

CSC 262
Homework 3
Due Oct. 9, 2008

1. The following questions are based on the following simplified disk diagram:

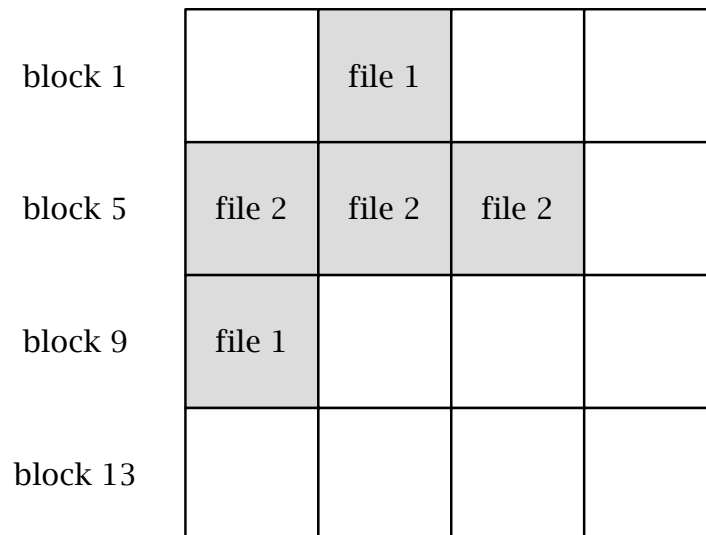


Figure 1: A teeny disk

This disk has only 16 blocks, and two files on it.

- A** What would the free block bitmap for this disk be?
- B** What would the file allocation table look like? (Be sure to include the pointers for file 1 and file 2).
2. On a system with a block size of 2048 bytes, how many entries would a FAT require for a 250 GB hard drive (assume 1 GB is 2^{30} bytes)? Assuming 4 bytes per entry, how much memory would the FAT consume?
3. How large would the bitmap be for the hard drive mentioned above?
4. The following questions concern the order of operations on an ext2 filesystem. Although ext2 is technically unreliable, efforts are made so that an ext2 filesystem won't get too inconsistent. In general, you are trying to prevent 'dangling' references. An example of a dangling reference is a block pointer in an inode referring to a block that doesn't contain file data (i.e. the power went off before the bytes were written to disk).

- A** Describe the actions and their order that are taken when a user creates a file. The actions must be ordered such that if the power goes out at any point (even in the middle of an action), there will be no dangling references in any inodes. *HINT: think in terms of allocating space, writing out meta-data/inodes, and writing file data*
- B** Describe the actions and their order when deleting a file. For the purposes of this question assume that the file is just large enough to require one pointer in the indirect block. The actions must be ordered such that if the power goes out at any point (even in the middle of an action), there will be no dangling references in any inodes.