History of the Computer Timeline

First Generation: Vacuum Tubes (1946–1959)

The history of computers is generally divided into four periods or generations, with a fifth poised to emerge. Computer generations are defined by major technological developments that fundamentally changed the way computers operated. Most major developments have resulted in smaller, less expensive, more powerful, and more efficient computing systems. This evolution has been incredibly rapid and continues at a dramatic pace.

Second Generation: Transistors (1959–1965)

As technology continued to evolve, so did computers. Smaller electronic components were able to maintain the two states of "off" and "on," and transistors were more reliable and economical than vacuum tubes. It is interesting to note, however, that while transistors were invented in 1947, it took nearly a decade for them to find their place in computer hardware. With transistors generating less heat than the vacuum tubes previously used, overheating became less of a concern. This meant that components would last longer, and there was less risk of the system crashing.

Third Generation: Integrated Circuits (1965–1971)

The invention of integrated circuits enabled the development of computer systems that were cheaper, faster, smaller, and more reliable. Operating systems made it possible for computers to run multiple applications at the same time and to share memory and other resources. The computational time was reduced from milliseconds to nanoseconds. While integrated circuits increased computing power, they were complicated to manufacture, difficult to maintain, and required air conditioning to keep the computers cool enough to run.

Fourth Generation: Microprocessors (1971–Present)

Microprocessors include thousands of integrated circuits on a single silicon chip. This generation of computers is characterized by a significant reduction in processor size and at the same time, a significant increase in capabilities. The Intel 4004 chip, developed in 1971, included all the components of the computer on a single chip. The IBM computer for home use was available in 1981, followed by Apple's Macintosh computer in 1984. Fourth generation computers also saw the development of graphical user interfaces, the mouse, and handheld devices.

Fifth Generation: Artificial Intelligence (Future)

The fifth generation started in the early 1980s when microprocessor chips were able to accommodate tens of millions of electronic components using ultra large-scale integration (ULSI). These systems are capable of running multiple programs concurrently and are based on artificial intelligence (AI). Fifth generation computers will support the development of artificial intelligence and natural language processing while using principles of robotics, neural networks, expert systems, and natural language understanding and generation.