

# Question 1

## Option1: Journal FS data structure updates

- ✓ Efficient use of journal space; hence faster journaling
- ✗ Individual updates are applied separately
- ✗ The journaling layer must understand FS semantics

## Option2: Journal disk block updates

- ✗ Even a small update adds a whole block to the journal
- ✓ Multiple updates to the same block can be aggregated into a single update
- ✓ The journaling layer is FS-independent (easier to implement)

Ext3 implements Option 2

