I/O Systems

Reading: OS Concepts: Chapters 13 & 14

Contents

- Methods

- Methods

- Implementation

- Scheduling

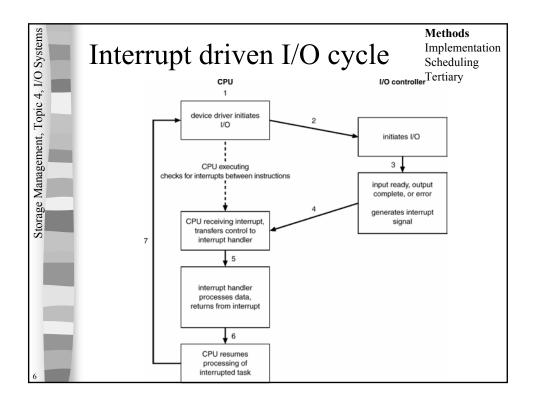
- Tertiary

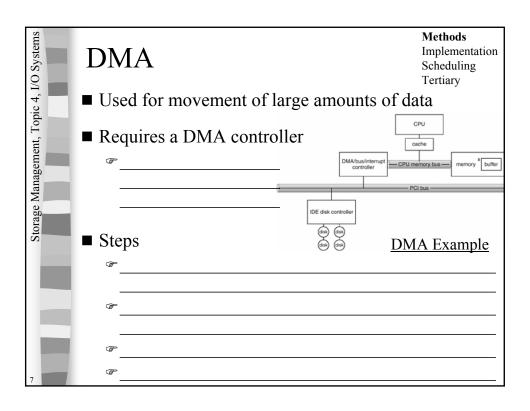
Storage Management, Topic 4, I/O Systems	Device I/O methods	Methods Implementation Scheduling Tertiary
ic 4,	■ Interfaces to devices:	
Top	Ports:	
nent,		
lagen	☞ Interrupts:	
Mar	☞ DMA:	
rage		
Sto	■ Methods of communication:	
_	Two-way communication:	
	Polling:	
	☞ Interrupts:	
	@ DMA:	
2		

Storage Management, Topic 4, I/O Systems	Ports	Methods Implementation Scheduling Tertiary
Fopic 4,	■ Two way communication	
gement, T	₽	
ge Manaş		
Stora		
		Port Example
3		

SU				Methods
sten		Ţ	Polling	Implementation
Sy		1	Offing	Scheduling
, I/C			Control & Status registers are memory ma	Tertiary
ic 4		Г.	Control & Status registers are memory ma	ippcu
, Top		1.	Busy waiting:	
nent,			<i>e</i>	
negı	_			
Storage Management, Topic 4, I/O Systems		2.	Issuing a Command:	
age]			©	
Stora				
п		3.	Action by the Controller:	
			·	
				
			Polling Example Memory Mappin	ng Example
4				

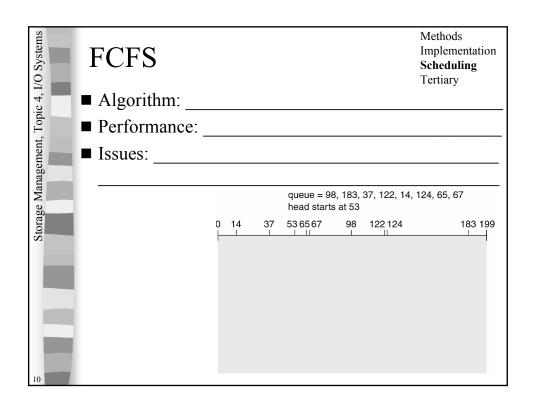
Storage Management, Topic 4, I/O Systems		I	nterrupts	Methods Implementation Scheduling Tertiary
pic 4, I/		1.	CPU interrupt request line triggered by I/	-
ent, To		2.	Interrupt handler:	
nagem				
ige Ma	3		₽	
Stora	•	3.	Handler:	
ı	×			
F			Interru	ıpt Examples
5				





Storage Management, Topic 4, I/O Systems	Performance	Methods Implementation Scheduling Tertiary
oic 4,]	■ Issues & Improvements	
nt, Toj	Reduce Context switches:	
ageme	Reduce Data Copying:	
ge Man	Reduce Interrupts:	
Storag	☞Use DMA:	
	Balance	
8		

Storage Management, Topic 4, I/O Systems	Disk Scheduling	Methods Implementation Scheduling Tertiary
ic 4,	■ Access time has two major components:	
Top	Seek time:	
nent,	Rotational latency:	
ge Manager	■ For Disk Drives Efficiency means	
Stora	■ Algorithms FCFS, SSTF, SCAN, C-SCAN, C-LOOK	
Ē	■ Example • 0-199 • 53 • 98, 183, 37, 122, 14, 124, 65, 67	



I/O Systems	SSTF					Method Implem Schedu Tertiar	nentation
ic 4,	■ Algorithm:				 		
, Top	■ Performance:				 		
ment	■ Issues:						
= Storage Management, Topic 4, I/O Systems		0 14	37	head starts	37, 122, 14, 122,124	, 124, 65, (183 199

, I/O Systems	SCAN						Method Implem Schedu Tertiary	entation ling
Storage Management, Topic 4, I/O Systems	■ Algorithm: ■ Performance: _ ■ Issues:			queue = 98,		37, 122, 14,	124, 65, 6	67
Storage		0 14	37	head starts	98 98	122 124		183 199

I/O Systems	C-SCAN		Methods Implementation Scheduling Tertiary
c 4, 1	■ Algorithm:		
Topi	■ Performance:		
ment,	■ Issues:		
E Storage Management, Topic 4, I/O Systems		queue = 98, 183, 37, 122, 14 head starts at 53 0 14 37 53 65 67 98 122 124	, 124, 65, 67 183 199ı

Storage Management, Topic 4, I/O Systems	C-LOOK			Methods Implementation Scheduling Tertiary
Topic 4, I	Algorithm:			
nent,	■ Performance:			
anagen	■ Issues:			
age Ma			queue = 98, 183, 37, 122, head starts at 53	14, 124, 65, 67
Stor		0 14 37	53 65 67 98 122 124	183 199
14				

Storage Management, Topic 4, I/O Systems	Which Algorithm?	Methods Implementation Scheduling Tertiary
ic 4, I/	■ Considerations	y
, Top	*	
ment	₽	
anage		
Storage Ma	■ Common choices for default algorithm	
	₽	
15		

Storage Management, Topic 4, I/O Systems	Tertiary Storage Characteristics	Methods Implementation Scheduling Tertiary
opic	&	
nt, To	P	
geme	P	
Manag	■ Broad Classes of tertiary storage:	
age l	Magnetic Disks:	
Stor	☞ Optical Disks:	
	Tapes:	
	■ Main Issues:	
	☞ Speed:	
	© Cost:	
	☞ Reliability:	
16	© Capacity:	

Storage Management, Topic 4, I/O Systems	Magnetic Disks	Methods Implementation Scheduling Tertiary
ic 4,	■ Floppy Disks (3.5")	
Top	☞ Speed:	
nent,	© Cost:	
nager	Capacity:	
Mar	Reliability:	
Storage	■ ZIP Drives	
	Speed:	
	© Cost:	
	Capacity:	
	© Reliability:	
	■ Others	
17		

Storage Management, Topic 4, I/O Systems	Optical Disks	Methods Implementation Scheduling
0/1	_	Tertiary
, 4 J	■ CD-ROM, CD-R, CD-RW	
Topi	Speed:	
nent,	Cost:	
agen	Capacity:	
Man	PReliability:	
rage		
Sto	■ DVD	
	Speed:	
	© Cost:	
	© Capacity:	
	☞ Reliability:	
	-	
18		

I/O Systems	Tapes	Methods Implementation Scheduling Tertiary
Storage Management, Topic 4, I/O Systems	■ Tapes	
	FSpeed:	
	© Cost:	
	© Capacity:	
	Reliability:	
	■ Operations	
	Read & Write	
	*Locate:	
	Read position:	
	FSpace:	
	FEOT mark	
19		

