

PRACTICE EXAM

Difficulty: MEDIUM

Questions: 10

Operating Systems: File Systems Exam

Instructions:

Please answer all questions to the best of your ability. Read each question carefully and provide your answer in the space provided.

Section 1: Multiple Choice Questions (4 points each, 40 points total)

Instructions: Choose the single best answer for each question.

Question 1: Which of the following is NOT a typical directory operation?

- A) Create
- B) Rename
- C) Execute
- D) Unlink

Question 2: In a single-level directory system, what is a major limitation?

- A) Difficulty in implementing file sharing.
- B) Inability to group related files together.
- C) Slower file access times compared to hierarchical systems.
- D) Increased disk fragmentation.

Question 3: Which file implementation method suffers from external fragmentation?

- A) Linked List Allocation
- B) I-nodes
- C) Contiguous Allocation
- D) Linked List - Table in Memory

Question 4: What is the primary function of an i-node?

- A) To store the content of a file directly.
- B) To map file names to directory entries.
- C) To store metadata about a file, such as permissions and disk block locations.
- D) To manage free disk space.

Question 5: A file system that uses linked list allocation with a table in memory is also known as:

- A) Virtual allocation table
- B) File allocation table (FAT)

- C) Index allocation table
- D) Directory allocation table

Section 2: Short Answer Questions (6 points each, 30 points total)

Instructions: Answer each question in 2-3 complete sentences.

Question 6: Explain the key difference between a single-level directory system and a hierarchical directory system.

Question 7: Briefly describe how the "link" directory operation facilitates file sharing.

Question 8: What are two advantages of contiguous file allocation?

Section 3: Problem-Solving Questions (10 points each, 30 points total)

Instructions: Provide a detailed response to each question, demonstrating your understanding of the concepts.

Question 9: Consider a hierarchical file system. Describe the steps involved in resolving the absolute path `/home/user/documents/report.txt`. Relate your answer to how the operating system traverses directories.

Question 10: Suppose a file system uses contiguous allocation. The disk has 1000 blocks, and file metadata indicates that file 'X' starts at block 100 and is 20 blocks long. After file 'X' is deleted, a new file 'Y' needs to be stored. Explain how the system determines if there is sufficient contiguous space to store file 'Y', assuming file 'Y' is 30 blocks long. Also, describe what happens if another file 'Z' needs to be saved that is 15 blocks long.