

CPSC614: Graduate Computer Architecture

**I/O 2: Failure Terminology, Examples,
Gray Paper and a little Queueing Theory**
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**Based on lectures by
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Review Storage

- **Disks:**

- Extraordinary advance in capacity/drive, \$/GB
- Currently 17 Gbit/sq. in. ; can continue past 100 Gbit/sq. in.?
- Bandwidth, seek time not keeping up: 3.5 inch form factor makes sense? 2.5 inch form factor in near future? 1.0 inch form factor in long term?

- **Tapes**

- No investment, must be backwards compatible
- Are they already dead?
- What is a tapeless backup system?

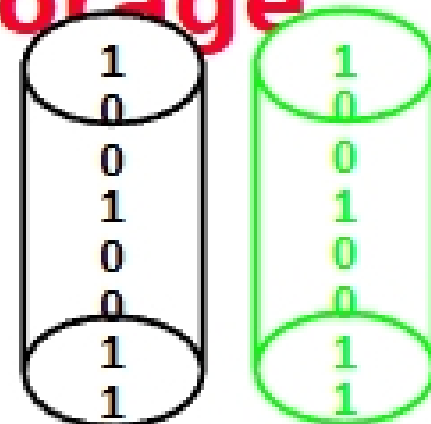
Review: RAID Techniques: Goal was performance, popularity due to reliability of storage

- *Disk Mirroring, Shadowing (RAID 1)*

Each disk is fully duplicated onto its "shadow"

Logical write = two physical writes

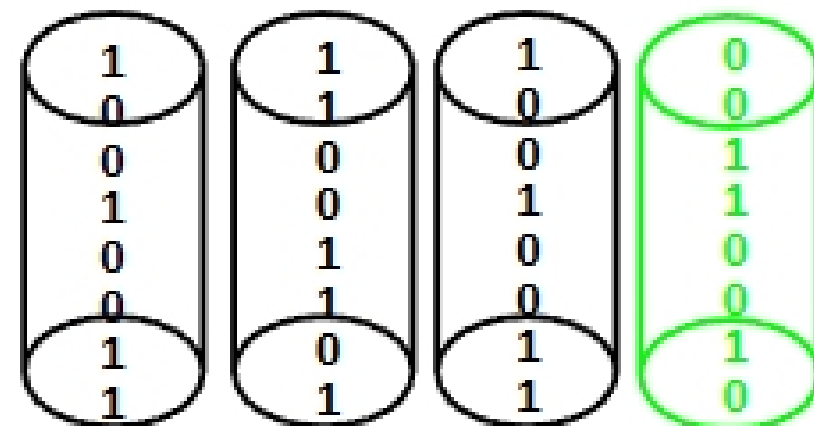
100% capacity overhead



- *Parity Data Bandwidth Array (RAID 3)*

Parity computed horizontally

Logically a single high data bw disk



- *High I/O Rate Parity Array (RAID 5)*

Interleaved parity blocks

Independent reads and writes

Logical write = 2 reads + 2 writes

