

Started in 1997, it consists of a collection of kernels organized into suites that address different portions of the embedded industry. They announced the second generation of these benchmarks in 2007.

A Half-Century of Progress

Since 1951, there have been thousands of new computers using a wide range of technologies and having widely varying capabilities. Figure 1.10.7 summarizes the key characteristics of some machines mentioned in this section and shows the dramatic changes that have occurred in just over 50 years. After adjusting for inflation, price/performance has improved by almost 100 billion in 55 years, or about 58% per year. Another way to say it is we've seen a factor of 10,000 improvement in cost and a factor of 10,000,000 improvement in performance.

Year	Name	Size (cu. ft.)	Power (watts)	Performance (adds/sec)	Memory (KB)	Price	Price/performance vs. UNIVAC	Adjusted price (2007 \$)	Adjusted price/performance vs. UNIVAC
1951	UNIVAC I	1,000	125,000	2,000	48	\$1,000,000	1	\$7,670,724	1
1964	IBM S/360 model 50	60	10,000	500,000	64	\$1,000,000	263	\$6,018,798	319
1965	PDP-8	8	500	330,000	4	\$16,000	10,855	\$94,685	13,367
1976	Cray-1	58	60,000	166,000,000	32,000	\$4,000,000	21,842	\$13,509,798	47,127
1981	IBM PC	1	150	240,000	256	\$3,000	42,105	\$6,859	134,208
1991	HP 9000/ model 750	2	500	50,000,000	16,384	\$7,400	3,556,188	\$11,807	16,241,889
1996	Intel PPro PC (200 MHz)	2	500	400,000,000	16,384	\$4,400	47,846,890	\$6,211	247,021,234
2003	Intel Pentium 4 PC (3.0 GHz)	2	500	6,000,000,000	262,144	\$1,600	1,875,000,000	\$2,009	11,451,750,000
2007	AMD Barcelona PC (2.5 GHz)	2	250	20,000,000,000	2,097,152	\$800	12,500,000,000	\$800	95,884,051,042

FIGURE 1.10.7 Characteristics of key commercial computers since 1950, in actual dollars and in 2007 dollars adjusted for inflation. The last row assumes we can fully utilize the potential performance of the four cores in Barcelona. In contrast to Figure 1.10.3, here the price of the IBM S/360 model 50 includes I/O devices. (Source: The Computer History Museum and Producer Price Index for Industrial Commodities.)

Readers interested in computer history should consult *Annals of the History of Computing*, a journal devoted to the history of computing. Several books describing the early days of computing have also appeared, many written by the pioneers including Goldstine [1972]; Metropolis, Howlett, and Rota [1980]; and Wilkes [1985].