History of Unix Part 1: The 1960s and 1970s

This is part one of a four-part series on the history of Unix. In this article I'll cover the birth and development of Unix during the 1960s and 1970s.

In the mid-1960s the Massachusetts Institute of Technology (MIT) in America was leading a joint research project with General Electric and Bell Labs to develop Multics ("Multiplexed information and computing service") , an operating system to replace the successful Compatible Time Sharing System (CTSS). But in 1969, unsatisfied with Multics progress, Bell labs decided to quit the project. Several Bell Labs researchers found themselves looking for new projects to further develop their time sharing system ideas. One of the researchers, Ken Thompson, found an unused DEC PDP-7 computer and started working on a personal programming project.

A PDP-7 at University of Oslo, Norway
(https://commons.wikimedia.org/wiki/File:Pdp7-oslo-2005.jpeg)

Ken initially designed and implemented a filesystem for testing, but he soon realized he was close to having an actual operating system. In the summer of 1969, Ken's wife and newborn baby went to California to visit family. Ken stayed behind and spent three weeks working to finish his new operating
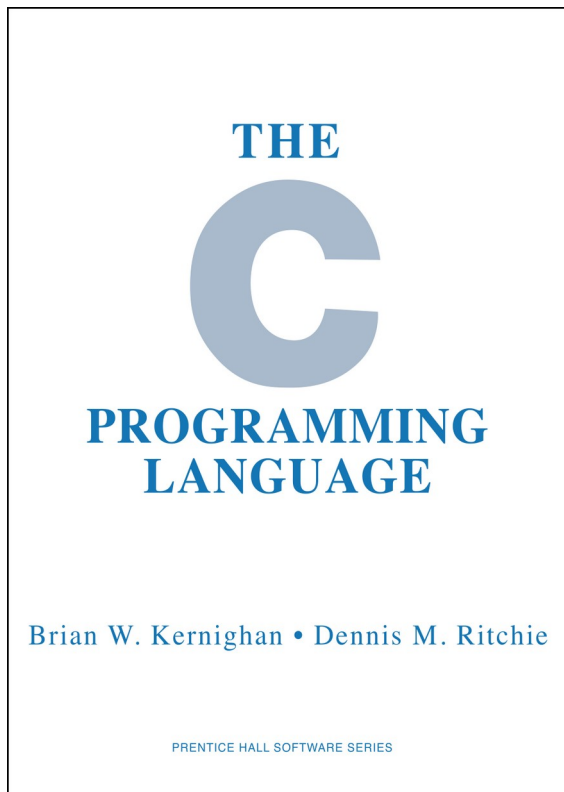
system. The creation of the filesystem as a central component of Unix was significant, and led to the Unix philosophy of "everything is a file".

After creating an initial running system, other researchers like Dennis Ritchie joined in the development and together they created a useble, general purpose, operating system. As a humorous comparison to Multics, this new system was named "Unix". In 1972 Bell labs approved the purchase of a PDP-11 to use Unix for processing patent applications. Several editions of Unix were run on the PDP-11 architecture.

Ken Thompson and Dennis Ritchie working on a PDP-11
(https://commons.wikimedia.org/wiki/File:Ken_Thompson_(sitting)_and_Dennis_Ritchie_at_PDP-11_(2876612463).jpg)

The initial Unix versions were written in low level assembly language. To run on different computers, Unix had to be rewritten for that particular CPU architecture. This was complex and time consuming, so Dennis Ritchie created the C programming language to enable any system with a C compiler to run Unix. In 1973 the 4th edition of Unix was rewritten in C, making it portable to new computer architectures. In 1974 Ritchie and Thompson submitted a paper to the Communications of the ACM journal, called "The Unix time-sharing system" which described the new operating system. The paper can be found here: https://www.bell-labs.com/usr/dmr/www/cacm.pdf .

THE

C

PROGRAMMING
LANGUAGE

Brian W. Kernighan • Dennis M. Ritchie

PRENTICE HALL SOFTWARE SERIES

The original "K&R" C programming language book

Mechanical keyboard and printer terminals called teletypewriters were used to interact with early Unix systems (the Unix "tty" device name originated from the teletypewriter device). A popular device in the late 1960s was the Model 33 from Teletype Corporation. Lines of text could be typed or printed, and line-oriented programs like the "ed" editor were used. The introduction of CRT electronic terminals ("glass teletypes") made computers easier, quieter, and more visual to operate. A modifiable screen led to new programs like visual editors ("vi" or "emacs" for example). A popular CRT terminal was the DEC VT100 released in the late 1970s.

Early popular Teletype Model 33 terminal
(https://commons.wikimedia.org/wiki/File:Teletype-IMG_7287.jpg)

People used terminals to interacted with a "shell", a computer program designed to accept commands and display output. Two popular shells were the C-Shell (csh) written by Bill Joy in 1978, and the Bourne shell (sh) written by Stephen Bourne in 1979. In the shell, the output of one command or program could be used as the input of another, and groups of commands could be saved as shell script programs. This revolutionary idea was called a "pipe" or "piping" and it revolutionized how the shell was used, leading to the Unix philosophy of many small tools doing one thing well.

Early popular DEC VT100 terminal
(https://commons.wikimedia.org/wiki/File:DEC_VT100_terminal.jpg)

During the 1970s Unix at Bell Labs reached the 7th edition and popularity was growing among other researchers in the community. The parent company of Bell Labs was AT&T (American Telephone and Telegraph - similar to the former Swiss PTT). AT&T was a monopoly and they were not permitted to sell Unix, so they gave the source code away for free (mostly to Universities). This resulted in new modified versions and communities, including University of California at Berkely creating the Berkeley Software Distribution, or BSD Unix. BSD Unix became popular among academics and several BSD versions were released by the end of the 1970s.

The BSD mascot "Beastie"
https://en.wikipedia.org/wiki/File:Bsd_daemon.jpg

By the end of the 1970s Unix had become well known within Bell Labs and externally among Universities, academic researchers, and students. The Unix Heritage Society is an excellent resource created to preserve the source code and documentation of historical Unix systems (https://www.tuhs.org/). In the next article I'll describe the growth and commercialization of Unix in the 1980s.