CSE 121: Homework 1

Due: Thursday, 1/22/09, in class (hardcopy or email kaisenl@cs)

1. **OS Review:** OS designers often talk about separating mechanism (the tools to make decisions) from policy (the decisions that are made). For two different OS components (e.g. scheduler, file system, processes, security, etc), describe a policy that each component might enforce, and the mechanisms that can be used to implement those policies.

2. **FFS:**

   (a) What technique can the OS do with data writes that it can't do with data reads that gives the illusion that the operation has completed? (Hint: FFS does it, and the old BSD file system did as well.)

   (b) It turns out that FFS reads and writes actually have about the same performance. Why is this?

   (c) As discussed in class, inodes are placed at the beginning of the disk in the old BSD file system. Where are the inodes placed in FFS and why are they placed there?

3. **LFS:**

   (a) Suppose you bootup your system with LFS and your memory is empty. What on-disk LFS data structures does the OS need to walk through to access a particular data block of a file?

   (b) Checkpoint regions are used to start crash recovery in LFS, so their integrity is important. How does LFS deal with the situation where the OS crashes while editing a checkpoint?

   (c) Suppose you are building a streaming video site (e.g. YouTube). Would you use an FFS-like file system or an LFS-like file system? Why? (This is an open-ended question. Your reasoning is more important than the actual file system you pick.)