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CS 312 – System Administration
HW2
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1. What is a DIMM memory module? When a slot in a laptop is labelled "DIMM", what official form factor name is actually usually intended? (Hint: it's very close to "DIMM") (3 points)
   For laptops, DIMM is actually short for SO-DIMM, which stands for Small Outline Dual In-line Memory Module, which are half the size of normal DIMM. Both DIMM and SO-DIMM are different versions of Dynamic Random Access Memory (DRAM) [1][2].

2. All you really need to open up a desktop or laptop is a couple screwdrivers and often a pry-tool of some kind. Time issues aside, do you find it easy? What kinds of electronics do you think you shouldn't open? (3 points)
   I find it not too difficult to open up inside of the computer. For most parts, the plastic or aluminum casing has a clear label on which components it is. The kind of electronics that you shouldn't open are something with high capacitor or batteries like power supplies. Even after you ground yourself, there are still a chance you can get electrocuted if the capacitor still has leftover energy inside that could potentially leak out and shock you.

3. What is the backlight in a laptop screen? How is the light generated? (3 points)
   According to A Plus Computer Tech, "The backlight in a laptop is the small CCFL bulb that illuminates the screen, usually from the bottom of the screen. The light then bounces off of different plastic sheets, passes through the actual LCD pixels, and displays an image." [3] In recent years of LED popularized with cheaper cost and energy efficiency, and even lighting, most of the screens are being replaced with LED displays. They are tiny bulbs that will illuminate RGB in each pixels and does not light up when the color is black.

4. What is a Kensington Security Slot? The laptop we disassembled in Lab 2 had one, as do most laptops. (3 points)
   Kensington Security Slot is an anti-theft system for computers and laptops patented by Kryptonite. The slot will often be labeled with a small padlock symbol and it prevents theft for shared devices, such as computers in public library and laptops in labs or companies. [4]

5. Describe a scenario where data could be deleted from a HDD yet recovered afterwards. (3 points)
   There are many case a data could be accidently deleted. One popular example would be following the stupid trend of "Delete System32" or "sudo rm –rf /" Both commands are designed to delete important files in the computer's OS, Windows and Linux respectively. Unless data is overwritten right after, there are tools such as Recuva (windows) or SystemRescueCD (linux-live) [5]. Another way to recover your data would be to retrieve it

from a snapshot or an image. Windows, for example, will try to create a system restore point when updating an important system update so that if there is an error while booting up the windows, it could be restored.

6. What is the TRIM command, as used on SSDs? How does it solve the problem of “write amplification”? (5 points)
   TRIM is SSD version of “defragment”. Unlike defragment, it won’t move files around, which will decrease the lifespan of SSD’s. Instead, it uses garbage collection that “manages and maintains the available storage space, handling the disparity between the erase unit size (block) and the read/write unit size (page).” TRIM then notifies the OS, which block can be erased instead of rewriting an entire block like a hard drive. The TRIM command marks invalid data and tells SSD to ignore it during garbage collection to increase the program/erase cycles of the SSD. [6]

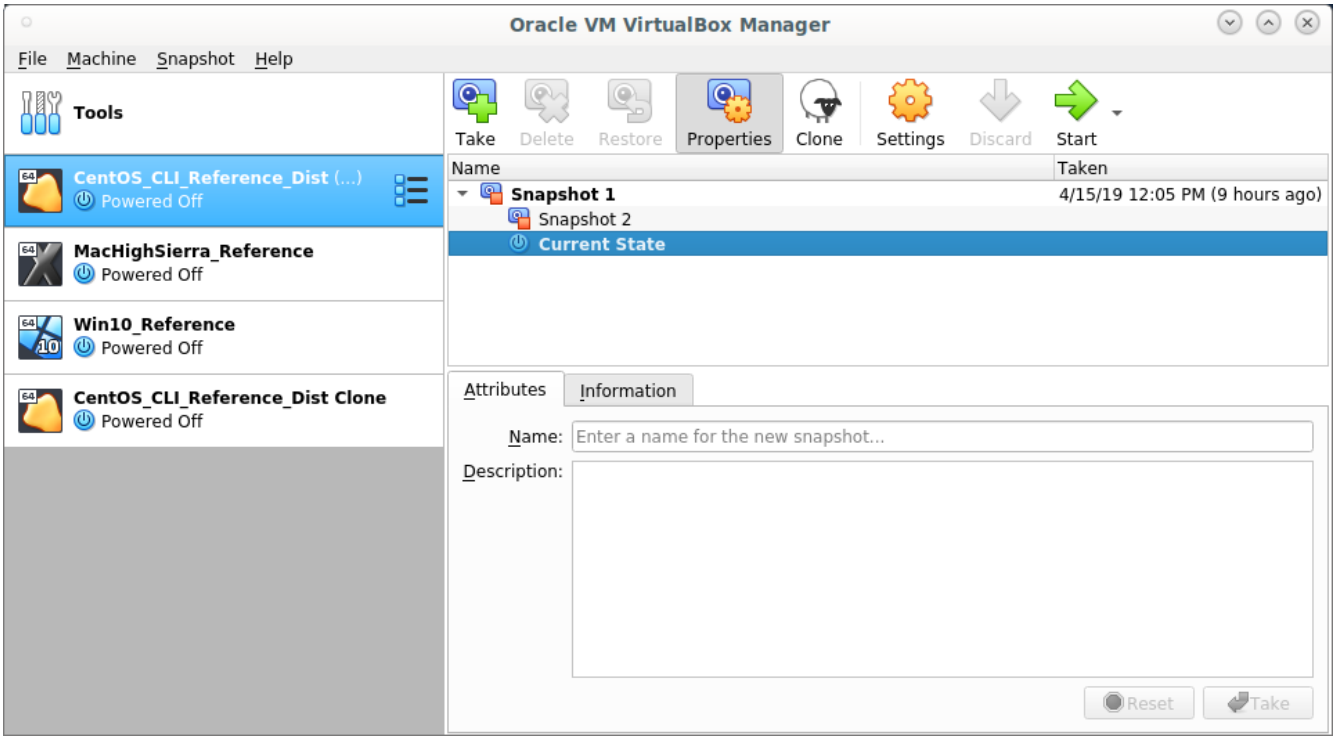
7. Is it OK to perform disk management operations on a drive, that contains files you care about, but which are not backed up? Are these always safe? (3 points)
   It is technically “OK” to do a disk management operations which could potentially ruin all data within the drive. However, it is **strongly not recommended** since the data in the drive could potentially be corrupted or lost during the operations. Since disk management operations means rewriting the disk, the files that is corrupt or lost during the operation will be unlikely to be recoverable, even with the recovery tools. So, no, friends don’t let friends do disk operations without proper back up.

8. What is your current backup strategy for your personal & school files? If you don’t have one, what plan would you propose to keep YOUR important files safe? What is the chance you’ll adopt that plan? (3 points)
   My current backups for school files include github (online/current), Google Drive (online/collaborations), Box.com (online/archive) and dropbox.com (online/current). I also have a separate accounts for Box, OneDrive, Dropbox, and external hard drive back up for important files. Depending on the importance, I also have a flash drive or microSD card that contains my backups since they’re really cheap. Before the cost effective flash drives, I used to burn them to a CD or DVD, but finds out, once they’re scratched, it’s hard to recover.
   I also lost my graduation pictures to a HDD no longer spinning, even after recovery, (the freezer trick), the files were unusable.

9. What is the difference between a file system and a volume? (3 points)
   Filesystem is how the OS determines the data be written on to a disk. Within a filesystem, it could have more than one volume that could be mounted onto the OS or mount it to boot the OS from it (in case of logical drives containing OS).
10. Name another few virtual machine hypervisors other than VirtualBox. (3 points)
    Most popular alternative to VirtualBox is VMWare because of it’s enterprise level support and QEMU and KVM for their free open-sourceness. Parallels is

among the most popular in MacOS because of its compatibility to Windows without having to dual boot. [7]

11. In VirtualBox, take a snapshot of one of the class reference virtual machines, start it up, make some changes to it, shut it down, then restore back to the previous state. Take a screenshot of the VirtualBox main program showing this hierarchy of snapshots and include it along with your other answers. The snapshot should NOT say “changed” in the hierarchy list your screenshot shows. (8 points)



Snapshot1 is the original, snapshot2 is the copy.

Sources:

1. https://www.wikiwand.com/en/SO-DIMM
2. https://www.wikiwand.com/en/DIMM
3. https://www.apluscomputertech.com/laptop-repair/laptop-backlight-repair/
4. https://www.wikiwand.com/en/Kensington_Security_Slot
5. https://www.linux.com/learn/get-your-data-back-linux-based-data-recovery-tools
6. https://searchstorage.techtarget.com/definition/TRIM
7. https://alternativeto.net/software/virtualbox/