HW- 02 Lab 1

By :- Faraz Ahmed

Using guymager to import and verify an existing disk image

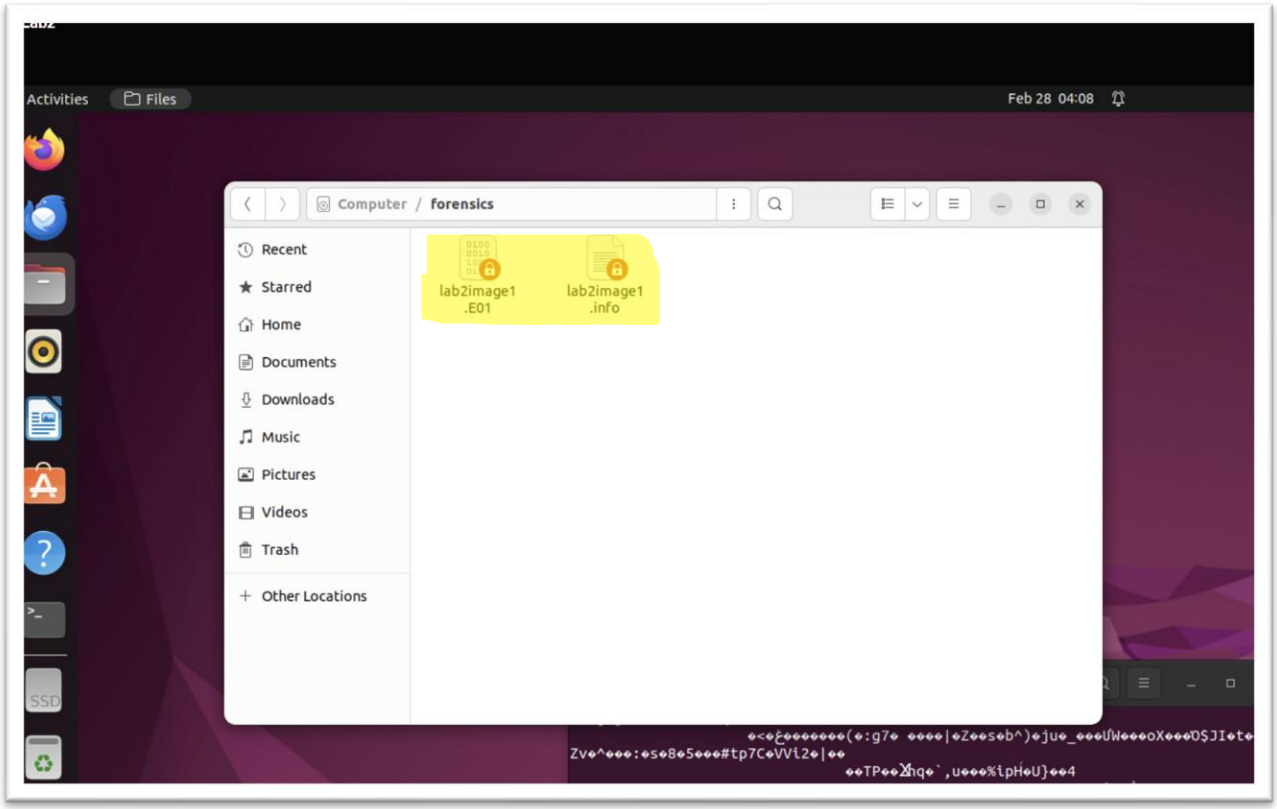
Q7 a. Provide a brief overview of the dd (or raw) file format vs the Expert Witness Format and its significance to a forensic investigator.

Ans7 a.

- **Dd (raw) File Format**- it comes from a Unix command “dd” which creates a bit-for-bit copy of a storage drive or device. So, the copied data doesn’t have any metadata, uncompressed, large file size and simple and widely supported for any forensic tools.
- **Expert Witness Format**- it is developed by EnCase which creates simple copy of storage drive or device. So, the copied data includes compression, metadata and widely supported for organized and crucial forensic investigation.

Q12. What file(s) have been created?

Ans12. As we can observe from the screenshot 1 (highlighted below), there’s two new files “lab2image1 and lab2image1” which are newly created.



Screenshot 1: Screenshot of two new files “lab2image1 and lab2image1” added.

Q13. Open the file ending in “.info”.

a. What is the MD5 hash?

Ans a. e134ced312b3511d88943d57ccd70c83 is the hash value.

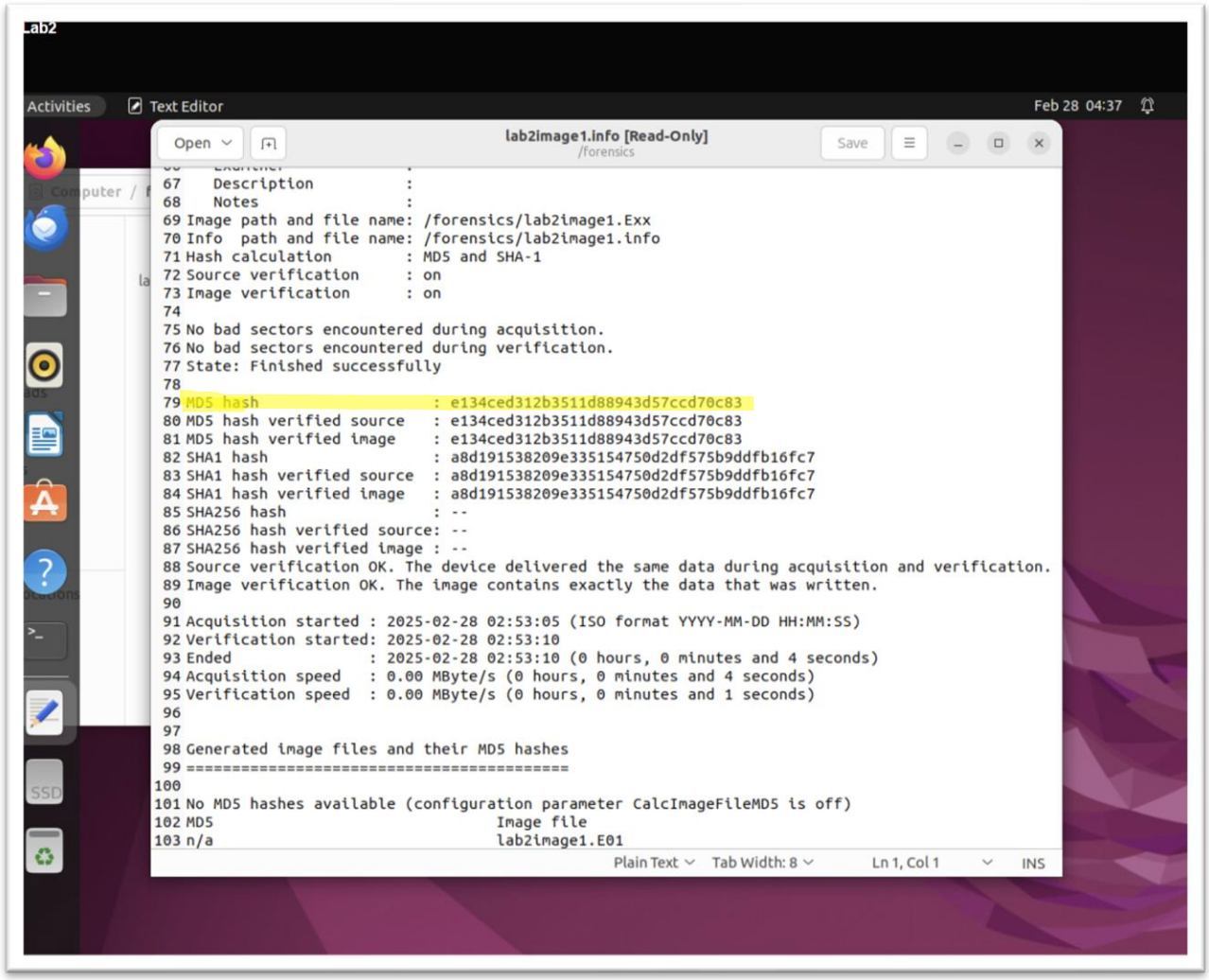
b. What is the MD5 hash verified source?

Ans b. e134ced312b3511d88943d57ccd70c83 is the MD5 hash verified source.

c. Do these two values match? Why is that significant?

Ans c. Yes, these two values match with each other as shown(highlighted) below in screenshot 2. It is significant as:-

- It makes sure that there is data integrity between both copy and original disk.
- It ensures that there was no modification or data lose during coping the data.



Screenshot 2: Screenshot of MD5 hash value of "lab2image1.info".

d. What is the size of each file created?

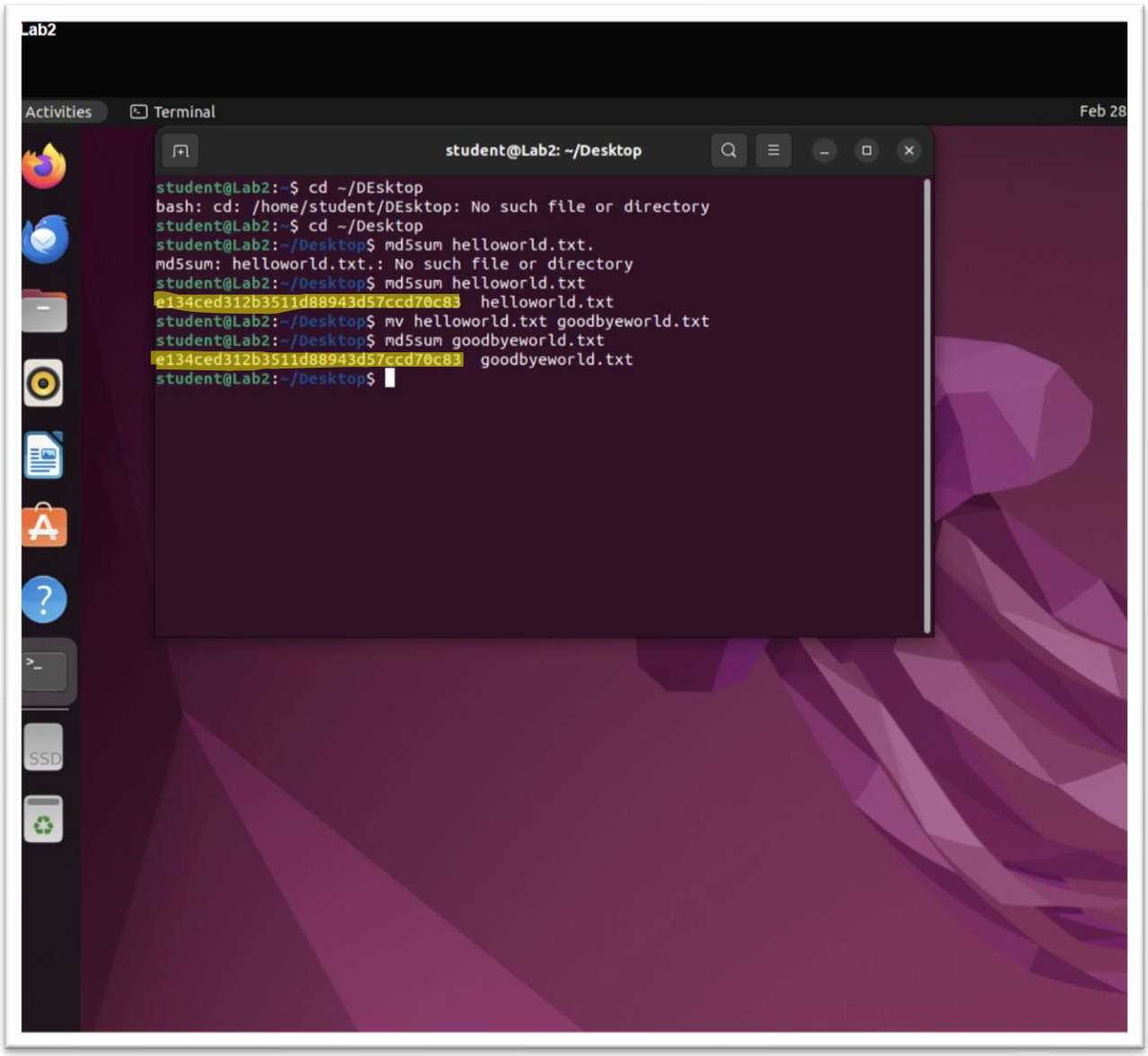
And d. Space of each file is:-

- Lab2image1.E01- 3.7 kB (3,672 bytes)
- Lab2image1.info- 6.0 kB (5,973 bytes

Experimenting With Hashing

Q4. What did this command do?
Ans4. The mv command (move) is a command to rename any file which in this case from helloworld.txt to goodbyeworld.txt but it does not modify or change the contents inside it. So, its same file with just different name.

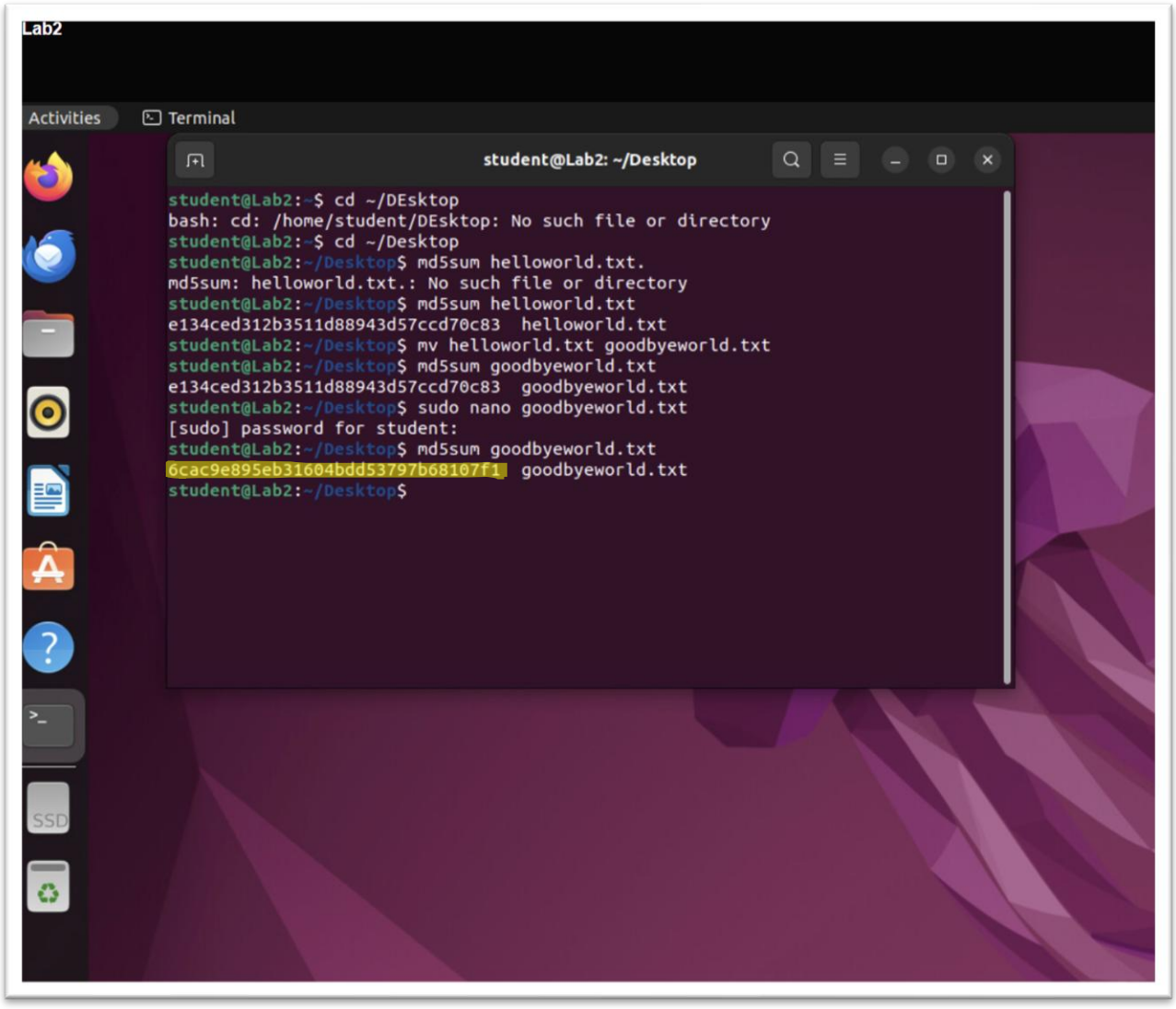
Q6. Did the hash change? Why (did/did not) the hash change?
Ans6. No, the hash value did not change. It is because MD5 hash value is evaluated based on the contents inside the file, not its name. So, modifying name does not involve changing data include that file hence the hash value remains the same as shown in Screenshot 3.



Screenshot 3: Screenshot of hash values after renaming the file.

Q9. Did the hash change? Why (did/did not) the hash change?

Ans9. Yes, the hash value changed. This is because MD5 hash values fully depends on inside contents of any file. So, since we are modifying and adding “Goodbye!” inside that file, the hash value will be changed as shown and highlighted in Screenshot 4.



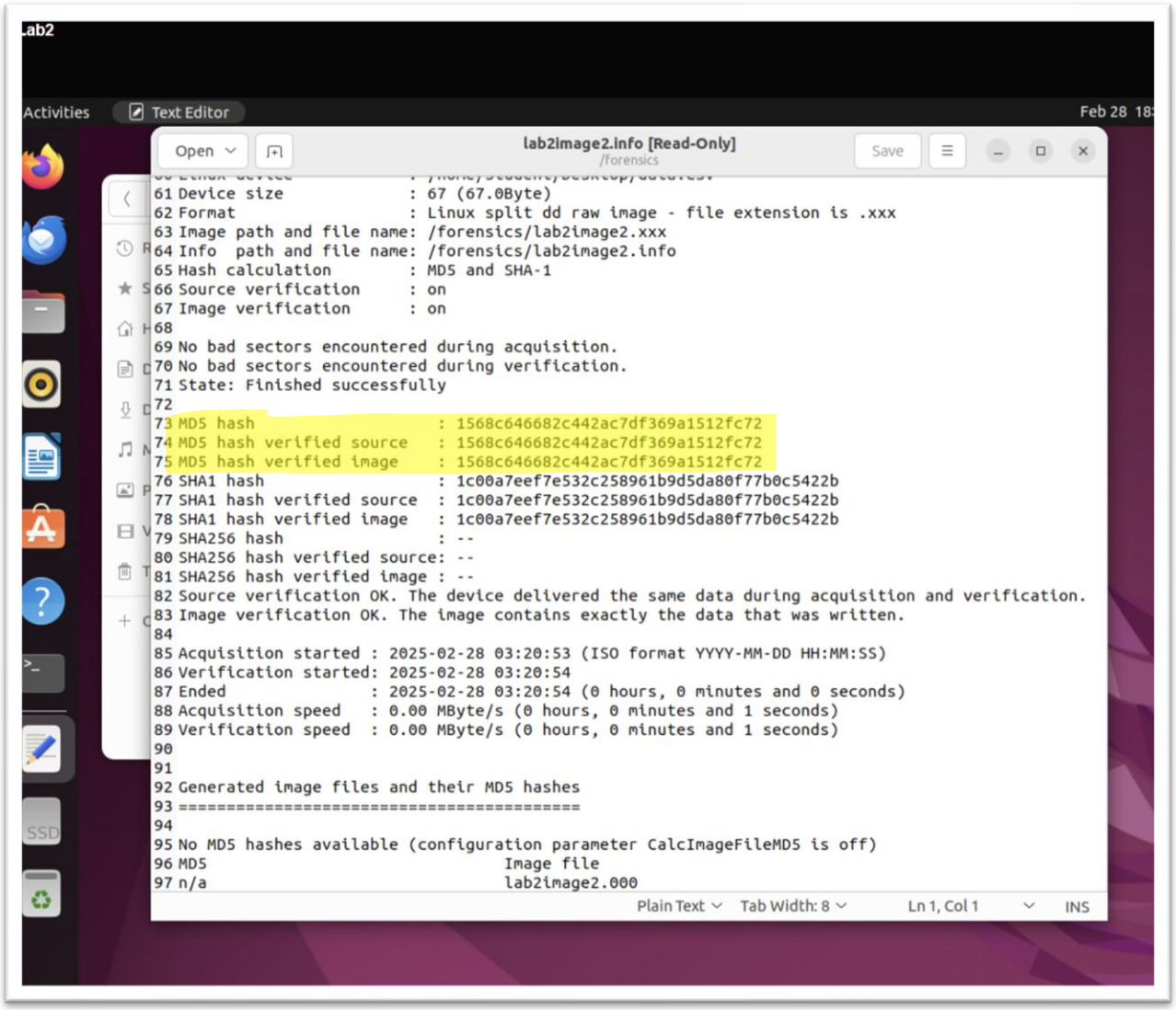
Screenshot 4: Screenshot of hash values after changing contents in that file.

Creating a New Image

Q10. Open the resulting info file and document the MD5 hash values.

Ans10. All of the different MD5 hash values are:-

- MD5 Hash- 1568c646682c442ac7df369a1512fc72
- MD5 Hash Verified Source- 1568c646682c442ac7df369a1512fc72
- MD5 Hash Verified Image- 1568c646682c442ac7df369a1512fc72 (as highlighted below)



Screenshot 5: Screenshot of all MD5 values in "lab2image2.info".

Q11. Document the method and what you suspect is the type of acquisition conducted for these suspect files:

Ans11. The method we used in this was that Guymager basically select and produce a copy of data.csv file rather than take the entire physical drive into consideration. So, this method is known as Logical Acquisition.

So, this is a file-based (logical) forensic acquisition which means that it will copy or image only specific files rather than taking an entire storage device and the file is copied and hashed to verify the integrity and contents properly.

Q12. What is one major drawback of this acquisition method?

Ans12. One major drawback of this acquisition method is it only copies the file and other forensic evidence such as deleted files, hidden space and all system logs so if any criminal or suspect modifies metadata or timestamps of any files, those changes might be missed by it which can influence the investigation.

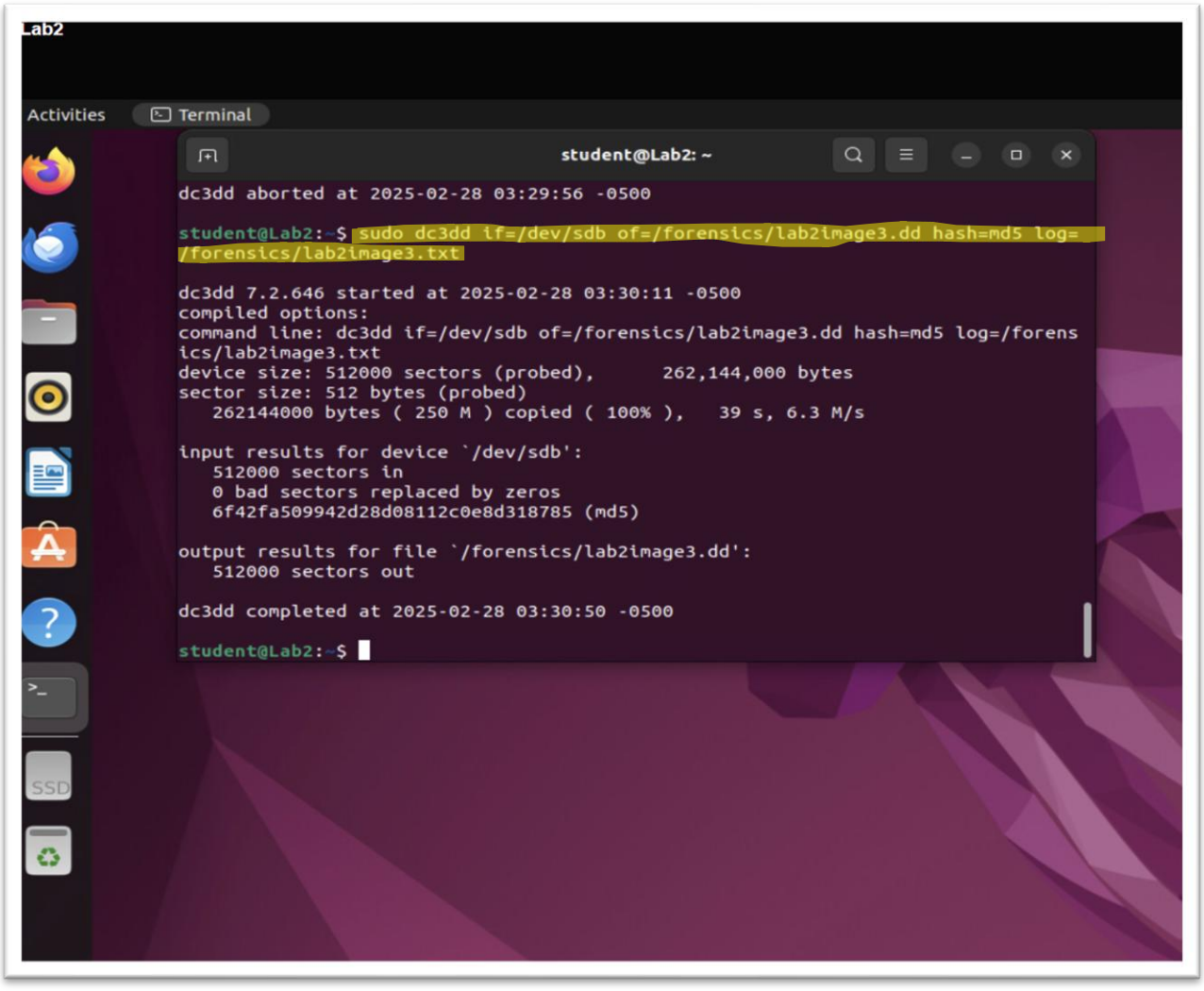
Creating a New Image Using The CLI

Q1 d. Why would you not want to mount the drive?

Ans1 d. Mounting the drive is not good for overall investigation or forensic integrity. Mounting the drive may overwrite the metadata or system logs which will give any suspect to alter with the evidence and destroy forensic integrity.

Q2 b. Do a little bit of research into this command. In 2-5 sentences, describe what the command is doing.

Ans2 b. sudo dc3dd if=/dev/sdb of=/forensics/lab2image3.dd hash=md5 log=/forensics/lab2image3.txt
Where: **dc3dd** is a special forensic version of dd which is optimized for securing all digital evidence. It picks up a specific file from location **if=/dev/sdb** and save output in **of=/forensics/lab2image3.dd** location. Then it calculate an MD5 hash value of that file for data integrity and **log=/forensics/lab2image3.txt** which records all of the forensic details including hash value and other imaging process. (as shown in screenshot 6)

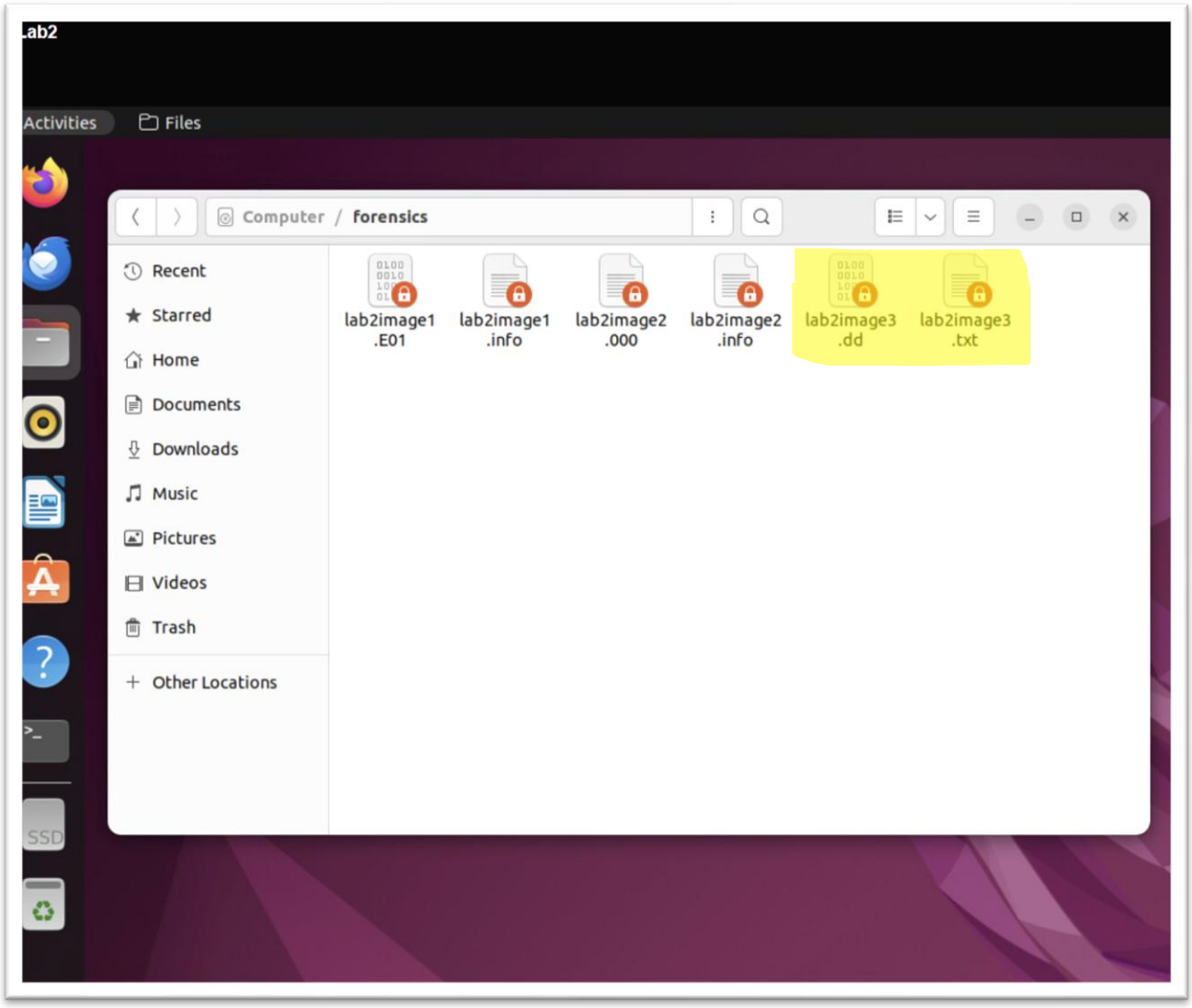


Screenshot 6: Screenshot of executing "sudo dc3dd if=/dev/sdb of=/forensics/lab2image3.dd hash=md5 log=/forensics/lab2image3.txt".

Q3. Open the Forensics folder again.

a. What file(s) have been created?

Ans a. There are two files created which are “lab2image3.dd” and lab2image3.txt” as shown in screenshot 7.



Screenshot 7: Screenshot of two new files “lab2image3.dd and lab2image3.txt” created.

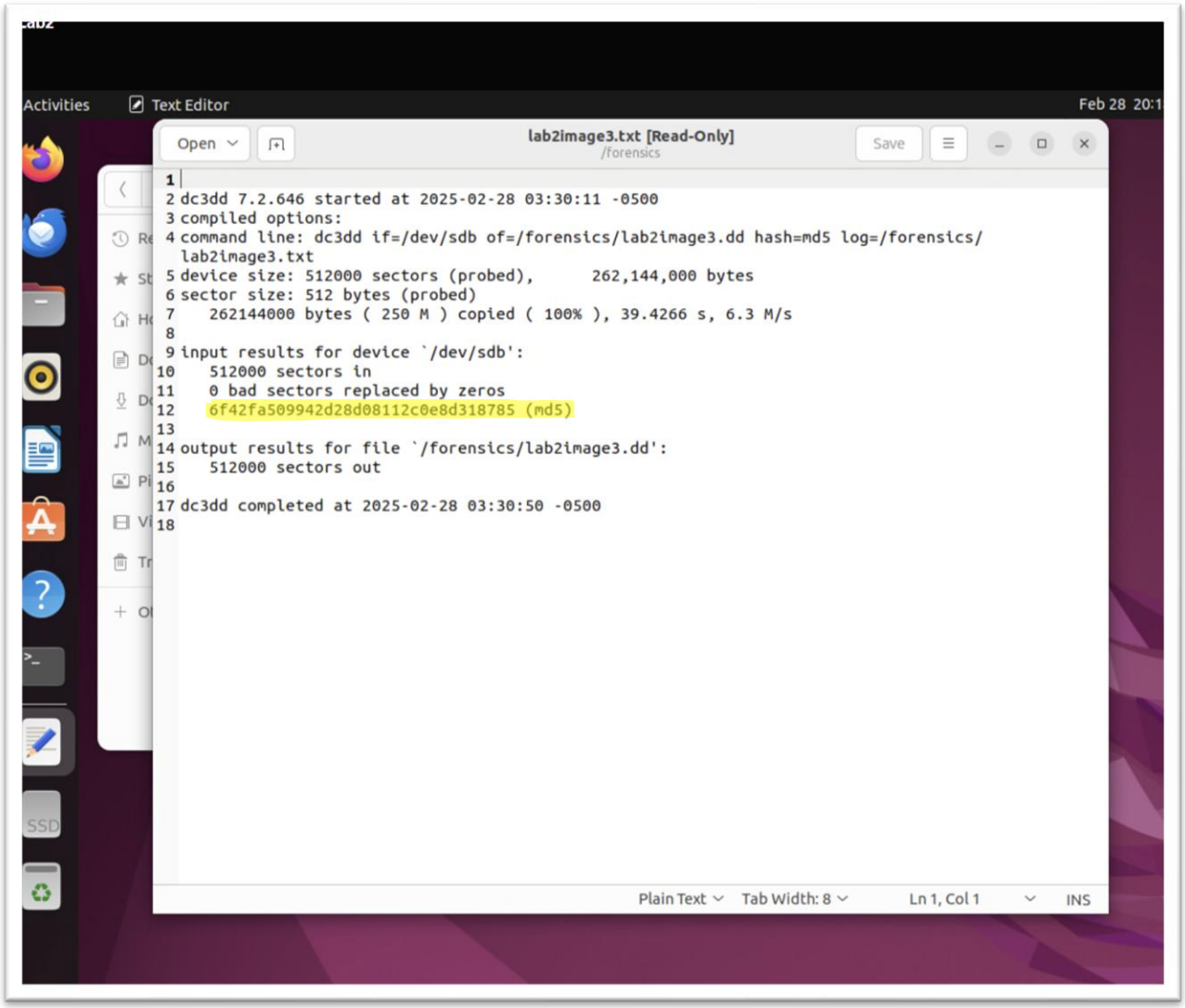
b. What two methods can you use to verify the hash of the newly created forensic image?

Ans b. Two different methods to verify hash values are:-

- **Md5sum**- Enter md5sum /forensics/lab2image3.dd and then verify this output with original hash of lab2image3.txt.
- **Dc3dd**- Enter sudo dc3dd if=/forensics/lab2image3.dd hash=md5 and this recalculates the hash values.

c. What is the MD5 hash of the new lab2image3.dd file?

Ans c. MD5 hash value is- 6f42fa509942d28d08112c0e8d318785 (highlighted in screenshot 8).



Screenshot 8: Screenshot of hash value of "lab2image3.txt".

Additional Questions

Q1. Aside from MD5 and SHA1, what other hashing algorithms can be used to verify digital evidence? List two.

Ans1. Aside from MD5 and SHA1, the other hashing algorithms are:-

- SHA-256- A robust cryptographic hash function with better collision resistance.
- SHA-512- A more and better secure and high integrity robust algorithm with 512-bit hash.

Q2. Would it be useful for a digital forensic investigator to use multiple hashing algorithms to verify digital evidence?

Ans2. Yes, multiple hashing algorithm could be useful as:-

- **Reliability**- If one of the algorithms failed to give correct results, we can depend on other algorithms for accurate outputs.
- **Cross-Validation**- Using multiple hashing algorithm helps us to check if the original data has been altered or not during forensic investigation.

Q3. Research and identify two other forensic drive imaging programs aside from guymager and dc3dd.

Ans3. Two other forensic drive imaging programs are:-

- **FTK Imager**- it is one of the most crucial and widely used forensic tool that helps in creating copy data images, hash values and program logs.
- **Ddrescue**- it is a toll designed specially to recover a lost data from damaged or stolen disks or drivers while minimizing any further data loss.

Q4. One tool we did not get to use during this lab is a write blocker. Describe what a write blocker is and its significance to digital forensic practitioners.

Ans4. A write blocker is a tool used on hardware and software and prevents modification of data inside them during anu crucial forensic investigation. Its significance are:-

- **Data Integrity**- It basically prevents any intentional or accidental modifications on the data which is under investigation, keeping evidence in original state.
- **Legally Practice**- It helps in keeping a healthy legal ethics and practice and also ensure that the evidence remains untouched by anyone.