



10.1 Introduction

• Virtual memory

- Solves problem of limited memory space
- Creates the illusion that more memory exists than is available in system
- Two types of addresses in virtual memory systems
 - Virtual addresses
 - Referenced by processes
 - Physical addresses
 - Describes locations in main memory
- Memory management unit (MMU)
 - · Translates virtual addresses to physical address

◀ ▶

© 2004 Deitel & Associates, Inc. All rights reserved.

Real	Real			Virtual		
user dedicated systems	Real memory multiprogramming systems			Virtual memory multiprogramming systems		
	Fixed-partition multi- programming Absolute Re- locatable		Variable-partition multi- programming	Pure paging	Pure segmentation	Combined paging and segmentatior



















$d \qquad \qquad v = (b, d)$	$d \qquad \qquad v = (b, d)$







T	Page number	Displacement	Virtual address
	Page number	Displacement d	Virtual address $v = (p, d)$













































Figu	10.5 re 10.20 Virtual addre	Segmenta	ation re segmentation system.	
	Segment number s	Displacement d	Virtual address v = (s, d)	
© 2004 Deitel & Associates,	Inc. All rights reserved.			



















Type of access	Abbreviation	Pescription
Read	R	This segment may be read.
Write	W	This segment may be modified.
Execute	E	This segment may be executed.
Append	А	This segment may have information added to its end

re 10 26 Combining read, write and execute access to yield useful access co						
ire 10.2	6 Comp	ining rea	id, write an	d execute acces modes.	s to yield useful access co	
Mode	Read	Write	Execute	Pescription	Application	
Mode 0	No	No	No	No access permitted	Security.	
Mode 1	No	No	Yes	Execute only	A segment made available to processes that cannot modify it or copy it, but that can run it.	
Mode 2	No	Yes	No	Write only)	These possibilities are not	
Mode 3	No	Yes	Yes	Write/execute but cannot be read	useful, because granting write access without read access is impractical.	
Mode 4	Yes	No	No	Read only	Information retrieval.	
Mode 5	Yes	No	Yes	Read/execute	A program can be copied o executed but cannot be modified.	
Mode 6	Yes	Yes	No	Read/write but no execution	Protects data from an errone ous attempt to execute it.	
Mode 7	Yes	Yes	Yes	Unrestricted	This access is granted to trusted users.	



















