

The Sysadmin's Warm-Up

Prepared by Mark on January 24, 2025

Most of you have seen a hard drive. Many have touched one, and a lucky few have poked around inside one. These devices have two interesting properties:

- A:** They hold valuable data
- B:** They eventually fail

Needless to say, this is a problem.

We need to design a system that allows hard drives to fail without data loss.

Definition 1:

You can think of a hard drive as a long string of bits.

Assume all hard drives can store 1 TiB of data.

Drive A	Drive B
1	0
1	1
0	0
...	...
1	0
0	1

Problem 2:

Suppose we have two hard drives. How can we arrange our data so that...

- A:** We get 1 TiB of usable storage
- B:** We lose no data if any one drive fails

Problem 3:

Suppose we have three hard drives. How can we arrange our data so that...

- A:** We get 2 TiB of usable storage
- B:** We lose no data if any one drive fails