

Donald Knuth

The Great Computer Scientist

Selman B. Özkurt^{1,2}

¹Department of Industrial Engineering
Boğaziçi University

²Department of Computer Engineering
Boğaziçi University

CMPE220 Fall 2019
Haluk O. Bingöl



Table of Contents

- 1 Life
- 2 Theoretical work
- 3 Books and Software
- 4 Extra



Table of Contents

1 Life

2 Theoretical work

3 Books and Software

4 Extra



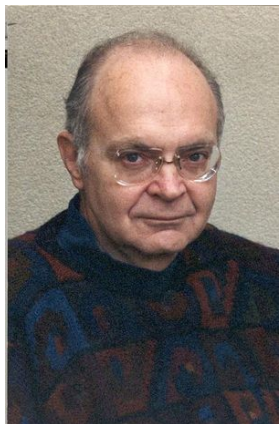


Figure: Portrait of Knuth

- Donald Ervin Knuth was born in January 10th, 1938 in Milwaukee, Wisconsin.



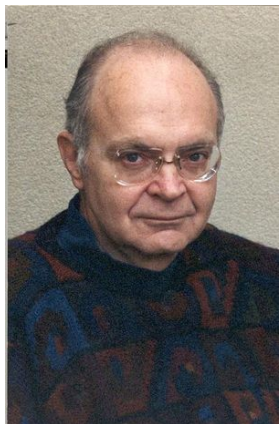


Figure: Portrait of Knuth

- Donald Ervin Knuth was born in January 10th, 1938 in Milwaukee, Wisconsin.
- Son of a publisher and librarian father



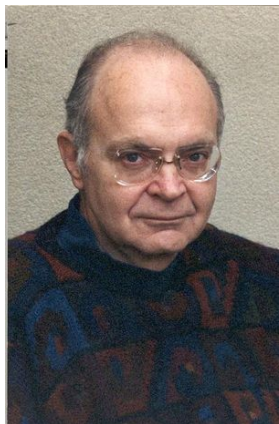


Figure: Portrait of Knuth

- Donald Ervin Knuth was born in January 10th, 1938 in Milwaukee, Wisconsin.
- Son of a publisher and librarian father
- Received B.S. and M.S. in *Physics* from Case Institute of Technology in 1960.



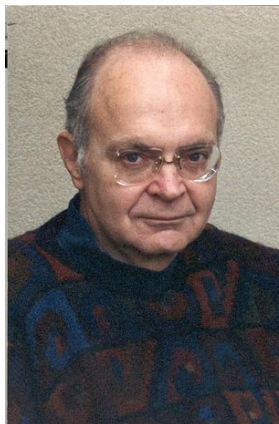


Figure: Portrait of Knuth

- Donald Ervin Knuth was born in January 10th, 1938 in Milwaukee, Wisconsin.
- Son of a publisher and librarian father
- Received B.S. and M.S. in *Physics* from Case Institute of Technology in 1960.
- Received Ph.D. in Mathematics from Caltech in 1963.



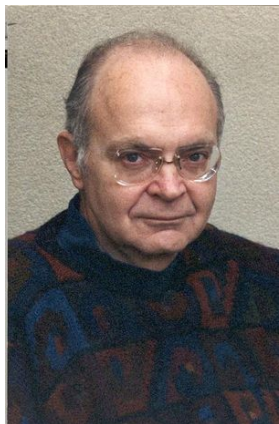


Figure: Portrait of Knuth

- Donald Ervin Knuth was born in January 10th, 1938 in Milwaukee, Wisconsin.
- Son of a publisher and librarian father
- Received B.S. and M.S. in *Physics* from Case Institute of Technology in 1960.
- Received Ph.D. in Mathematics from Caltech in 1963.
- Transferred to Stanford in 1969, where he still teaches at age 81 as Professor Emeritus.



Table of Contents

1 Life

2 Theoretical work

3 Books and Software

4 Extra



Algorithm Analysis

Upon realizing most CS publications at the time were wrong, he decided to define algorithm analysis formally.

He is the father of the field as we know it today (See CmpE300¹).

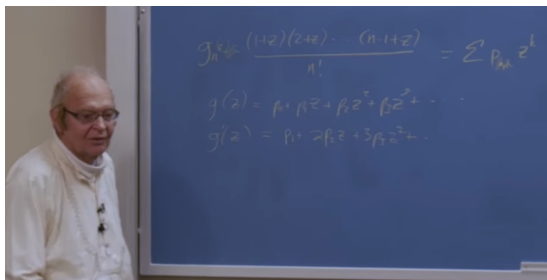


Figure: 2015 Stanford Lecture "Recreating 1969" on Algorithm Analysis. See <https://youtu.be/vkUNH9r6UCI>

¹Has a midterm tomorrow

Literate Programming

He developed a programming style in which the programmer uses literate language and systems automatically output compilable code and well-written documentation.

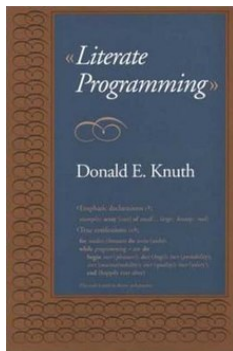


Figure: Cover of his seminal book on the topic



Table of Contents

- 1 Life
- 2 Theoretical work
- 3 Books and Software**
- 4 Extra



After intending to write a book on compilers, he urged the need to give formal definitions in Computer Science, so he began writing this series in 1968, and he still continues today with 4^2 main volumes and lots of supplemental books published so far.

The series basically contains the whole Computer Science in its most well-defined form.

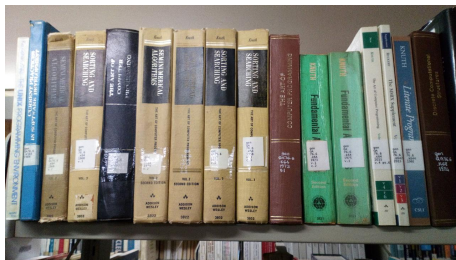


Figure: Part of the series at QA76.6.K64 section in BOUN Library

²The last being half-complete

He is planning to complete 7 Volumes in total, the last being about compilers, his original intention.

Preface of Volume 1

"This series of books is affectionately dedicated to the Type 650 computer once installed at Case Institute of Technology, in remembrance of many pleasant evenings."



Figure: Knuth holding a volume of his masterpiece



In 1992, he said he needed 20 years to complete the series so he partially retired. In 1996, he again said he needed 20 years. Today, Volume 5 (out of 7) is expected for release in 2025.

Quote by Bill Gates

"If you think you're a really good programmer... read (Knuth's) Art of Computer Programming... You should definitely send me a résumé if you can read the whole thing."



There is one more thing we owe Knuth a lot for ...



There is one more thing we owe Knuth a lot for ...
That is ...



There is one more thing we owe Knuth a lot for ...
That is ...

L^AT_EX



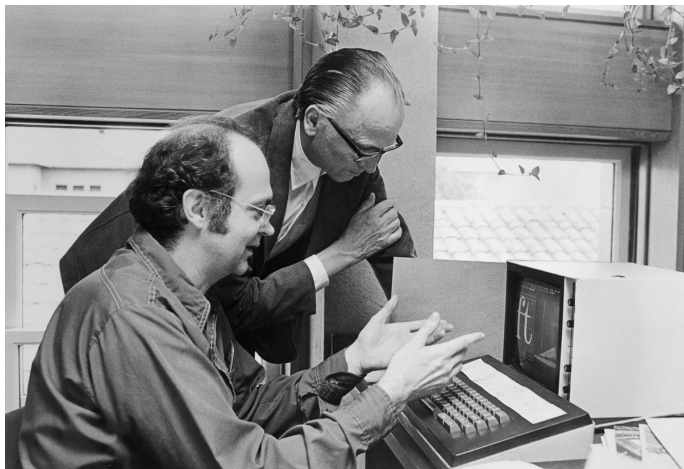


Figure: Knuth discussing on T_EX typefaces with typeface designer H. Zapf



- Compiler Techniques
 - TAOCP
 - Concrete Mathematics
 - MIX/MMIX Assembly Language
 - T_EX System
 - ④ METAFONT System
 - Literate Programming
 - WEB/CWEB Programming Systems



Figure: All his books, photo by H. Garcia-Molina



Table of Contents

1 Life

2 Theoretical work

3 Books and Software

4 Extra



He pledges 0x\$1.00 (256 decimal cents) to whoever finds a small mistake in his books. He does not use personal e-mail and allows people to contact him only for errata.

Udo Wermuth is the person who got most money in his account in The Bank of san Seriffe, with 0x\$869.f8 wired to him by Knuth.



He has written books and given lectures trying to explain religion and the God from the perspective of a computer scientist.

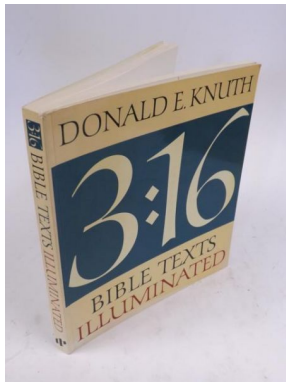


Figure: A book he authored on Bible



He has a huge pipe organ installed in his house and has transliterated Biblical book of Revelation into music.



Figure: Playing his organ. See https://youtu.be/p_aV41F0j10

Contact Information

- **Personal Website:**

<https://www-cs-faculty.stanford.edu/~knuth/>

- **E-mail:** taocp@cs.stanford.edu³

- **Mailing Address:**

Donald E. Knuth
Computer Science Department
Gates Building 4B
Stanford University
Stanford, CA 94305-9045 USA.

Notice

You should only write him for matters for which you may get 0x\$1.00 in return. He gets mad when people write to him asking questions.

³He doesn't use a personal e-mail. This one is maintained by his secretary. ▶