Jeremy Holloway
CPSC-3220-001
6/14/2019

Pre-class Assignment #19

Relevant Materials:
OSPP textbook, chapter 12
chapter 12 slides

1. Define the following terms:
 -platter: A single thin round plate that stores information in a magnetic disk, often on both surfaces.
 -surface: One side of a disk platter
-arm: An attachment allowing the motion of the disk head across a disk surface.
 -sector: The minimum amount of a disk that can be independently read or written.
 -track: A circle of sectors on a disk surface.
 -logical block address: A unique identifier for each disk sector or flash memory block, typically numbered from 1 to the size of the disk/flash device. The disk interface converts this identifier tot he physical location of the sector/block.
 -cylinder: A set of tracks on different surfaces with the same track index.
 -seek: The movement of the disk arm to reposition it over a specific track to prepare for a read or write.
 -rotational latency: Once the disk head has settled on the right track, it must wait for the target sector to rotate under it.
 -surface transfer time: The time to transfer one or more sequential sectors from (or to) a surface once the disk head begins reading(or writing) the first sector.
 -host transfer time: The time to transfer data between the host's memory and the disk's buffer.
 -solid state storage: A persistent storage device with no moving parts; it stores data using electrical circuits.
 -wear out: After some number of program-erase cycles, a given flash storage cell may no longer be able to reliably store information.
 -wear leveling: A flash memory management policy that moves logical pages around the device to ensure that each physical page is written/erased approximately the same number of times.

2. Explain the benefit of command queueing for disks.
        It allows an operating system to issue multiple concurrent requests to the disk and for the disk to process those requests out of order to optimize scheduling.

3. What is the request pattern assumption made for determining the average seek times reported by manufacturers?
        Manufacturers often use the time it takes for a disk to accomplish a particular workload.

4. Why would a disk start reading immediately after the head settles?

  To determine exactly where the head is and make fine grained positioning corrections.

5. Why does a sequence of random accesses on a disk require so much more time than the same number of sequential accesses?

  It may have to move from one side of the platter to the other and then would take time to resettle and find the right track each time. Sequential data would require very little to no movement so the response time would be much faster.

6. The textbook describes a situation in which a solid state storage device can be worn out in 64 days. If such devices have this kind of vulnerability, why have they grown in popularity?

  The ssd is rated for 1.1 PB of endurance of endurance for many workloads, so for most users this will last for a long period of time.