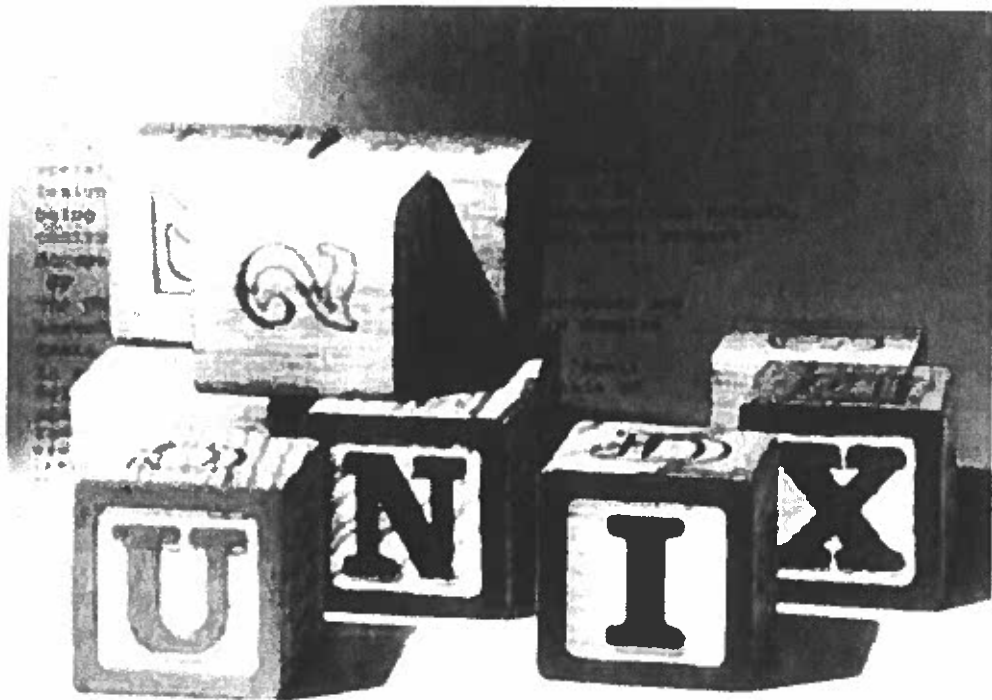


UNIX

A History and a Memoir

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was the case with Multics. The phrase “over-engineered” appears in several descriptions, and Sam Morgan described it as “an attempt to climb too many trees at once.” Furthermore, one does not need to be much of a student of organizations to anticipate that there might also be problems with a project involving two very different companies and a university, in three locations spread across the country.

Half a dozen or more Bell Labs researchers worked on Multics from 1966 through 1969, including Doug McIlroy, Dennis Ritchie, Ken Thompson, and Peter Neumann, who had taken over Vic Vyssotsky’s role when Vic moved to another Bell Labs location. Doug was deeply involved with PL/I, the programming language that was to be used for writing Multics software. Dennis had worked on Multics documentation while a student at Harvard and worked on the device input and output subsystem at the Labs. Ken focused on the input/output subsystem, experience that proved valuable when he began work on Unix, though in a 2019 interview, he described his Multics work as being “a notch in a big wheel and it was producing something that I didn’t want to use myself.”

From the Bell Labs perspective, by 1968 it was clear that although Multics was a good computing environment for the handful of people that it supported, it was not going to achieve its goal of being an information utility that would provide computing services for the Labs at any reasonable cost; it was just too expensive. Accordingly Bell Labs dropped out of the project in April 1969, leaving MIT and GE to soldier on.

Multics was eventually completed, or at least declared a success. It was supported and used until 2000, though not widely. Multics was the source of many really good ideas, but its most lasting contribution was entirely unanticipated: its influence on a tiny operating system called Unix that was created in part as a reaction to the complexity of Multics.

2.3 The origin of Unix

When Bell Labs pulled out of Multics, the people who had been working on it had to find something else to do. Ken Thompson (Figure 2.2) still wanted to work on operating systems, but upper management at the Labs had been burned by the Multics experience and had no interest in buying hardware for another operating system project. So Ken and others spent time exploring ideas and doing paper designs for various operating system components, though with no concrete implementations.

Around this time, Ken found a little-used DEC PDP-7, a computer whose main purpose was as an input device for creating electronic circuit designs.



Figure 2.2: Ken Thompson, ~

The PDP-7 was first shipped in 1966 so by 1969 it was dated. The machine had 8K 18-bit words of memory (16K total) so Ken wrote a version of a space-wander through the solar system an addictive and I spent hours playing.

The PDP-7 had another interesting feature: a single vertical platter. Credible for its time to stand in front of it in case someone would touch the computer. This presented an interesting scheduling algorithm that would be particularly this one.

Now the question was how to store the disk with data, and Ken decided to do it in quantity.

“At some point I realized that I needed to write three programs: one that could create code; an assembler, which could run on the PDP-7; and a ‘kernel’.

Right at that time, Ken’s wife had a one-year-old son to visit Ken’s office for a few weeks to work undisturbed. As a result,