

The First Electronic Computer

1996 is the fiftieth anniversary of the birth of the first electronic computer. On February 14, 1946 the Electronic Numerical Integrator and Computer (ENIAC) was formally switched on at the Moore School of Electrical Engineering at the University of Pennsylvania, U.S.A. ENIAC, designed by a team headed by John W Mauchly and J Persper Eckert Jr. used 18000 vacuum tubes, weighed 30 tonnes, occupied a 10mx15m room and took 3 years to build. Its main goal was to calculate the trajectories of missiles. Precedence in designing the first electronic computer is claimed by John Atanasoff and Clifford E Berry, who in 1941 had designed and partially completed an electronic calculator which used 300 vacuum tubes to add and subtract. John Mauchly had met Atanasoff and Berry at Iowa State College in 1941 and did gain from their discussions on building ENIAC (Atanasoff's machine was not completed due to the exigencies of war). ENIAC thus became the first large electronic computer successfully used for solving important problems.

ENIAC was programmed by plugging wires on a large 1 sq.m plug board which interconnected various arithmetic circuits. Each program required a different plug board to be wired and this was a tedious job.

John von Neumann became involved with the ENIAC team in August 1944 by which time the difficulties of programming ENIAC were quite evident. Von Neumann, Eckert and Mauchly cooperated in initiating the design of a successor

to ENIAC called EDVAC (Electronic Discrete Variable Automatic Computer). In June 1945, von Neumann wrote a report titled 'First draft report on the EDVAC' in which he examined the problem of computer design logically and identified design principles which went beyond the electronic hardware problems of the day. He proposed building a *stored program computer* in which instructions and data would be stored in the same storage unit that he called *memory*, invoking neurological terminology. The idea of storing data and instructions indistinguishably in the same memory was a master stroke. This allowed one to repetitively execute a sequence of instructions with different data in each repetition leading to concise programs. By treating instructions as data, they could be altered based on previous computations thereby 'adaptively' altering a program. Over the last 50 years, advances in technology have made computers smaller, cheaper and extremely fast. At a fundamental level, however, they are all stored program computers whose architecture was originally proposed by von Neumann.

Suggested Reading

N Stern. From ENIAC to UNIVAC. Digital Press. Bedford, MA. USA. 1981.

M R Williams. A History of Computing Technology. Prentice Hall Inc. Englewood Cliffs, U.S.A., 1985.

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