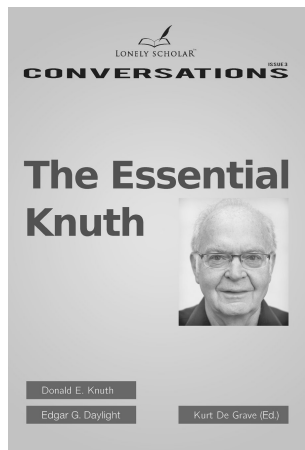


**Book review: *The Essential Knuth***

David Walden

Donald E. Knuth and Edgar G. Daylight, *The Essential Knuth*. Lonely Scholar, 2013, 94 pp. Paperback, US\$15.00. ISBN 978-9491386039.



*The Essential Knuth* is primarily an interview of Don Knuth by Edgar Daylight. It is published as a booklet of about 90 pages divided into six chapters: 1. Childhood, 2. College, 3. ALGOL, 4. Structured Programming, 5. Computer Pioneers, 6. Historiography. There is also a preface by the interviewer, a 66-item bibliography of books and papers mentioned during the interview, and an index. The title page states that the booklet was edited by Kurt De Grave. In other words, it is longer and more richly documented and carefully published than many interviews.<sup>1</sup> The interview was done in November 2012 in Frankfurt, Germany.

Edgar Daylight is a researcher in the history of programming languages living in Belgium, with a goal of extensively interviewing high-profile and retired computer scientists.<sup>2</sup> Thus, his interview of Knuth deals with Knuth's work with computer languages and language processors, Knuth's interest in the methodology of structured programming, and Knuth's personal involvement with the computing pioneers of the 1950s and 1960s who were involved with computer language research, such as Ole-Johan Dahl, Edsger Dijkstra, C. A. R. (Tony) Hoare, and Peter Naur. There is almost no mention of T<sub>E</sub>X in the booklet.

I am happy I bought and read the booklet. It covers some things about Knuth that I had not read elsewhere and gives a slightly different slant on some

<sup>1</sup> Some of them are available at <http://tug.org/interviews/#knuth>.

<sup>2</sup> Email of August 3, 2012, by Daylight to SIGCIS.org.

things of which I was already aware. Although the booklet doesn't go into Knuth's work with T<sub>E</sub>X, that was OK with me; plenty has already been written (by Knuth and others) about T<sub>E</sub>X in this our T<sub>E</sub>X community. Rather, because I came into computing in the 1950s and 1960s and knew of many of the computing pioneers from that era through their books and journal articles, I greatly enjoyed learning more about Knuth's interactions with the rest of those pioneers. Also, I am interested in the practice of researching and writing computing history, and the booklet contains some discussion, both implicit and explicit, of this. For those interested in more detail in this regard, I wrote another review for the *IEEE Annals of the History of Computing*; a preprint of that review is at <http://walden-family.com/ieee/daylight-knuth.pdf>.

I recommend the booklet. However, I suspect that many potential readers will wish it was available in ebook form.

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T<sub>E</sub>X *is* mentioned in the booklet in a couple of discussions. Regarding specifying programs, Knuth states that he could not have specified T<sub>E</sub>X without also being a user of T<sub>E</sub>X. Regarding structured programming, Knuth notes that T<sub>E</sub>X is not entirely structured, as it includes macros which don't have to obey nested structure. Regarding portability of programs, Knuth states,

[W]hen I wrote T<sub>E</sub>X, I was extremely careful about portability. I completely avoided floating point arithmetic in places where the computations could affect page layout. Instead I implemented my own arithmetic for internal computations, using integer operations only, and I checked boundary conditions so my programs would be machine-independent. I wanted to be sure that everyone who uses T<sub>E</sub>X would get the same results, regardless of the country they lived in and regardless of the operating system they were using, either now or fifty years from now.

Regarding this machine portability point, elsewhere in the booklet Knuth states that he is not good at forecasting, for example, how big computer memories would become. I wonder if he also didn't anticipate a standard specification for floating point computer arithmetic; or if he anticipated a specification but couldn't wait; or if he would in any case have developed his own portable arithmetic capability for T<sub>E</sub>X.

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