

Table 4.3 Cache Sizes of Some Processors

Processor	Type	Year of Introduction	L1 cache^a	L2 cache	L3 cache
IBM 360/85	Mainframe	1968	16 to 32 KB	—	—
PDP-11/70	Minicomputer	1975	1 KB	—	—
VAX 11/780	Minicomputer	1978	16 KB	—	—
IBM 3033	Mainframe	1978	64 KB	—	—
IBM 3090	Mainframe	1985	128 to 256 KB	—	—
Intel 80486	PC	1989	8 KB	—	—
Pentium	PC	1993	8 KB/8 KB	256 to 512 KB	—
PowerPC 601	PC	1993	32 KB	—	—
PowerPC 620	PC	1996	32 KB/32 KB	—	—
PowerPC G4	PC/server	1999	32 KB/32 KB	256 KB to 1 MB	2 MB
IBM S/390 G4	Mainframe	1997	32 KB	256 KB	2 MB
IBM S/390 G6	Mainframe	1999	256 KB	8 MB	—
Pentium 4	PC/server	2000	8 KB/8 KB	256 KB	—
IBM SP	High-end server/ supercomputer	2000	64 KB/32 KB	8 MB	—
CRAY MTA ^b	Supercomputer	2000	8 KB	2 MB	—
Itanium	PC/server	2001	16 KB/16 KB	96 KB	4 MB
SGI Origin 2001	High-end server	2001	32 KB/32 KB	4 MB	—
Itanium 2	PC/server	2002	32 KB	256 KB	6 MB
IBM POWER5	High-end server	2003	64 KB	1.9 MB	36 MB
CRAY XD-1	Supercomputer	2004	64 KB/64 KB	1MB	—

^a Two values separated by a slash refer to instruction and data caches

^b Both caches are instruction only; no data caches

Table 4.7 Characteristics of Two-Level Memories

	Main Memory Cache	Virtual Memory (Paging)	Disk Cache
Typical access time ratios	5 : 1	10^6 : 1	10^6 : 1
Memory management system	Implemented by special hardware	Combination of hardware and system software	System software
Typical block size	4 to 128 bytes	64 to 4096 bytes	64 to 4096 bytes
Access of processor to second level	Direct access	Indirect access	Indirect access

Table 4.8 Relative Dynamic Frequency of High-Level Language Operations

Study	[HUCK83]	[KNUT71]	[PATT82a]		[TANE78]
Language	Pascal	FORTRAN	Pascal	C	SAL
Workload	Scientific	Student	System	System	System
Assign	74	67	45	38	42
Loop	4	3	5	3	4
Call	1	3	15	12	12
IF	20	11	29	43	36
GOTO	2	9	—	3	—
Other	—	7	6	1	6