

A Summary of “Observations on the Development of a Operating System” by
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To the knowledge of a modern computer specialist, one hypothesis is that computer systems design can occur in 5 stages, taking 7 years in total for a working prototype to finally develop. Lauer's experience in computer architecture classifies operating systems into 5 different types, each with their own impact on the computing community.

The history of Pilot starts as an operating system kernel, Consisting of 50 thousand code written in the Mesa language. The systems development component of Pilot consists of 200 thousand lines of Mesa code, organized into about 24 subsystems including the Kernel, Debugger, and other essential internal processes, and another 200 thousand lines of (Mesa) code for general applications. As a way of life, Pilot engages people in the theory of how subsystems may easily communicate across networks. For example, it is the operating system for a number of Xerox Products, and a tool for supporting software research.

Work on Pilot began on January 1976, and by October 1978, Pilot was first released to clients. The third debut of Pilot was on March 1980. By this time, it was bootstrapped away from the Alto subsystem, and all Alto code was replaced by Mesa code. It was the first to appear in a printer (the Xerox 5700), and could read and write the disk much faster than the second version. On April, 1981, demanding clients sent letters indicating that the 5th release of Pilot was the preferred choice for use in Pilot/Alto systems. This was 5 years after the start of Pilot.

Over the years, our clients pointed out certain problems with the system that could have been foreseen by our team. One such problem was that each new version of Pilot was much larger in disc space than the previous version. One problem that we foresaw and appended throughout the developments was Set Sizes, which was the amount of virtual memory needed per physical memory. Programmer Productivity was another serious issue, but not so serious as to be dealt with immediately, due to the fact that most of the reasons a Programmer would not be working would be to attend classes, write papers, or attend seminars.

At first, there was a dense debate about whether Pilot should be a system of monitors and controls, or of messages. Originally, there was an attempt to reach a compromise between the two, but the system of messages was preferred eventually, since it was less labor intensive for people and computers, saves time, and required less memory. In the implementation of virtual memory, we found that the system could not accept back to back requests, and the system had to be rewritten to submit single disc requests whenever it could.

Systems of the first kind are small, ubiquitous, have limited requirements, and are meant to serve limited functions. Systems of the second kind are meant for major business projects, Systems of the third kind are prepackaged with applications meant for everyday use. Systems of the fourth kind are inventive improvements on existing systems, and systems of the fifth kind are ubiquitous in use, function, and location, and can appear as many different devices running on the same operating system.

The world of programming methodology is designed to help us achieve perfection in creating artificial organisms like the Pilot program, and to benefit from these efforts in the future...