth of the way across and one-ninth of the way down the page.

This division has been described by J.A. van de Graaf [8]. In 1955 Tschichold presented another approach to this using the knowledge of Villard de Honnecourt, an architect who lived in the first half of the 13th century, and the studies presented by H. Kayser [9]. The idea is that one can geometrically divide any length into thirds, fifths, and sevenths and so on. This construction was further improved by Goldenheim, Litchfield and Dietrich (GLaD-construction)[2], which yields odd and even divisions in separate diagrams. Kayser combined these methods in a single diagram. A Villard diagram is presented in figure 1.5.

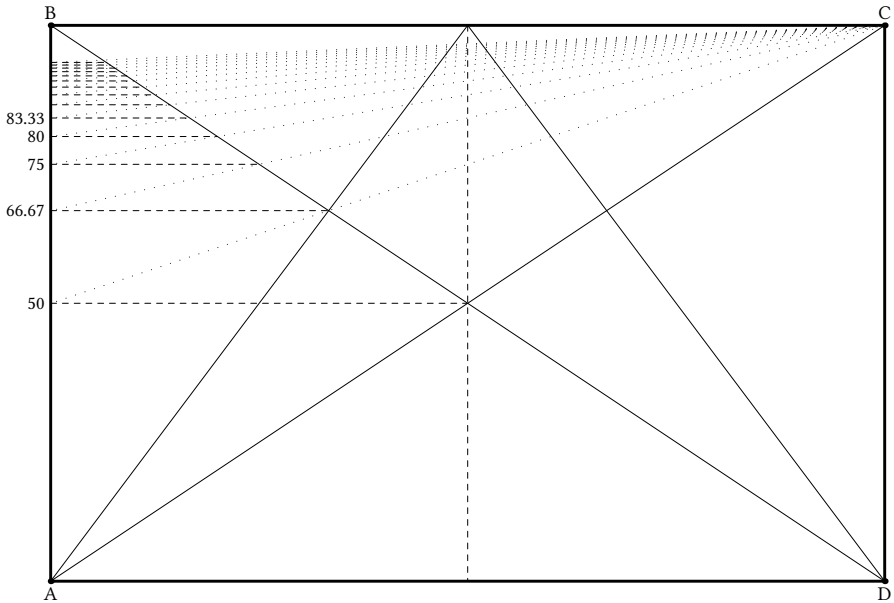


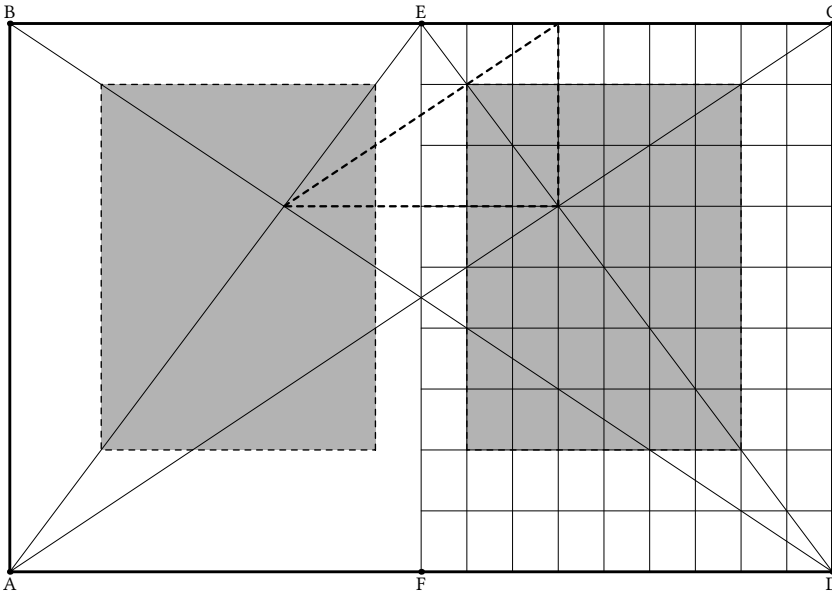
Figure 1.5 An example diagram according to Villard de Honnecourt

Tschichold applied Villard de Honnecourt’s construction recursively, and since  $(1/3) \times (1/3) = (1/9)$ , this method ensures that the top inner corner of each text block (shown dashed in the figure 1.6) is located both one-ninth of the way across and down the page. Thus, the recursive Villard construction can be used to determine the size and position of the typesetting area, which has the same aspect ratio as the pages themselves.

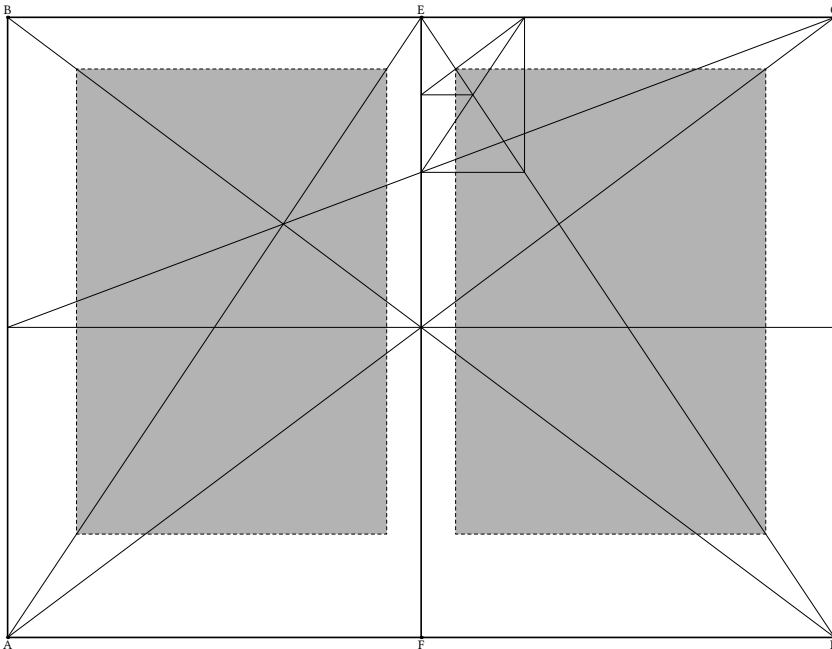
Though Tschichold preferred a *page* ratio of 2 : 3 so the spread would have a ratio of 3 : 4, the same construction method can be applied to any page dimension and paper proportion. Moreover, one not even has to adhere to the division into ninths; other divisions like twelve (see figure 1.7) will also result in a harmonious proportion between the page and the typesetting area and the amount of white space around the text block [6].

### 1.7 Binding correction

So far, only a single spread was used to calculate the typesetting area and the white space around it. When the document will be bound into a book, there must be an additional correction for the optical loss of white space at the binding edge. How big this correction must be is difficult to tell because it depends on the weight and thickness of the paper, the thickness of the book, and, last but not least, on the type of binding used. So the binding correction can best be discussed with the printing house and the bindery.



**Figure 1.6** Finding the left upper corner of the typesetting area with the method presented by Tschichold (dashed) and van de Graaf



**Figure 1.7** Finding the typesetting area with a division of 12 using the Villard de Honnecourt method

## 1.8 Literature

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