

# Assignment 1

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## Brief history of Integrated Circuit:

The integrated circuit, IC, or just a chip, is a series of transistors placed on a small, flat piece that is usually made of silicon. It is a type of circuit that eliminates the need for several components through the use of silicon board and soldering for electrical conduction.

German engineer Werner Jacobi filed a patent in 1949 for a semiconductor that operated similarly to the current integrated circuit we have today. Jacobi eventually created small electrical devices such as hearing aids out of his invention of an integrated-circuit-like semiconductor amplifying device.

Three years later, Geoffrey Dummer who worked for the Royal Radar Establishment as part of the Ministry of Defence in Britain proposed the first fully conceived idea for the integrated circuit. He gave many conference publicly to propagate his ideas and unsuccessfully attempted to build such a circuit in 1956. Between 1953 and 1957, Sidney Darlington and Yasuo Tarui proposed similar chip designs where several transistors could share a common active area, but there was no electrical isolation to separate them from each other.

Newly employed by Texas Instruments, Kilby recorded his initial ideas concerning the integrated circuit in July 1958, successfully demonstrating the first working example of an integrated circuit on 12 September 1958. In his patent application of 6 February 1959, Kilby described his new device as "a body of semiconductor material ... wherein all the components of the electronic circuit are completely integrated". Kilby won the 2000 Nobel Prize in physics for his part in the invention of the integrated circuit.

Half a year after Kilby, Robert Noyce at Fairchild Semiconductor invented the first true monolithic IC chip. Noyce's design was made of silicon, whereas Kilby's chip was made of germanium. Modern IC chips are based on Noyce's monolithic IC, rather than Kilby's hybrid IC.

Nearly all modern IC chips are metal–oxide–semiconductor (MOS) integrated circuits, built from MOSFETs (metal–oxide–silicon field-effect transistors). The MOSFET (also known as the MOS transistor), which was invented by Mohamed M. Atalla and Dawon Kahng at Bell Labs in 1959, made it possible to build high-density integrated circuits. The earliest experimental MOS IC to be fabricated was a 16-transistor chip built by Fred Heiman and Steven Hofstein at RCA in 1962.

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## VLSI Technology

VLSI Stands for **Very large-scale integration**. It is the process of creating an integrated circuit (IC) by combining millions or billions of MOS (metal-oxide-semiconductors) transistors onto a single chip. VLSI began in the 1970s when MOS ICs chips were widely adopted. The microprocessor and memory chips are examples of VLSI devices.

In 2008, billion-transistor processors became commercially available. This became more commonplace as semiconductor fabrication advanced from the then-current generation of 65 nm processes. Current designs, unlike the earliest devices, use extensive design automation and automated logic synthesis to lay out the transistors, enabling higher levels of complexity in the resulting logic functionality.