New York University

CSCI-UA.0202-003: Operating Systems (Undergrad): Fall 2025

Quiz 7

- Write your full name on both:
  - the bubble sheet in the "Name" field
  - the quiz booklet
- Write your NYU NetID on the quiz booklet and the bubble sheet in the "ID" field
- Use a #2 pencil to fill in your answers on the bubble sheet (preferred, but you can also use a pen)
- This quiz contains 6 questions only. Each question has choices from A to D
- Fill the bubbles completely by darkening the entire circle, as shown in the example
- Only mark answers for questions 1-6. Do not mark any bubbles beyond question 6
- Choose only one answer per question
- Submit your bubble sheet **together with your quiz booklet**

Name:

NetId:

1. A common observation in file systems is that most files are small, yet most of the disk space is consumed by large files. How does the Unix inode structure accommodate this?
   (A) It stores all small files in a contiguous array and large files in a linked list.
   (B) It compresses all small files but leaves large files uncompressed.
   (C) It requires small files to be padded to the size of a large block.
   (D) It uses an imbalanced tree with direct pointers for small files and indirect pointers for large files.

2. Which of the following critical pieces of metadata is not stored directly inside a file's inode?
   (A) The file's name
   (B) The file's permissions
   (C) The file's size
   (D) The count of hard links

3. What is the correct relationship between "sectors" and "blocks"?
   (A) A sector is the logical allocation unit for the FS; a block is the physical unit on disk.
   (B) A sector is the smallest unit addressable by the disk hardware; a block is the logical allocation unit used by the file system.
   (C) Sectors are used to store metadata (inodes), while blocks are used to store file data.
   (D) The terms "sector" and "block" are interchangeable and refer to the same 512-byte unit.

4. Which of the following is an example of a "special name" that is resolved by the shell, not by the file system itself?
   (A) `.`
   (B) `..`
   (C) `/`
   (D) `~`

5. What is the fundamental difference between a hard link and a soft link?
   (A) A hard link can point to a directory, but a soft link cannot.
   (B) Creating hard links does not create new inode, but creating soft links does.
   (C) Deleting the original file invalidates a hard link but not a soft link.
   (D) Hard links work across different file systems, while soft links do not.

6. What advantage did FFS gain by replacing the free block linked-list with a bitmap?
   (A) A bitmap consumes significantly less memory than a linked list.
   (B) A bitmap is a persistent data structure, whereas a linked list is volatile.
   (C) A bitmap makes it much easier and faster to find contiguous free blocks.
   (D) A bitmap allows for O(1) random access to any free block.