• Chap.10: 10.21, 10.24, 10.37 • Chap.11: 11.13, 11.17, 11.21 • Chap.14: 14.14, 14.15

10.21 Assume that we have a demand-paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty frame is available or if the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory-access time is 100 nanoseconds.

Assume that the page to be replaced is modified 70 percent of the time. What is the maximum acceptable page-fault rate for an effective access time of more than 200 nanoseconds?

oms for page fault

Memory access 100 ns

FAT SUDOns 令EAT的patter (所求) not modify or empty modify

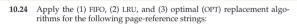
(1-p)x Memont occess+ P

x (page fault

page out

page in)

ANG page tault $0.3 \times 8 + 0.7 \times 20$ $= 2.4 + 14 =)16.4 \text{ m/s} 16.4 \times 10^6 \text{ n/s}$ $(1-p) \times 100 + 1.64 \times 10^7 \text{ p} \leq 200$ $100 - 100p + 1.64 \times 10^7 \text{ p} \leq 200$ $p \leq \frac{100}{16399900} \approx 6.1 \times 10^{-6} \text{ p}$



- 2,6,9,2,4,2,1,7,3,0,5,2,1,2,9,5,7,3,8,5
- -0,6,3,0,2,6,3,5,2,4,1,3,0,6,1,4,2,3,5,7
- 3,1,4,2,5,4,1,3,5,2,0,1,1,0,2,3,4,5,0,1
- 4,2,1,7,9,8,3,5,2,6,8,1,0,7,2,4,1,3,5,8
- 0.1.2.3.4.4.3.2.1.0.0.1.2.3.4.4.3.2.1.0

Indicate the number of page faults for each algorithm assuming demand paging with three frames.

anot m簡報

13 faults 一类科技的原因。

10.37 What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?

Thrashing原因 → page fault喜致 Page Replacement 太常發生。

Cause of thrashing: O任 CPU利用率 Detect thrashing: ②復熟 process 后

②慎測 process 白 Page fault rate 病國一定門標二) Thrushing

Eliminote the problem: O Working Set Model 根據 locality 分配 frames

學例與音樂

D Poge-fault Frequency. 根據 fault 狀況論整frame

3 Swap out Processes 暫停 Process 釋放記憶體 11.13 Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1,805. The queue of pending requests, in FIFO order, is:

2,069; 1,212; 2,296; 2,800; 544; 1,618; 356; 1,523; 4,965; 3,681

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

a. FCFS

b. SCAN

c. C-SCAN

b SCAN

$$2150 \rightarrow 2296 \rightarrow 2800 \rightarrow 3681 \rightarrow 4965 \rightarrow 4999 \rightarrow 1618 \rightarrow 1523 \rightarrow 1212 \rightarrow 544 \rightarrow 356$$
 $146+504+88)+1284+3++338+957311+$

C. C-SCAN 2150+2296-72800-13681-14965-14999-356-1544-1 1212-71523-1618-72069

146+504+881+1284+34+4999+356+188+668+311+

97+45 =9917

Describe some advantages and disadvantages of using NVM devices as a caching tier and as a disk-drive replacement compared with using only HDDs.

NVM ART HDD

優:善達、耗電更低、更耐用(無機構元件)

缺:貴、有讀宮限制

- Compare the throughput achieved by a RAID level 5 organization with that achieved by a RAID level 1 organization for the following:
 - Read operations on single blocks
 - Read operations on multiple contiguous blocks

RAID 1較 RAID 5 大、快车, 党下较快的 b. RAID 5較 RAID 4大、快 以兩顆硬碟為例,RAID工只依靠一顆硬碟去 處理所有block 的複取。 RAID 5可以将要讀取的 block分在2颗硬炭上, 添工量大。

- 4.14 Consider a file system on a disk that has both logical and physical block sizes of 512 bytes. Assume that the information about each file is already in memory. For each of the three allocation strategies (contiguous, linked, and indexed), answer these questions:
 - a. How is the logical-to-physical address mapping accomplished in this system? (For the indexed allocation, assume that a file is always less than 512 blocks long.)
 - b. If we are currently at logical block 10 (the last block accessed was block 10) and want to access logical block 4, how many physical blocks must be read from the disk?

X:分割後裔 Y:分割後餘 Z:Abbress 走B點

(a) Contiguous

将 address = Z+X×512+Y

Winked

address 以与11分割

(a) Indexed 与以分割

X是飞热气是偏移量

对 whome the state

(6) 人,直接管即可

(1) 5世鬼 (0-11-) 2->3->4)

2需走到X+1塊找YABaddress。 (b) 2次

(存 Index block -次) 對應 block-次 14.15 Consider a file system that uses inodes to represent files. Disk blocks are 8 KB in size, and a pointer to a disk block requires 4 bytes. This file system has 12 direct disk blocks, as well as single, double, and triple indirect disk blocks. What is the maximum size of a file that can be stored in this file system?

8KB/4bytes => 2048個指標 12× 8= 96KB single 2048×8KB=16384KB > 16MB 20482 ×8KB=33554432KB ~326B Triple 20483 x 8KB = 68719476 736KB ~ BYTB total 64 TB+ 32GB+ 16384KB+96KB 64 03TB