Table 8.2   Example Page Sizes

Computer	Page Size
Atlas	512 48-bit words
Honeywell-Multics	1024 36-bit word
IBM 370/XA and 370/ESA	4 Kbytes
VAX family	512 bytes
IBM AS/400	512 bytes
DEC Alpha	8 Kbytes
MIPS	4 kbyes to 16 Mbytes
UltraSPARC	8 Kbytes to 4 Mbytes
Pentium	4 Kbytes or 4 Mbytes
PowerPc	4 Kbytes
Itanium	4 Kbytes to 256 Mbytes

Table 8.3   Operating System Policies for Virtual Memory

Fetch Policy
   Demand
   Prepaging
 	
Placement Policy
 	
Replacement Policy
   Basic Algorithms
      Optimal
      Least recently used (LRU)
      First-in-first-out (FIFO)
      Clock
      Page buffering
	Resident Set Management
	   Resident set size
	      Fixed
	      Variable
	   Replacement Scope
	      Global
	      Local
	
	Cleaning Policy
	   Demand
	   Precleaning
	
	Load Control
	      Degree of multiprogramming

Table 8.4 Resident Set Management

	Local Replacement	Global Replacement
Fixed Allocation	•Number of frames allocated to process is fixed. •Page to be replaced is chosen from among the frames allocated to that process.	•Not possible.
Variable Allocation	•The number of frames allocated to a process may be changed from time to time, to maintain the working set of the process. •Page to be replaced is chosen from among the frames allocated to that process.	•Page to be replaced is chosen from all available frames in main memory; this causes the size of the resident set of processes to vary.

Table 8.5 UNIX SVR4 Memory Management Parameters (page 1 of 2)

Page Table Entry

Page frame number
Refers to frame in real memory.

Age

Indicates how long the page has been in memory without being referenced. The length and contents of this field are processor dependent.

Copy on write
Set when more than one process shares a page. If one of the processes writes into the page, a separate copy of the page must first be made for all other processes that share the page. This feature allows the copy operation to be deferred until necessary and avoided in cases where it turns out not to be necessary.

Modify
Indicates page has been modified.

Reference
Indicates page has been referenced. This bit is set to zero when the page is first loaded and may be periodically reset by the page replacement algorithm.

Valid
Indicates page is in main memory.

Protect
Indicates whether write operation is allowed.

Disk Block Descriptor

Swap device number
Logical device number of the secondary device that holds the corresponding page. This allows more than one device to be used for swapping.

Device block number
Block location of page on swap device.

Type of storage
Storage may be swap unit or executable file. In the latter case, there is an indication as to whether the virtual memory to be allocated should be cleared first.

Table 8.5   UNIX SVR4 Memory Management Parameters (page 2 of 2)

Page Frame Data Table Entry

Page State
>   Indicates whether this frame is available or has an associated page. In the latter case, the status of the page is specified: on swap device, in executable file, or DMA in progress.

Reference count
>   Number of processes that reference the page.

Logical device
>   Logical device that contains a copy of the page.

Block number
>   Block location of the page copy on the logical device.

Pfdata pointer
>   Pointer to other pfdata table entries on a list of free pages and on a hash queue of pages.

Swap-use Table Entry

Reference count
>   Number of page table entries that point to a page on the swap device.

Page/storage unit number
>   Page identifier on storage unit.

Table 8.6 Average Search Length for one of N items in a Table of Length M

Technique	Search Length
Direct	1
Sequential	$\dfrac{M+1}{2}$
Binary	$\log_2 M$
Linear hashing	$\dfrac{2 - N/M}{2 - 2N/M}$
Hash (overflow with chaining)	$1 + \dfrac{N-1}{2M}$