

CS 537: Intro to Operating Systems (Summer 2017)

Worksheet 13 - RAID

DUE: Aug 3<sup>rd</sup> 2017 (Thursday)

In this worksheet, we'll examine how long it takes to perform a **small workload** consisting of **12 writes to random locations** within a RAID. Assume that these random writes are spread "evenly" across the disks of the RAID. To begin with, assume a simple disk model where each **read or write** takes **D** time units.

- a. Assume we have a 4-disk RAID-0 (striping). How long does it take to complete the 12 writes?
  
  
- b. How long on a 4-disk RAID-1 (mirroring)?
  
  
  
- c. How long on a 4-disk RAID-4 (parity)?
  
  
  
  
- d. How long on a 4-disk RAID-5 (rotated parity)?
  
  
  
  
  
- e. Now assume we have a better disk model, in which it takes **S** time units to perform a **random seek** and **R** units of time to perform a **full rotation**; assume transfer is free. How long do the 12 random writes take to complete on a 4-disk RAID-0?
  
  
  
  
  
- f. How long on a 4-disk RAID-1 (mirroring)?
  
  
  
  
  
- g. How long on a 4-disk RAID-4 (parity)?
  
  
  
  
  
- h. How long on a 4-disk RAID-5 (rotated parity)?