

2.4_Closure

By the early 1970s, the computer was becoming an important tool in business.	Banks began to use large mainframe computers to automate some of their accounting and financial transactions. Airlines began to computerize their flight-booking and ticketing services. Computers were also used in the public switched telephone network (PSTN), which made it possible for people to make national and international phone calls. Digital switches replaced physical switches in many telephone systems. Much of this growth in computing was made possible by the increased availability of integrated circuits (ICs), which combined many different components on a block of silicon. These made computers smaller, cheaper and more reliable. Microchips also made the development of products such as portable electronic calculators possible. As companies such as Texas Instruments and Hewlett-Packard competed to introduce new models of calculators using more powerful microchips, the cost of the chips decreased rapidly.
The growing availability of relatively cheap ICs on the market from the early 1970s onward meant that it was possible to build cheap microcomputers.	The Apple I was the best example of these. It had many of the features of modern computers for a relatively low price. Unlike many other microcomputers in 1977, it could use a keyboard for input and had video output. It could also store and load programs. When the first spreadsheet program, VisiCalc, was made available on the Apple II in 1979, companies bought the computer in record numbers to computerise their accounting processes. By 1981, IBM recognized the demand for business microcomputers and introduced the IBM Personal Computer. Because of the need for speed, IBM used hardware and software from external suppliers. For example, the processor was an 8086 type processor from Intel and its operating system was licensed from a small company called Microsoft. The PC was very successful for IBM, but their decision to use external suppliers meant that other companies could also build computers with the same design. The PC design, using Intel chips and running Microsoft software became a standard for business and home computing and, over time, it became the most common type of microcomputer. Microsoft developed a range of business application software, such as Excel and Word, which ran on PCs and Apple computers and which established it as the most valuable software company in the world.

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By the end of the 1980s, national and international links between mainframe computers for banking, airline booking and phone connections were becoming common.	Links between microcomputers at local level – Local Area Networks (LANs) – were reasonably common, allowing companies to share files and peripherals, such as printers. However, it was difficult for microcomputers to communicate over long distances as part of Wide Area Networks (WANs). The national and international networks used by mainframes used many different network protocols. During the late 1980s and early 1990s, there was a lot of debate about which protocols would provide the best WANs. By the middle of the 1990s, TCP/IP (Transfer Control Protocol/Internet Protocol) emerged as the standard internet protocols which would be used. Around the same time, the World Wide Web (WWW) was developed. This used a protocol called HTTP (the hypertext transfer protocol) to link different pages together. As the world wide web of information grew, computer users could easily access information held on computers around the world. Google, a search engine which allowed users to search for information across this world wide network of linked computers, was another development. Because it used new techniques for searching which provided very accurate results, it was able to become the most widely used search engine in the English-speaking world.
While mainframes had supported the public switched telephone network (PSTN) since the 1970s, it was only in the late 1990s that mobile computing began to become an everyday presence in peoples' lives.	Initially, mobile phones could make and receive voice calls and send and receive texts. Over time, they began to have more functions, such as taking pictures and accessing a version of the internet. However, they were generally very limited. In January 2007, Apple launched the iPhone. This was a revolution in mobile and personal computing. It had an extremely simple user interface which used newly developed hardware and software. It allowed users to create, view and share text, audio and video, not only from one phone to another, but to anybody who had access to the internet. Other companies, such as Samsung, copied the design of the phone, and the Android operating system was developed to run these phones. These smartphones became smaller, more powerful and cheaper, making them very affordable and widely used. Between the early 1970s and the early 2020s, personal computing had moved from the dream of a computer in every home to the reality of small, high-powered devices that people carry in their pocket and use many times a day.