BRAC UNIVERSITY

Department of Computer Science and Engineering

Examination: Quiz 3 Duration: 30 min

Semester: Summer 2025 Full Marks: 15

CSE 321: Operating Systems

Name: **ID:** **Section:**

1. One day, while saving a document to his PC, Hasan wonders how the computer decides where on the disk the file should go. He starts thinking about how the computer knows which parts of the disk are already used and which parts are still free for storing new files. [2*2 = 4]

   I. How can Hasan find out which data block is currently free?

   II. How does this help in identifying consistency errors in the file system?

Answer:

I	Data Bitmap
II	By comparing blocks denoted by data bitmap with blocks denoted with inode blocik

2. A file system uses UNIX inode data structure which contains 3 direct block addresses, 4 single indirect blocks, 2 double indirect blocks and 1 triple indirect block. The size of each block is 64 Bytes and the size of each block address is 8 Bytes. Find the maximum possible file size? [5]

Answer:

64 / 8 = 8

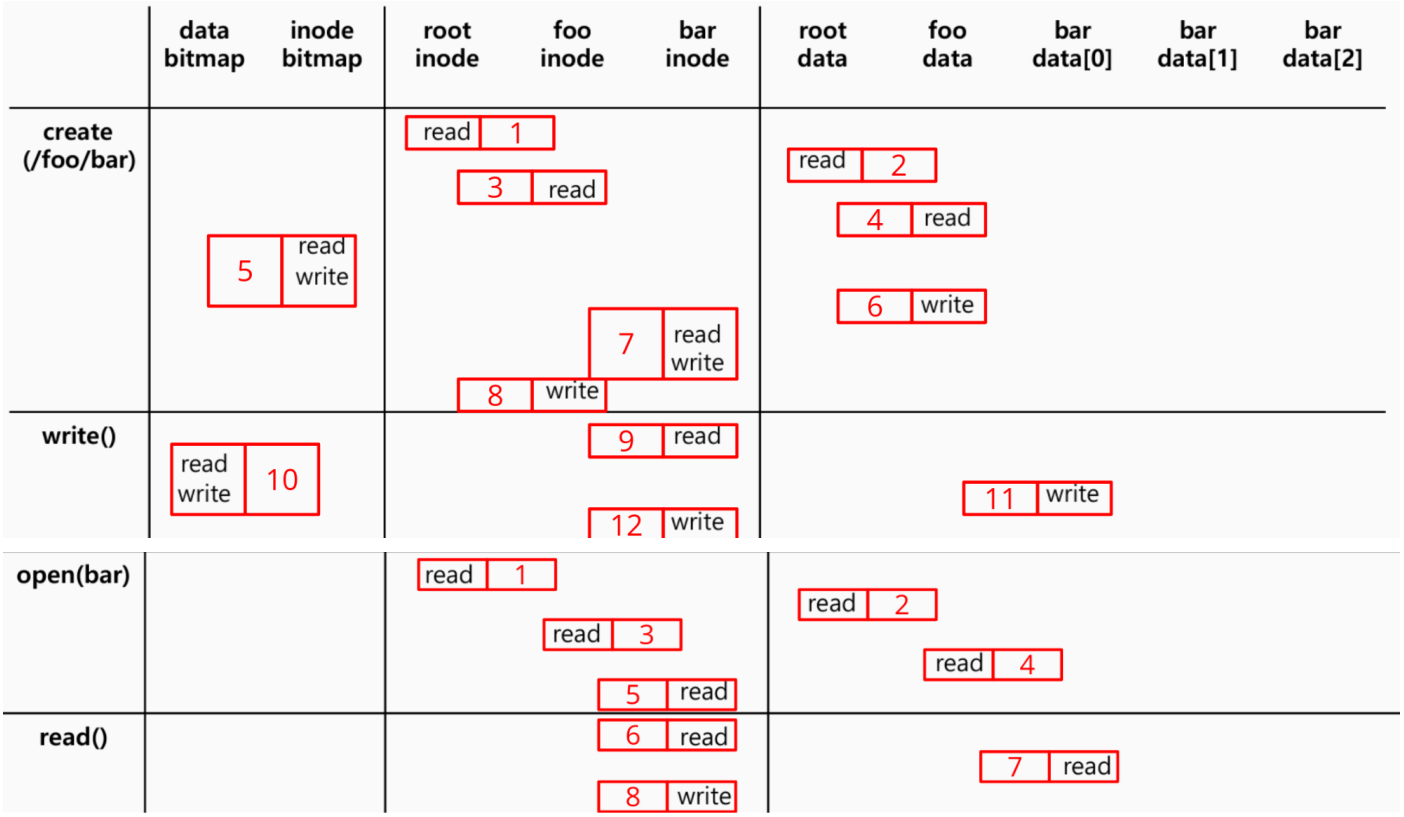
3 + 4*8 + 2*8*8 + 1*8*8*8 = 675 data blocks

675 * 64 = 43200 = 43.2 OR 42.1875

[PTO]

3. A new file “bar” needs to be created, and write one block, then open the file and read that block. [6]
   - Path of the new file: “/foo/bar”
   - After creating the file write() system call was issued in the file to write new contents and after the write operation the file has been allocated in 1 data block
   - To read the file it was then opened by open() system call.
   - After opening the file read() system call was issued in the file to read the single block.

   Illustrate the file access path timeline according to the scenario described above.



If open starts directly from inode = 4.5
If no open, no lseek = 4