Branch : CSE & IT Batch : Hinglish

Subject : OPERATING SYSTEMS

Topic : File systems & Device Management

DPP 01

[MCQ]

1. Context of file is stored /saved in _____.
(a) File control Block
(b) Process control block
(c) Both (a) & (b)
(d) None of the above.

[MCQ]

2. Which among these schemes are frequently used to manage disk free space?
(a) Linked list and bit vector
(b) bit vector and FIFO
(c) Linked list and Hash
(d) None of the above.

[MCQ]

3. Which procedure among the given below has the worst support for writing and reading files with a random-access pattern?
(a) FAT (b) Indexed
(c) Linked List (d) Contiguous

[MCQ]

4. Which among the given policy suffers from internal fragmentation?
(a) indexed (b) FAT
(c) Linked (c) All of the above.

[MSQ]

5. Choose the correct statements from following
(a) A record is a collection of related fields that can be treated as a unit by some application program.
(b) A file is a collection of similar records.
(c) A database is a collection of non-related data.
(d) A field is the basic element of data.

[MCQ]

6. Each Inode in a file system has 6 direct pointers to disk blocks, 4 single-indirect pointers to disk blocks, 3 double-indirect pointers to disk blocks and nothing else. A disk block is 500 bytes, and a pointer to disk block is of 10 bytes. The entire disk consists 17,000,000 bytes at most. Calculate the maximum size [in byte] of a file in this file system.
(a) 3850000 (b) 3853400
(c) 3853200 (d) 3853000

[MCQ]

7. In a UNIX OS, each data block is of 512 bits, each node has 5 direct data block addresses and three additional addresses. One for single indirect block, one is for double indirect block and one is for triple indirect block. Each block is addressed with 128-bit. Calculate the total size of a file possible in the file system (in k-bits).
(a) 81.91 to 81.92 (b) 82.91 to 82.92
(c) 80.91 to 80.92 (c) None of these

Answer Key

1. **(a)**
2. **(a)**
3. **(c)**
4. **(d)**
5. **(a, b, d)**
6. **(d)**
7. **(a)**

Hints & Solutions

1. (a)
File attributes like id, name, type, size, owner, data and time stamps etc., are stored in file control block.

2. (a)
Linked list and bit vectors are the two schemes which are frequently used to manage disk free space.

3. (c)
In linked procedure, each file is treated as a linked list of disk blocks. In this we need to traverse each block, if the pointer in this procedure breaks in linked list, then the file gets corrupted.

4. (d)
Internal fragmentation occurs in those policies which uses fixed size allocation unit and a process is allocated more memory than required.

5. (a, b, d)
A data base is a collection of related data.

6. (d)
Each pointer is 10 bytes, so each disk block can contain

$\frac{500}{10} = 50$ pointers

An Inode can reference 5 blocks directly and each single indirect pointer references a block which have 50 pointers.

So, a total of 200 blocks can be referenced by 4 single indirect pointers.

similarly, each double-indirect pointer references a block of 50 pointers, so each of them again reference a block of 50 pointers, means 2500 blocks in total. So, for 3 double-indirect pointers, a total of 7500 blocks referenced by them.

Total: 6 + 200 + 7500 = 7706

which mean, 7706 × 500 = 3853000

7. (a)
Total file size =

$$\left[\text{Direct DBA} + \text{No. of single indirect pointers}\left(\frac{\text{Data Block size}}{\text{DBA}}\right) + \text{No.of double indirect pointer}\left(\frac{\text{Data block size}}{\text{DBA}}\right)^2 + \text{No. of triple indirect pointer}\left(\frac{\text{Data Block Size}}{\text{DBA}}\right)^3 \times\right] \text{Data Block Size}$$

Data block Size = 512 bits

$\left(\frac{\text{Data Block Size}}{\text{DBA}}\right)$ = No. of disk block address stored inside one block.

Maximum file size

$= [5 + 1(5) + 1(5)^2 + 1(5)^3] \times 512$

$= [5 + 5 + 25 + 125] \times 512$

$= 81920 \approx 81\text{K bits}$

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