**BRIEF HISTORY OF THE PC**

The modern personal computer is not the brainchild of any one person – no single “Eureka!” heralded the beginning of its development. Instead its history is a tale of leaps, bounds and hold-ups stretching back five thousand years to the invention of the abacus in Mesopotamia. This brief history outlines some of the important people and events in the evolutionary passage from wooden bead-counter to multimedia workstation.

**1. The mechanical era**

In this age of microelectronics, computer components are not only powerful but also incomprehensibly small – it”s atoms, not inches, that count. But the forerunners of today”s computers were mechanical: they were made of cogs, shafts and sliders large enough to put together by hand, and were operated not by a keyboard and mouse but with dials and handles.

The earliest breakthroughs were made by the likes of Leonardo da Vinci, who designed a simple mechanical calculator in 1500, and William Oughtred, who in the early 1600s came up with the slide rule, a handheld tool for speeding up arithmetic which was still being used in schools three and a half centuries later. By the 1640s the French mathematician Blaise Pascal had invented a machine capable of multiplication and division which was later improved by Gottfried Leibnitz, the same man who is credited with having laid down the principles of binary – the number system using only 0s and 1s that is the fundamental language spoken by all modern computers. The greatest achievements of the mechanical era, though, came courtesy of the eccentric British mathematician and inventor Charles Babbage, whose inventions included the Difference Engine and the Analytical Engine of 1833. Though he died before it could be constructed, the Analytical Engine could not only cope with the complex mathematics, but it could be programmed to deal with various types of problem and make decisions based upon its own results – thus heralding the leap from calculator to “real” computer. Babbage”s partner in crime was none other than Ada Byron – aka Lady Lovelace, the daughter of the poet Lord Byron – who is now sometimes described as the first ever computer programmer.

**2. Punch cards and vacuum tubes**

It wasn’t until the end of the nineteenth century that computers actually started to prove themselves useful. Just before the 1890 census, the US government held a design contest to find an efficient way of counting the records of its exploding population. It was won by a German immigrant named Herman Hollerith, whose electric tabulating machine read data from paper punch cards, saving many years of manual counting and marking a significant point at which computing became as much to do with data management as performing calculation. Hollerith”s Computing–Tabulating–Recording Company went from strength to strength, and in 1924 it merged with a rival to form International Business Machines – IBM – which grew into one of the most significant forces in computer design.

In the meantime the vacuum tube was being developed, from which a new generation of computers was to grow. The tubes did the same job as mechanical or electrical switches, but they were capable of switching on and off thousands of times faster, facilitating a whole new level of computing speed. This technology reached its zenith in machines designed on both sides of the Atlantic during World War II. The British utilized it in their powerful code-breaking machine, Colossus, but more significant was the American ENIAC (Electronic Numerical Integrator and Computer), developed between 1943 and 1945 to calculate missile trajectories. Containing nearly 17500 vacuum tubes, ENIAC was the first multitasking computer, and it could add 5000 numbers or carry out fourteen ten-digit multiplication per second – making him about a hundred times faster than its closest rival.

While ENIAC was still being built, its designers J. Presper Eckert and John V. Mauchly joined forces with another key figure, mathematician John von Neumann, to work on a new machine. What they came up with was EDVAC, the first computer to have a stored program. This was a real breakthrough: instead of spending hours or even days turning knobs and pressing buttons to instruct a computer to carry out a particular task, the commands could be written as numerical code and stored inside the machine. This made everything much faster, but more significantly it paved the way for the programming languages of the 1950s – which in turn led to the development of modern software.

**3. Transistors and microchips**

For all its speed, ENIAC highlighted the shortcomings of vacuum tube technology: it was 150 feet wide, weighed 30 tons, produced so much heat that it regularly burnt out and guzzled electricity in such quantities that the lights in the neighbouring towns dimmed each time it was switched on. These problems were soon to be overcome with the advent of the silicon transistor, which was better that the vacuum tube at controlling the flow of electricity while being much smaller and generating considerably less heat. Transistors were invented back in 1920s, but it wasn”t until 1954 that reliable silicon models were manufactured commercially, bringing small, reliable and affordable computers a significant step closer.

The ensuing years saw the birth of the microchip or chip – a single piece of board containing many transistors. As time went by, chips became increasingly powerful and ever more tiny until 1971 a company called Intel (Integrated Electronics) released their 4004 chip, the first microprocessor. The 4004 combined 2300 transistors and all the essential elements of a computer on a single chip, and in the space of a few square inches provided roughly the same computational power as the 17500 vacuum tubes of ENIAC. These developments, combined with great advances in programming languages and other breakthroughs such as the invention of the floppy disk, made it possible to produce smaller and faster computers which were more flexible and less difficult to use.

**4. Computers get personal**

Despite all these advances, computers remained in the realm of academics, governments and big business, and it wasn”t until 1975 that a vaguely personal computer – something that individuals could actually afford to buy – came onto the market. It arrived in the form of the MITS Altair 8800, which was shipped with an Intel processor and 256 bytes of memory, around one millionth of the amount found in a decent modern PC. And it wasn”t just in the memory department that the Altair was lacking: it had neither a keyboard nor a monitor. Instructions were fed in by small switches and results displayed by a pattern of little red lights – great for discos, but not a lot else.

But this was soon to change. In 1977 Stephen Jobs and Steve Wozniak produced the Apple II, which, with its neat plastic case and video out socket (allowing you to use your TV as a monitor), was an instant success. While the Altair was primarily of interest to hobbyist and enthusiasts the Apple II was actually useful for business, and programs began to appear which could save hours of manual number – crunching – such as VisiCalc, the first ever spreadsheet program.

During this time the price of components plummeted, and various bargain computers started appearing on the market. By the end of 1970s, a variety of machines were available for a few hundred dollars – like the Radio Shack TRS – 80, which became incredibly popular in homes and schools.

**5. The PC is born**

The next big turning point came in 1981, when IBM released their Personal Computer – the IBM PC – which was the blueprint of the modern PC. Though the design was strong, it was not just the computer that made IBM”s new machine so popular: it was the company”s decision to tell the world, in near complete detail, how the PC worked and how it was built. IBM did this in the hope that other developers would produce extra pieces of hardware that will be compatible with the PC – which they did. However it soon occurred to these developers that they weren”t limited to manufacturing add-ons; they could produce their own versions of the whole machine and sell them cheaper. This was possible because IBM only held a patent for the BIOS (basic input/output system), and because most of the internal components of the PC had been bought off-the-shelf from other manufactures. Very soon computer companies everywhere where manufacturing their own copies of the IBM design: they could run all the same programs and data could easily be moved from one machine to the next. These computers were collectively known as IBM – compatible PCs, but it wasn”t long before PC became a generic term used to describe any computer based on IBM”s original.

**6. The rise of Microsoft**

When IBM designed the PC they commissioned the young Microsoft company (later Microsoft) to provide the all important operating system or OS: the underlying software that bridges the gap between a computer and the application software running on it. It was called Microsoft Disk Operating System – MS-DOS – and though it had been developed for IBM, Microsoft shrewdly retained the copyright. As PC clones began to spring up everywhere, nearly all were installed with MS-DOS, and though Microsoft”s founder Bill Gates didn”t know it at that time, this was soon to make him the world”s richest man.

As time went by, it became increasingly difficult for new types of computer to get a decent foothold in the market. Inexpensive machines like the Commodore 64 were very popular among home users, but any new system that set out to complete with the PC was faced with the problem of not being able to run all the software that had written for use with MS-DOS. Other PC operating systems were proposed by IBM and others, but they never really got off the ground or failed to gain the popularity of the Microsoft option. The MS-DOS PC still faced serious competition from established manufactures such as Apple, however, who introduced LISA and the Macintosh (the Mac) in 1983 and 1984 respectively. These were the first personal computers to use an operating system with a Graphic User Interface (GUI), meaning that the user, instead of typing encrypted instructions into the machine, could run programs and organize files by using a mouse to click on windows, icons and dropdown menus.

Soon afterwards, Microsoft released their own GUI operating system: a reworking of MS-DOS called Windows. Many of the features were very similar to those of the Apple system, and Apple promptly threatened to take Microsoft to court, claiming they had ripped of their design. In the end, Microsoft agreed to license certain elements of the Apple design to avoid court proceedings, and they managed to arrange it so that the features could be used in all future Microsoft programs. But when Windows 2.0 came out in 1987, Apple thought Microsoft had overstepped the mark and this time actually took them to court for breach of copyright. Microsoft won the case, in part because of the previous licensing deal and in part because many of the original ideas for the Apple system had originally been developed by Xerox for non – personal computers. This made it easy for Gates and Co to say, “Well, we may not have invented it, but neither did you …”

**7. And the rest is history**

As time went by, PCs and Macs held their ground as the most popular system, and Windows – after the release of version 3.0 in 1990 – became the dominant PC operating system. Machines designed for things that PCs and Macs didn”t do very well continued to enjoy success: the Atari ST and Commodore Amiga, for example, were popular for gaming until the early 1990s. But with the rise of specific gaming stations such as those made by Nintendo and the ever increasing versatility of the PC, computers such as these started falling by the wayside, leaving a two-horse contest between Windows-driven PCs and Macs.

And for the time being this situation seems unlikely to change. Once a company or user has data and programs for one platform, switching to another can be a major – and potentially expensive – upheaval. Perhaps the next big shift will be a move towards free software. A considerable number of people have already turned to Linux: they can get an operating system and an ever-growing selection of high-quality applications that are both free and legal.

As for the future of hardware, the tendency for ever-faster machines in ever-smaller boxes seems unlikely to lose pace. Who knows – a few years down the line the latest edition of this book may be sold as a thumbnail-size data chip to slip into your computer. We”ll just have to wait and see …