CSE 350

Advanced Data Structures

Lecture 5: RAID 🖴 & Buffering

RAID

Redundant

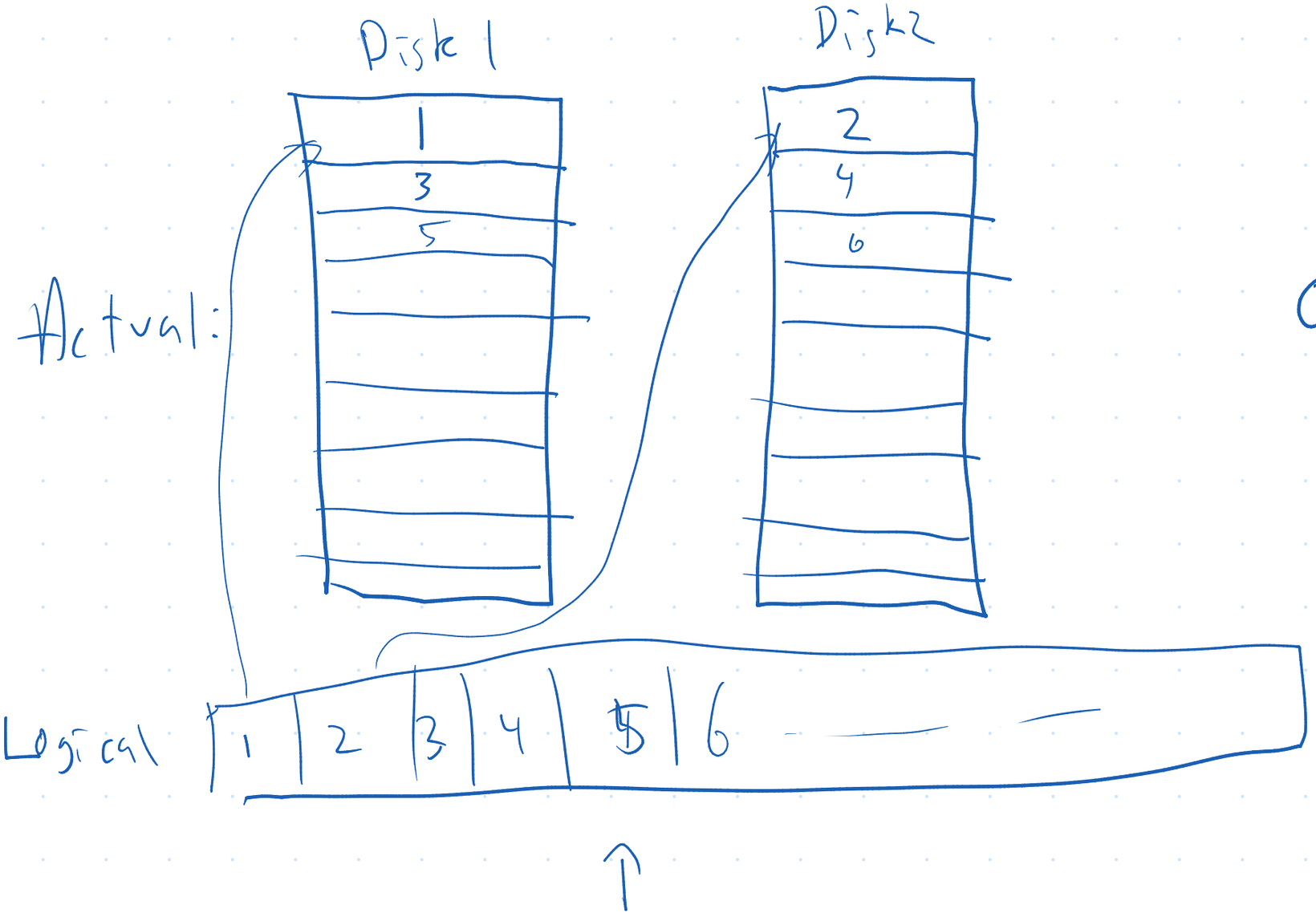
Array

of

Independent

Disks

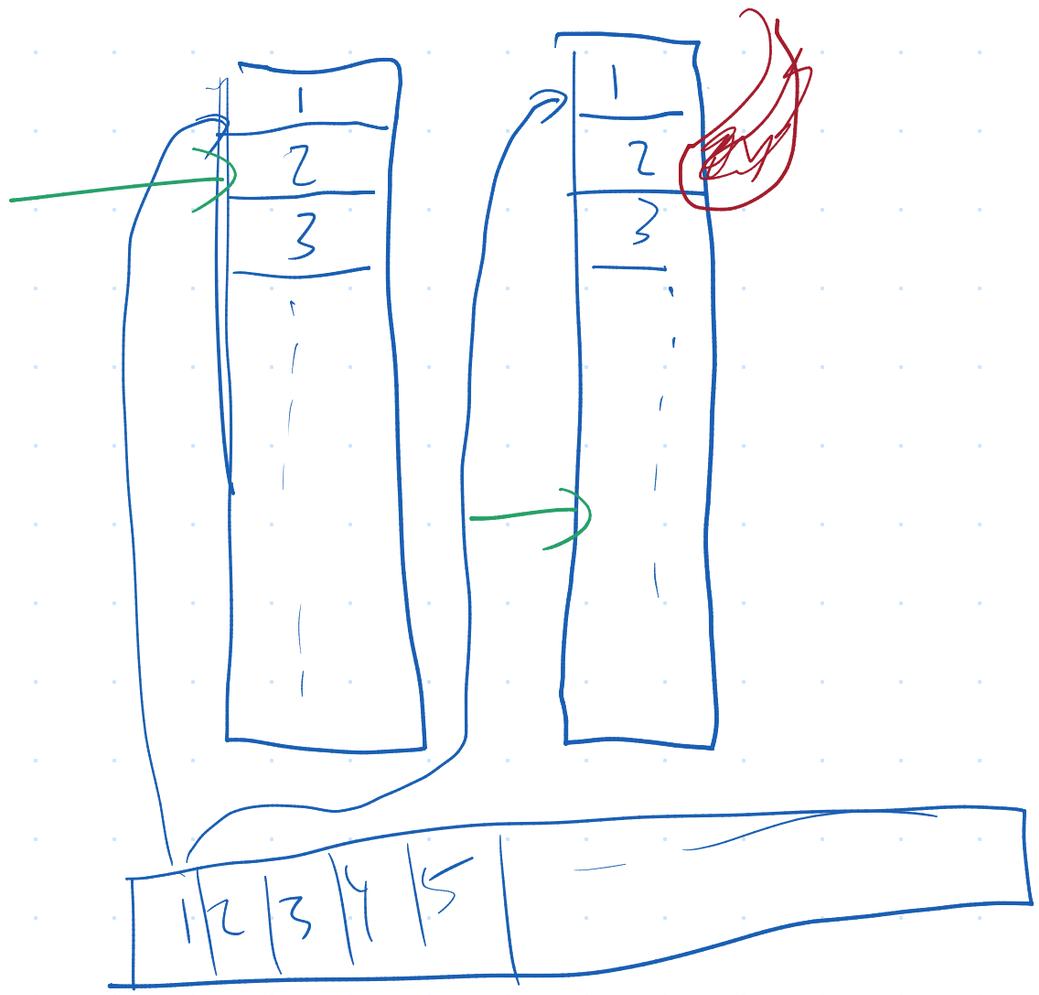
RAID0 (Striping) 2^T Disks



Pro: Fast
2x Bandwidth
2x Improved Random Access time

Con: 2x chance of failure

RAID1 (Mirroring) 2 disks



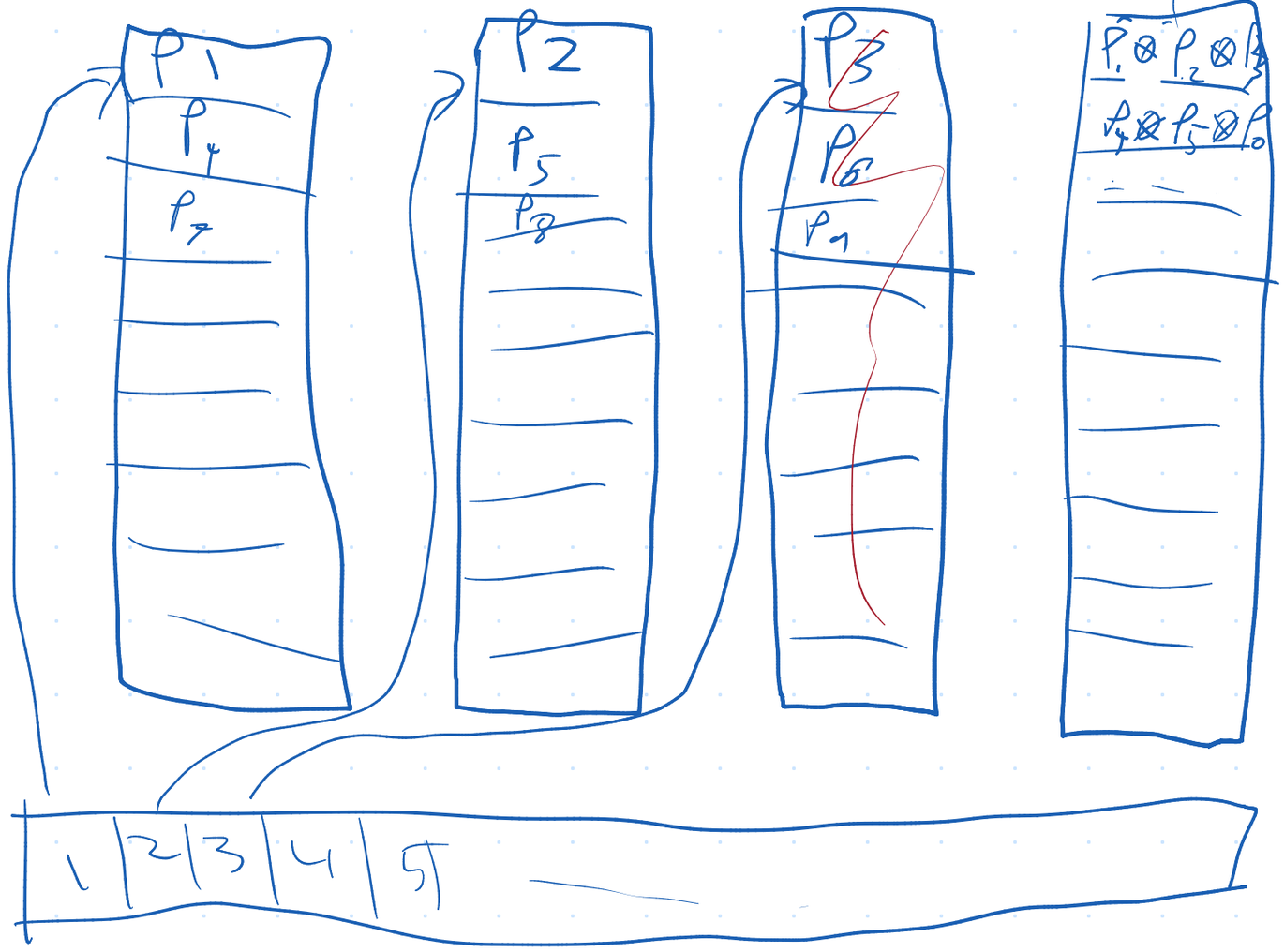
Pro: One disk can safely fail

Read from 2 locations in parallel

2x Performance on random Reads (not writes)

Con: 2y storage costs

RAID 4 (Striping w/ Parity) 3+ Disks



⊗	A	B	A⊗B
T	T	F	
T	F	T	
F	T	T	
F	F	F	

$(A \otimes B) \otimes A = B$

$P_1 \otimes P_2 \otimes (P_1 \otimes P_2 \otimes P_3) = P_3$

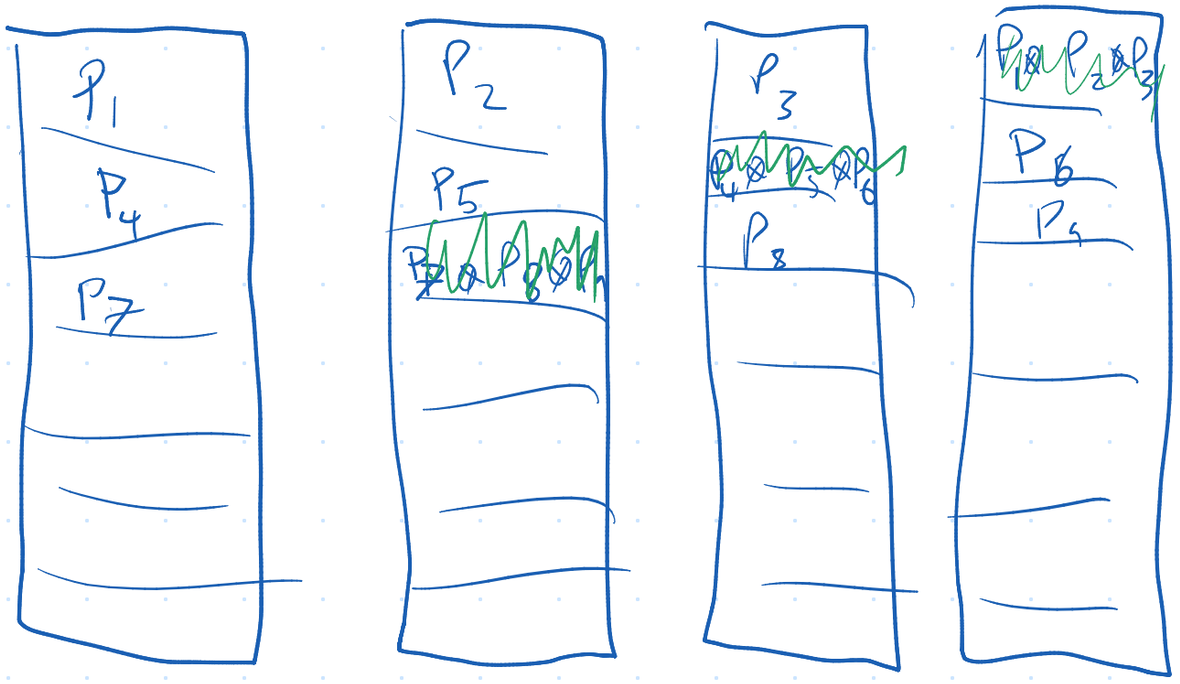
- Reads $(N-1)\times$ faster

Pro: Can lose any one disk

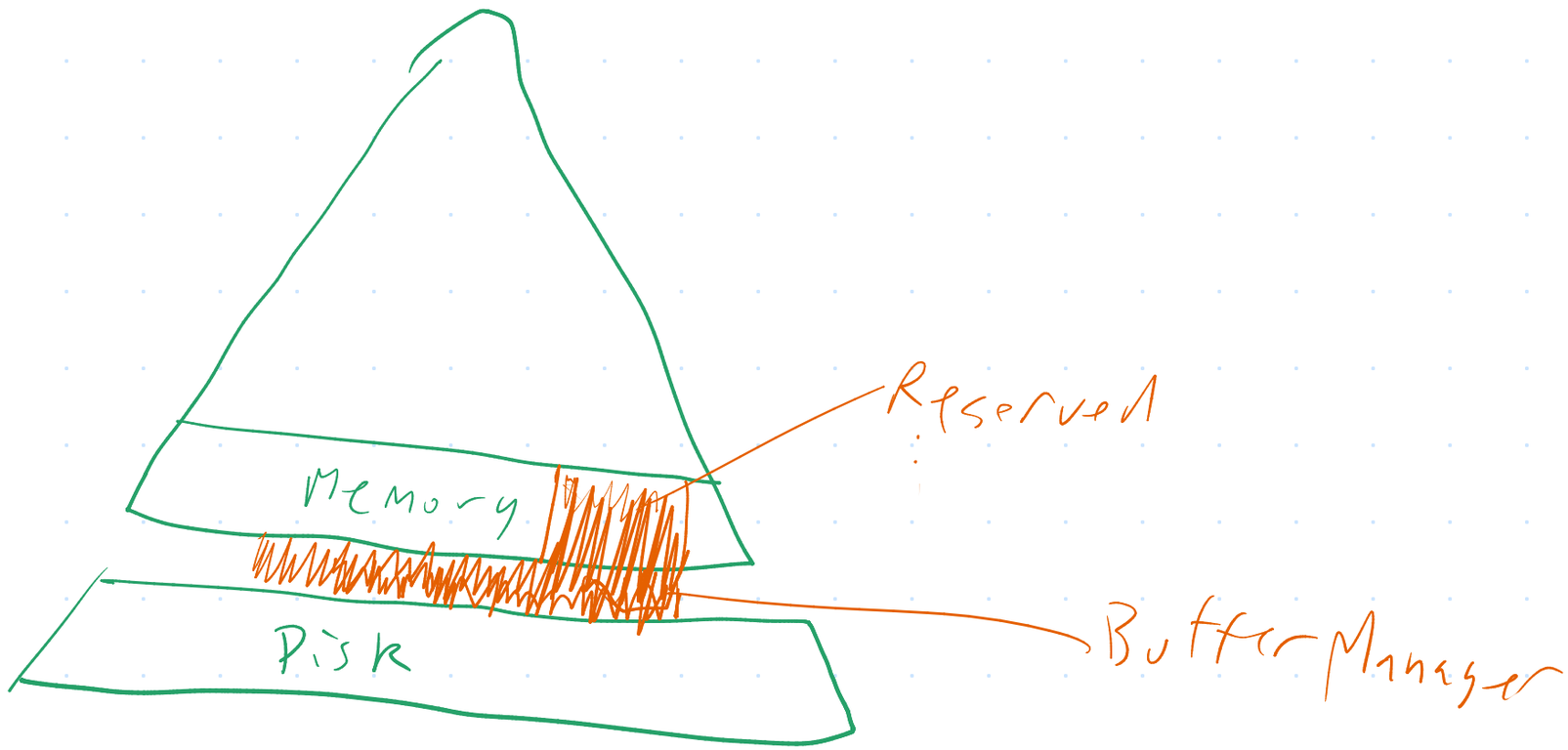
- Only waste $\frac{1}{N}$ of total storage

Con: $\frac{N-2}{N}$ reads + 2 writes for every "write"

RAID 5



RAID 6


Memory
Disk
Reserved
Buffer Manager

reserve me a spot for the data

&l1 ↓ ~~get data~~ on page 4 →