Figure 7: ... and another.

This problem could be alleviated by creating 16 special drawing characters for the bitmap patterns corresponding to the 16 hexadecimal figures. The complexity of a bitmap, however, will always be reflected in the cost of its typesetting. Remember that the aforementioned bitmap contains about as many pixels as there are characters on an average page.

Serious problems may arise if the bitmap file contains C language comments. They are discouraged when using `bitmap.sty`. The *bitmap* editor discards them anyway, so they aren't normally used; however, the *terminal* bitmap used in the X System contains a comment.

If the bitmap width is not a multiple of 8, the algorithm in "\," depends on the last byte in each line being padded with 0's. This could be changed by putting the check of \bmhpoz against \bmwid into \1. It turned out to be hardly ever necessary in practice.

Pictures with small pixel sizes come out better if a multiple of the printer resolution is chosen for the pixel size. (Oh well, I know TEX input should be device independent...) Here sometimes the "big point" (1bp = 1/72 in) unit is useful if the resolution is related to inches; e.g. the resolution of a 300dpi printer is 0.24bp; with 400dpi, 0.18bp.

Although the use of bitmaps in documents is limited by TEX's resources, they provide a comfortable way to put small images into documents and a useful interface to the X Window System, e.g. for documentation.

⋄ Reinhard Fößmeier
 iXOS Software GmbH
 Bretonischer Ring 12
 D-W-8011 Grasbrunn
 Germany
 refo@ixos.de

Output devices

Report on the DVI Driver Standard

Joachim Schrod
Secretary
TUG DVI Driver Standards Committee

The DVI Driver Standard will be available in several stages. The basic stage is now called level 0. It covers only those driver capabilities which are really necessary to output a DVI document on an output device. All other driver capabilities will be called features (and may even be realized outside a driver). In the future we will publish several additional standard documents which will cover ranges of features; those documents will represent "tiers" built upon level 0 or on previous tiers. In this way they will be available as future stages of a complete standard. (One may doubt whether the standard will ever be complete as there may be always new features to standardize.)

The basic stage, level 0, consists of three parts:

(1) The pure standard document telling what a driver must be able to do.

(2) Definitions of all file formats spoken of in part 1.

(3) A rationale describing why the committee has chosen the given definition in part 1, recalling discussions that led to particular decisions.

A draft of the level 0 document is about to be published for public review. Part 1 of the draft is (almost) ready; a few spelling errors and such have to be removed. Part 2 was ready, but D. E. Knuth has changed the GF documentation, and this change must be incorporated. Part 3 exists only in part.

The committee will publish the draft as soon as possible. It may be that the draft of the rationale will not be finished in time; in that event we will publish part 1 by itself. This is considered to be useful (although not desirable) so that we will get responses very soon — and especially to change the status from "draft" to "released" as soon as possible. The file formats will not be published in *TUGboat*; they are available on several file servers. For people who do not have access to file servers I've prepared a brochure covering all file formats.

When complete, the standard will be published in the *TEXniques* series. The style will be modified slightly to follow formal standards conventions. The body of the standard will form the main text; this will be followed by a number of "annexes". The

file formats will come immediately after the main text, as "normative" annexes; that is, these format specifications are an integral part of the standard, but the presentation of each is self-contained and too large to be appropriate in the main text. Finally, the rationale will appear as an "informative" annex, to present information that is not an integral part of the standard, but is intended to help a user in understanding it.

Future work

What tier will come next, i.e., what driver feature will be looked at next, is still unclear. There is public pressure to tackle the area of graphics inclusion at an early date; others want to touch areas such as page selection, etc., first. So this remains an open problem. We invite all parties to bring proposals to the committee. My personal opinion is that a proposal for a new tier received early will be handled early. So if someone is eager to see a specific topic addressed, he or she should do work on this topic and send us the result of the work. (We will be glad to acknowledge contributors.)

⋄ Joachim Schrod
  Technical University of Darmstadt
  Institut für Theoretische
    Informatik
  Alexanderstraße 10
  W-6100 Darmstadt
  Federal Republic of Germany
  Bitnet: `xitijsch@ddathd21`

Resources

Review of *3:16 Bible Texts Illuminated*

Karl Berry and Kathryn A. Hargreaves

3:16 Bible Texts Illuminated, by Donald E. Knuth. A-R Editions (801 Deming Way, Madison, WI 53717-1903; (608) 836-9000), 1991. ISBN 0-89579-252-4. 268 pages, paperbound.

In about three-fourths of *3:16*, his first book since *Computers & Typesetting*, Knuth studies — indeed gives an exegesis of — chapter 3, verse 16 of

every† book in the Bible. 59 calligraphers (from 26 countries) fill the remaining quarter of the book with their renderings of the verses. Hermann Zapf, one of the world's leading typographers, contributed the illustration for John 3:16 and the cover design.

The main text consists of four pages per Biblical book: a left-hand page with a summary of the book as a whole, the page of calligraphy, and two pages of discussion about the 3:16 of that book. In a foreword, Knuth discusses how he came to study the Bible using the statistical procedure of stratified sampling, and describes his reactions to the experiment (including a few quantitative conclusions) in an afterword. Mathematically-minded people will appreciate this novel application of statistics to the Bible. We wished we could have attended the Sunday morning Bible classes led by Knuth upon which he based the text.

The book design is attributed to both Knuth and Zapf. The typeface is Computer Modern (Knuth didn't do any of the calligraphy, so it seems only fair that all the typeset letters should be his own design). The book designers and calligraphers use up to four colors: the text is black, the name of the Biblical book is printed in rust red on the summary page, and the verse is printed in a blue-green on the left-hand discussion page, inset in the text. (It must have been a lot of fun to figure out those 59 `parshapes`.) The calligraphy also uses a light ochre. The book designers reduced the calligraphic works (or perhaps just had the calligraphers make them) so they would all fit in approximately the same rectangle, and then set the calligrapher's name and Biblical reference well underneath in sans — giving credit without detracting from the calligraphy.

We can read the title's word "Illuminated" in two different ways. First, through linguistic and historical analysis, Knuth "sheds new light on" the meanings of the Bible verses — finding humanistic interpretations that reinforce our contemporary experience. In fact, he gives his own fresh translation of the verses. (He wholeheartedly recommends this to anyone interested in Bible study.) He also gives a generous sprinkling of those personal insights for which he is well-known. Knuth's writing has the elegance to which we've grown accustomed; the book can be enjoyed even by those with no background

---

† Well ..., almost every. Some books don't have that many verses. Knuth "decided to omit all such books, because they turn[ed] out to be similar to other books that are long enough to be included."