

Some bits of computing history at UC

By Alan Causer

The Calcomp plotter:

Arrived in 1969 at a cost of about \$10,000 =cost of my new 3 bedroom house in Avonhead that year.

11 inch drum plotter. Multi coloured pens including ink, manually changed by staff.

1/100 inch steps in any of 8 directions, those at 45 degrees being 1/100 inch in each of the x and y directions

No software came with it, so Alan Causer had to write drivers etc in 1620 assembly language (SPS)

Fortran callable subroutines were written by Alan Causer for the 360/44 and these produced output on punched cards which were carried to the 1620 to be read and converted to a stream of commands to the plotter, its vocabulary being to move a step in any of the 8 directions or to raise or lower the pen.

Much of the plotters work was with drawing 3 dimensional pictures of molecules from data provided by researchers in X-ray crystallography in the Dept of Chemistry and with drawing graphs of earthquake data from the dept of Civil Engineering.

When the B6700 was purchased there was no means for attaching a plotter to it. To make up for this a TC500 small computing device was purchased as a terminal to the B6700 with a card punch attached. Alan Wilkinson programmed this TC500 to drive the card punch . The Fortran callable plotting subroutines from the 360/44 were rewritten in B6700 algol by Alan Causer and plotting data continued to be passed to the 1620 on punched cards until that system was replaced by a PDP11 as described below

Also it was extremely expensive to connect interactive terminals to the B6700, as each required a very costly interface card installed on the B6700. The PDP11 could take a cheap multiplexor which could interface to 16 "dumb" terminals. The PDP11 in turn could feed into just one of the expensive B6700 interfaces. Also a paper tape reader and punch were bought for the the PDP11. Robin Harrington wrote (in PDP11 assembler language) a driver program to transmit data to and from the B6700. Alan Causer wrote an operating system , drivers for paper tape reader and punch, card reader and plotter and a program to concentrate lines of text entered on the terminals into messages to go to the B6700, also handling the output of messages from the B6700. At this stage(1973 or 74?) plotter output from the B6700 was transmitted through the datacom lines and no longer punched onto cards.

Also the remote batch terminals (card reader and printer on a small computer) supplied by Burroughs for both the School of Engineering and Lincoln University were never able to perform at a satisfactory level, so were replaced by PDP11 computers with a system written by Alan Causer and using Robin Harrington's line driver program. This system was subsequently used by the Canterbury University

Registry data processing section, the Reserve Bank in Wellington, the Auckland Clinical School and Waikato University.

Cantran System

After running on the 360/44 from 1970 to 1974 (until the 360/44 went) a system utilizing the B6700 Fortran compiler was implemented by CCTR staff. This was not satisfactory so quotes from various companies were obtained to provide a stand alone system for students. Control Data were the leading contender but with a hardware price of around \$250,000, unaffordable. During the previous year Alan Causer had written a Fortran compiler with a stand alone operating system for the PDP11 and this had been put into successful operation at Lincoln University. Accordingly he given the task of writing in assembler language an operating system, editor, and this compiler for use with terminals directly attached for use at Canterbury. This system cost only \$50,000 and was put into use in 1974 with 5 terminals, a card reader and 2 printers initially. It ran until the end of 1978 and processed over a million student jobs.

Charles Brown obtained the source and B6700 executable code for a Pascal Compiler which would compile itself on the B6700. Charles analyzed the executable code it produced for itself and made it produce code for a virtual machine, with operation codes varying in length from 2 to several bits. The codes most frequently occurring in the executable for the compiler itself were allocated the shortest of the codes for the virtual machine. Thus the compiler executable for the virtual machine, which was like the B6700 stack oriented, was optimized to take the minimum amount of space and so could reside in the limited memory of the PDP11. Alan Causer wrote an interpreter for this code which was also used to interpret the code that the compiler produced for each student Pascal program. Thus both Fortran and Pascal were available to students on the PDP11 system during these years.