

VU Amsterdam objects and their stories | 140 years of Vrije Universiteit Amsterdam

[Photo: 25-Minix3-l-8.png The login screen to Minix Version 3.1.8, 2010. Wikimedia commons]

2000-2005 MINIX 3 and the heritage of computer science

VU Amsterdam was one of the first universities in the Netherlands to set up a Computer Science Department in the 1970s. Thanks to the American professor Andy Tanenbaum, the department soon achieved international fame. Tanenbaum became best known for MINIX, a very light UNIX operating system that would eventually inspire the creation of Linux in 1991. MINIX 3, which came out in 2006, is still used in education today. Computer historian Danny Beckers outlines the development of computer science at VU Amsterdam and MINIX. Curator Liselotte Neervoort reflects on the question of how such heritage can be preserved and presented.

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CPU 0 freq 3200 MHz
Wed Aug 25 11:43:42 GMT 2010
Setting /usr on cd is /dev/c0d2p2
/dev/c0d2p2 is read-only mounted on /usr
Starting services: random printer ipc.
Starting daemons: update syslogd.
Local packages (start): done.

Welcome to MINIX 3.1.8.

The system is now running and many commands work normally. To use MINIX
in a serious way, you need to install it to your hard disk, which you
can do by typing 'setup' while logged in as root. Then just follow the
on-screen directions.

After setup is complete, type 'shutdown' and when the boot monitor
starts, boot your new system by following the instructions at the end of
setup. Keep the CD-ROM in the drive, login as root and type 'packman'
to begin installing the many software packages available. After you
have installed the packages, type 'xwm' to start X Windows if you have
installed it.

Minix Release 3 Version 1.8 (console)

minix login: _
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Computer science at VU Amsterdam

VU Amsterdam's Computer Science Department was among the first in the country. Mathematics students could enrol in the Computer Science major as early as 1971. The curriculum focused on the description and development of automated numerical processes and the study of the associated error margins. Through Professor Koksmas, VU Amsterdam had been involved with the Mathematical Centre, now known as Centrum Wiskunde & Informatica (CWI, Dutch for 'centre for mathematics and informatics'), since 1946. This centre was founded in 1946 on the initiative of a number of professors of Mathematics, who advocated a new form of practising the discipline. With the centre, they wanted to contribute to the reconstruction of the Dutch economy. The Mathematical Centre's calculation centre was one of its essential components, and it was there that VU Amsterdam gained early knowledge of building computers. Among other things, the Mathematical Centre was involved in the design of the XI, built by the Dutch computer manufacturer Electrologica. This shows that VU Amsterdam's early involvement in computer science did not come out of the blue.

In the 1960s, VU Amsterdam staff and students performed calculations on the Mathematics Centre's machines. Many Mathematics students would enter the professional field through the Mathematics Centre. After the arrival of two professors by special appointment, [Reinder van de Riet](#) and [Jacob de Bakker](#), in 1970 and 1972 respectively, VU Amsterdam expanded its course offer to Mathematics students from 1973 onwards to include everything from numerical mathematics to business automation and from programming to database construction. Both professors by special appointment had studied at VU Amsterdam and had worked at the Mathematics Centre for some years afterwards. In 1971, in between these two professorial appointments, [Andy Tanenbaum](#) was appointed science officer. He was promoted to professor in 1978. One of the courses he taught was on the design of operating systems. In the mid-1980s, he built [MINIX](#) to give students the opportunity to study these operating systems in more detail. MINIX was a smaller version of the popular operating system [UNIX](#) (Mlni unX), which had been copyrighted by Bell Labs a few years earlier.

MINIX

Computer operating systems were a relatively new phenomenon in the 1970s. While the old mainframes could be operated with a set of basic commands, the need for an operating system did not become apparent until the 1960s, when it became more common for several users to use the same computer. The computer's operating system ensured that the various programmes in use were handled efficiently, without information disappearing or processes stalling along the way. In this way, a user could print a result while the processor in the computer was busy with another calculation, for example. With the rising popularity of the [PC](#) in the early 1980s, the

operating system took on the function of handling all the parallel processes that the PC user had started up and of which ordinary users were often no longer even aware, from screen control and word processing to clock and email programs.

In a 1987 book on operating systems, Tanenbaum used MINIX as the basis. The book came with a floppy disk containing MINIX. As an operating system, it was superseded in the market by Windows and MAC/OS, but as a case study at universities, MINIX continued leading the way into the 1990s, as students could study and adapt it by themselves. In 2006, with MINIX version 3, the operating system was transformed into a research project aimed primarily at the embedded systems market. In that market, the fact that the system was small and open-source was an advantage. The stability of MINIX was a welcome bonus.

Also, watch [this video](#), in which Tanenbaum discusses the start of MINIX.

Software as a heritage object

By Liselotte Neervoort

Thanks to the digital revolution, the idea of what constitutes an object has changed. Whereas an object used to only be something you could hold, nowadays we also have born-digital objects, such as books, emails and even works of art. You could also refer to software as heritage. It says as much about how the human mind thinks and develops as the hardware or the end products. But how do you store something like that in a sustainable way? And what exactly do you store? The code on a floppy disk? Or on a device? How can you keep it working and accessible? Perhaps on a virtual device? Or do you save a screenshot or an image of the logo to illustrate a text? Fortunately, this is a widely debated issue in the heritage world, with bodies such as UNESCO taking a close interest.

The next challenge is how to display software in a paper publication or physical exhibition. In a digital environment, you can link to videos and background information, like we did in this article. But in a display case? What do you see then? What experience do you have? In short, there are more questions than answers...

Danny Beckers currently works at Vrije Universiteit Amsterdam's Science Department. Danny conducts research into the history of mathematics, the history of computer science and the history of mathematics education. Current projects are 'History of Mathematics Education, 1945–1985' and 'History of programmed instruction'. Liselotte Neervoort is the curator of the VU Academic Heritage Collection.

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