

# A Note on LEO's Place in Computer Development:

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A synopsis of digital computer development during the period in which J. Lyons considered building LEO. The position of LEO in the timeline of computer development worldwide.

Some examples of a time-line for computers developed worldwide around the 1950's and their applications are.:

<https://www.computinghistory.org.uk/cgi/computing-timeline.pl>

<https://archivesit.org.uk/themes-and-topics/the-history-of-it-timeline/>

Early computing devices, some mechanical or electro-mechanical, others analogue and digital, converged on [ENIAC](#), or more broadly on the several electronic devices of a similar nature conceived and built at the time.

The U.S. military commission for ENIAC (Electronic Numerical Integrator and Computer) began on May 31, 1943. However, the machine wasn't introduced officially until November 1945, when the war had ended. ENIAC was the first programmable, electronic, general-purpose digital computer. It was Turing-complete and able to solve a large class of **numerical problems**. The military used ENIAC for a large class of numerical computations such as hydrogen bomb design, ballistics, and weather forecasting. However, ENIAC could not store programs and had to be re-configured for each job. That is, mechanical and electro-mechanical circuit changes were needed.

From ENIAC, Eckert and Mauchly started work on a new design, to be later called the [EDVAC \(Electronic Discrete Variable Automatic Computer\)](#) which would be both simpler and more powerful. The main enhancement to EDVAC design embodied the "stored-program" concept that we now call the [Von Neumann architecture](#). This was the storing of the program in the same memory as the data. Unlike ENIAC, EDVAC was binary rather than decimal.

The British computer [EDSAC \(Electronic Delay Storage Automatic Calculator\)](#) constructed by [Maurice Wilkes](#) and his team at the University of Cambridge Mathematical Laboratory in England at Cambridge (and the [Manchester Baby](#)) used this architecture. **EDSAC** was the second electronic digital stored-program computer to go into regular service. EDSAC provided general computation and practical support for mathematical and scientific calculations such as cosmic-ray investigations, thermal ignition, random-number studies, and wind tunnel design.

Maurice Wilkes was able to build upon the experience from war-time radar to develop the mercury delay-line for memory storage.

**LEO 1** followed these general principles, but was designed to process commercial and manufacturing data, and to follow the business processes of a large and complex commercial organisation. Importantly, LEO 1 embodied the "stored-program" concept.

LEO was more than a United Kingdom achievement. IBM's first experiments with computers in the 1940's and 1950's were modest advances on the card-based system. IBM's breakthrough came in the 1960's with its **System/360** family of mainframe computers. IBM introduced its first computer a

year after **Remington Rand's UNIVAC** was first delivered in 1951. The IBM 701 was introduced in 1952. In 1951 LEO I was already commissioned and running bakery applications for the Lyons business. This appears to confirm that in the field of applying digital computing to business processes for a large commercial company, LEO was then ahead of the progress in commercial and business application in the U.S., and elsewhere.



**CSIRAC** (**C**ommonwealth **S**cientific and **I**ndustrial **R**esearch **A**utomatic **C**omputer), originally known as **CSIR Mk 1**, was Australia's first digital computer, and the fifth stored program computer in the world. It is the oldest surviving **first-generation electronic computer**, and was the first in the world to play **digital music** (the **Zuse Z4** at the **Deutsches Museum** is older, but was **electro-mechanical**, not **electronic**).

In 1949, Zuse (Germany) founded Zuse KG in Haunetal-Neukirchen. In 1957, the company's head office moved to **Bad Hersfeld**. The **Z4** was finished and delivered to the ETH (Federal Institute of Technology) in Zurich, Switzerland, in 1950. At that time, it was the only working digital computer in Central Europe, and the second computer in the world to be sold or loaned, beaten only by the **BINAC**, which is reputed to have never worked properly after it was delivered. Other computers, all numbered with a leading Z, up to Z43, were built by Zuse and his company. Notable are the **Z11**, which was sold to the optics industry and to universities, and the **Z22**, the first computer with a memory based on magnetic storage.

Other developments included the MESH (Russia), BARK (Sweden), SAPO (Czechoslovakia), Odra (Poland), that were either electro-mechanical or were not delivered until late 1950's or later.

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