Operating Systems Course	**Deadline**: June 15, 2008
Computer Engineering Department Iran University of Science and Technology Tehran, IRAN	Homework 5 **Instructor**: Hadi Salimi

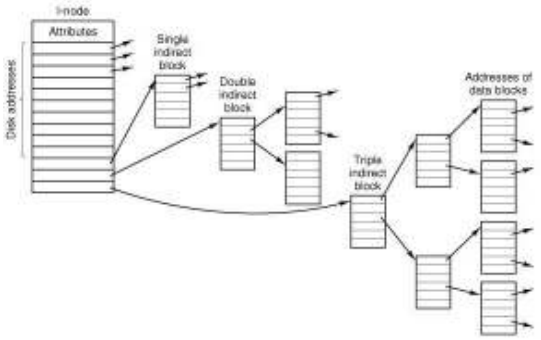
1. Contiguous allocation of files leads to disk fragmentation, as mentioned in the class. Is this **internal** fragmentation or **external** fragmentation? Make an analogy with something discussed in the previous chapter.
2. Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder **143**, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is
3.

   86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

4. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

   A) FCFS
   B) SSTF
   C) SCAN
   D) LOOK
   E) C-SCAN
   F) C-LOOK

5. Why rotational latency is usually not considered in disk scheduling? How would you modify SSTF, SCAN, and C-SCAN to include latency optimization?
6. Suppose that each i-node block contains 256 addresses. If the i-node structure supports single, double and triple indirect blocks, (like the following figure) and each disk block size is 128 KB, then what's the maximum file size that can be kept in this file system?



7. Why *link* and *unlink* operations cannot be implemented of FAT-* file systems?
8. In an operating system that uses FAT-64 file system, what's the maximum size of a partition?
9. If your windows operating system shut down unexpectedly, the next time the operating system starts up, it checks the file system. What's the reason for this action?
10. What are the main advantages of using NTFS file system?
11. What's a *journaling file system (JFS)?* Mention two file systems of this type.