Name: _____ USC ID: _____

Quiz 2: File Systems (10 points), 15 minutes (Afternoon section)

1. [6 points] Consider a file system with the following parameters:

Number of data blocks	1024
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] At most how many files can this file system store? Show your derivation.

   # of files this file system can store = # of inode
   4KB/512B = 8 inodes/block
   # of inode = 8*8 = 64

   b. [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)? Explain your answer.

   Size of imap = # of inode: 64bit
   Size of dmap = # of data blocks: 1024bit
   *If you treat # of data block as # of total block, also judge as correct.

   c. [2 points] What is the address of inode whose inode number is 10? Show your derivation.

   Address: 12KB + 10*512B = 17KB

2. [4 points] Consider a file "file1" of the size 2KB. Suppose we execute the following two commands in sequence: "ln file1 file2", "ln -s file2 file3".

   a. [2 points] What will be the size of file2 and file3 as reported by the "stat" command?

   Size of file2: 2KB

   Size of file3: 5B

   b. [2 points] Which of the 3 files have the same inode number? Explain your answer.

   File1 and file2 have the same inode number. 'ln' command creates a hard link between file1 and file2, they point to the same bytes of data on the disk, so they share the same inode number. However, 'ln -s' command creates a symbolic link between file2 and file3, instead of points to the data directly, it links to a file that stores the file name, so they have different inode number.