Computing: More Recent Developments

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The “first generation” of electronic digital computers spanned the 1950s. These computers stored their programs internally, and initially used vacuum tubes as their switching technology. However, such tubes were bulky, hot, and unreliable, and were gradually replaced by transistors.

Since then, computers have developed at an ever-accelerating pace, with a massive increase in speed and power and a corresponding decrease in size and cost. The late

1950s saw the development of printed circuit boards on which thin strips of copper were “printed,” connecting the transistors and other electronic components. This led to the all-important introduction of the **integrated circuit**, an assembly of thousands of transistors, resistors, capacitors, and other devices, all interconnected electronically and packaged as a single functional item.

In the second half of the 1970s, the first personal computers became available, for use in the home and office. Communications were also transformed with the introduction of electronic mail; the Thailand stamp portrays King Bhumibol checking his **e-mail**. The invention of the **world wide web** by **Tim Berners-Lee** in the early 1990s enabled all types of information from around the world to become easily accessible.

In recent years, **computer art** has also developed rapidly, and in 1970, the Netherlands produced the first set of computer-generated stamp designs; the stamps show an isometric projection in which the circles expand and become transformed into squares, and a design called “overlapping scales.” The computer drawing of a head is a graphic from the 1981 computer-animated film *Dilemma*.

Integrated circuit

e-mail

Tim Berners-Lee

World wide web

Computer art

Computer art

Computer art

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