



#3

Course: Master of Mathematics (MMath)

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Digital Electronic Universal Computing Engine (Deuce)
English Electric

The DEUCE was an early British Computer manufactured by the English Electric Company almost 50 years ago. The National Physical Laboratory at Teddington, which had created the Automatic Computing Engine (ACE), worked with the English Electric Company to produce a properly engineered version of that machine with an increased storage capacity. The commercial version of the ace was named the DEUCE and the first production machine was delivered in 1955. The company went on to develop DEUCE 2 (1955) and DEUCE 2A (1957). English Electric sold over 30 DEUCE computers between 1955 and 1964.

“The DEUCE is a universal electronic digital computer capable of carrying out automatically and rapidly a sequence of arithmetical or other operations comprising a computation. In using the machine the problem to be solved is broken down into a series of elementary operations, which will be performed in the correct order by the machine. “ [1]

The DEUCE was characterised had two levels of storage. The high speed storage was a set of mercury delay lines (tubes of mercury used as a conduit for relatively slow moving sound waves). The secondary storage was a magnetic drum. Data could thus be reused as many times as was required. Mercury delay lines are often considered to be the forerunner of core memory. Input and output from the machines was in the form of the Hollerith punch cards. A typical DEUCE instruction involved a transfer of a number in one location in the store (source) to another location in the store (destination) and the address of the next instruction, such a system was known as a '3 - address code'. The memory of the Deuce had two crucially important features firstly the fact that instructions were stored in the same way as variables this opened up the possibility of performing arithmetic with the instructions themselves and secondly the indexing of memory locations, which allowed more complex calculations to be carried out more easily. The Deuce machines were applied to solve a diverse range of problems including problems in nuclear physics, predicting election results, aerodynamics and railways.

[1] <http://users.tpg.com.au/eedeuce/pm.htm>

The Deuce Programming Manual

[2] http://ed-thelen.org/comp-hist/SODA_Bell.html

English Electric, DEUCE - SODA A Translation Routine for the DEUCE Computer - R. C. Brigham and C. G. Bell

[3] <http://users.tpg.com.au/eedeuce/raeprog.htm>

D.G. Burnett-Hall and P.A. Samet , Royal Aircraft Establishment (Farnborough) (1959)

A Programming Handbook For The Computer Deuce

A magnetic drum and a delay line for the English Electric DEUCE computer are currently on display at the Museum of Science and Industry, Manchester as part of the Computers Gallery.