Name: _____ USC ID: _____

INF 551 – Spring 2018

Quiz 3: File systems (10 points), 15 minutes

1. [4 points] Consider a file system with the following parameters:

Number of data blocks	128
Number of blocks storing inodes	8
Size of inode	512B
Size of block	4KB
Base address of inode table (i.e., the address of the first inode)	12K

   a. [2 points] What are the sizes (i.e., the number of bits) of the bitmaps for inodes (i.e., imap) and data blocks (i.e., dmap)?
   Size of the bitmaps for inodes
   = number of inodes
   = 8 * 4KB / 512 B = 64 bits (or 8 bytes)
   Size of the bitmaps for data blocks
   = number of data blocks
   = 128 bits (or 16 bytes)

   b. [2 points] What is the address of inode whose inode number is 20?
   12KB + 20 inodes * 512 B/inode = 22 KB

2. [6 points] Describe the steps in executing the system call: int fd = open("/foo/bar.txt", O_RDONLY). For each step, indicate the type of operations (read/write), the data structure accessed (e.g., inode, imap, etc.), and the purpose of each operation. Example: "read imap to find a free inode slot". Assume that you are given the inumber of root directory and that "bar.txt" exists in the specified directory.

Step	Type of operations	Data structure accesed	Purpose
1	Read	Inode of root	To get the position of root data
2	Read	Data of root	To get foo's inumber
3	Read	Inode of foo	To get the position of foo data
4	Read	Data of foo	To get bar.txt's inumber
5	Read	Inode of bar.txt	Permission check