File System & Logging

File System:

Why do inodes need to be written to disk?

Which file do the first and second inodes represent?

The disk cannot be interacted with when holding a spinlock. How can synchronization be handled at the file system level?

When overwriting 1 block of data, how many times will `bwrite` be called?

When appending 1 block of data to an existing file, assuming the extent is large enough, how many times will `bwrite` be called?

When adding a new file, how many times will `bwrite` be called?
This would include allocating a new extent.

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Logging:

Describe a scenario that can happen where the file system gets corrupted (assume no logging).

What's the difference between a REDO and UNDO log?
What are some of the trade-offs between them?

How can the log be synchronized among transactions?

Imagine the case where the log has been updated for the current transaction, and the transaction is being written to disk.
Why is it ok if a failure happens during this time? What will happen on reboot?

Does the swap space need to support logging?
Why or why not.