Computing: Early Days

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The central figure of nineteenth-century computing was **Charles Babbage** (1791–1871), who pioneered the modern computer age with his “difference engine” and “analytical engine.” The former, a digital machine conceived in the 1820s, was a complex arrangement of gears and levers designed to mechanize the calculation of

mathematical tables and print the results. Never built during his lifetime, a full-scale working version was constructed from his detailed drawings in 1991. It resides in the Science Museum in London.

Babbage’s analytical engine can be regarded as the forerunner of the modern programmable computer. Designed to be run by steam power, it contained a store (or memory) and was to be programmed by means of punched cards with holes in specific locations to convey information. Babbage got the idea of using punched cards from the “Jacquard loom,” invented by **Joseph Marie Jacquard** (1752–1834) to mechanize the weaving of complicated patterns.

Data processing with **punched cards** was developed by Herman Hollerith (1860–1929) for the United States population census of 1890. **Punched paper tape** based on the binary system was used in telegraph systems. Both punch cards and paper tape were in widespread use for many years for computer input and output.

Charles Babbage

Charles Babbage

Binary system

Joseph Marie Jacquard

Punched card

Punched paper tape

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