M4 Lab: File System (Part 1)

CITA 171: OPERATING SYSTEM USE & ADMIN

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3 CREATING A NEW VIRTUAL DISK

This lab requires a new blank disk. This section shows how to create and add a new virtual disk.

1. Start the VirtualBox Manager
2. Make sure the CITA 171 VM is powered off.
3. Select the VM and click **Settings**. See Figure 1.

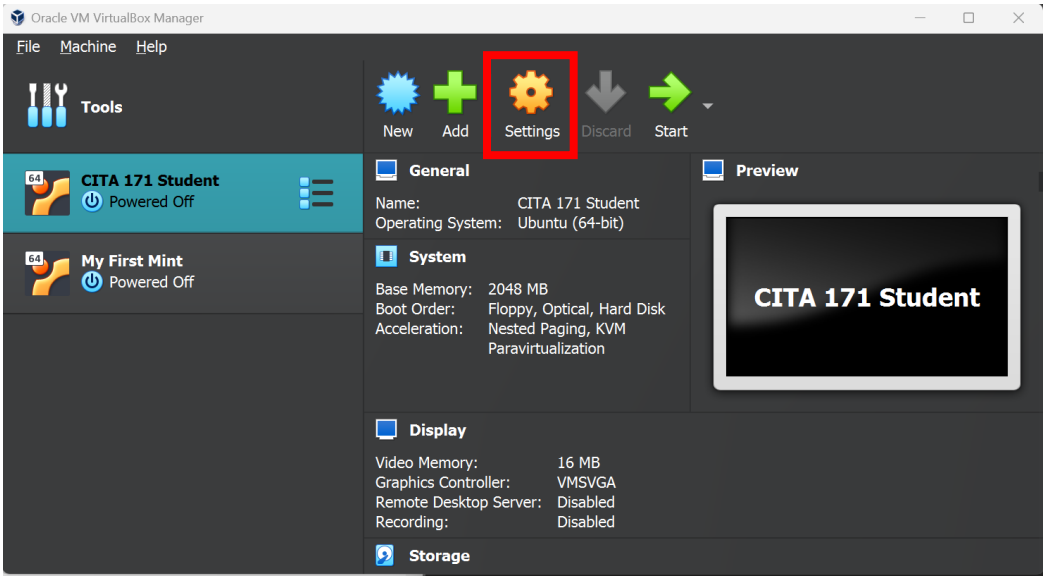

Figure 1. Preparing to Add a Virtual Disk

4. Click **Storage** and **Controller: SATA**. Click the **Add hard disk** button. See Figure 2.

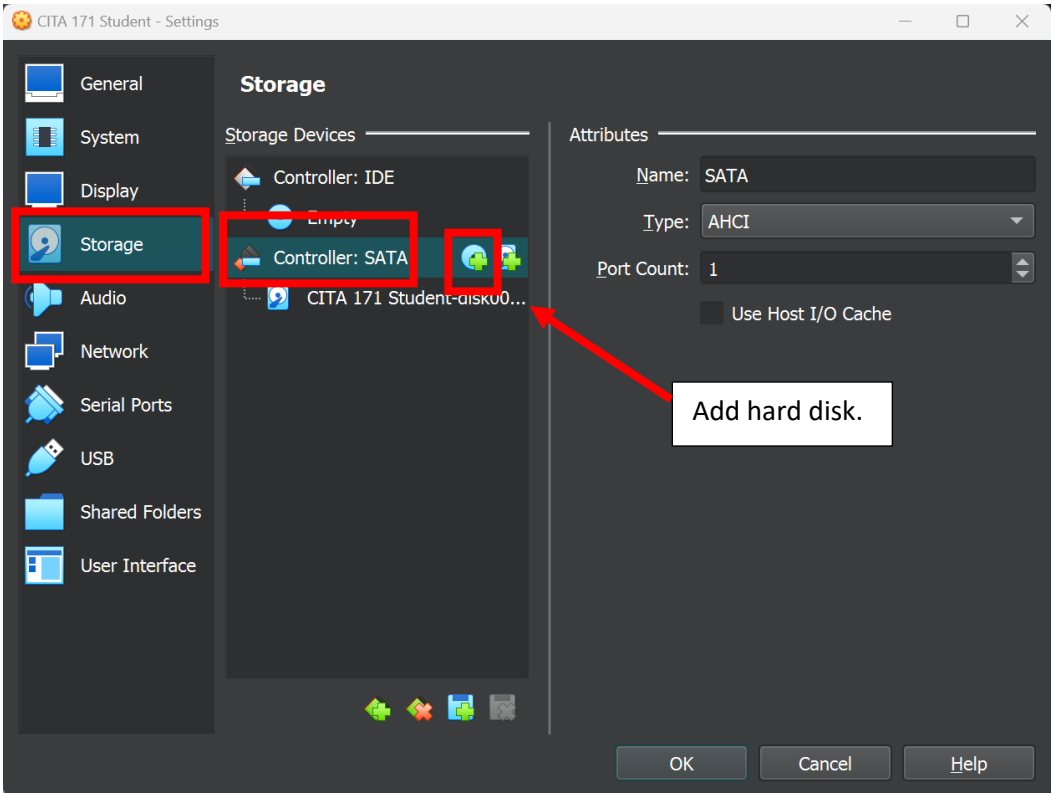

Figure 2. Choosing a New SATA Disk

5. Click Create. See Figure 3.

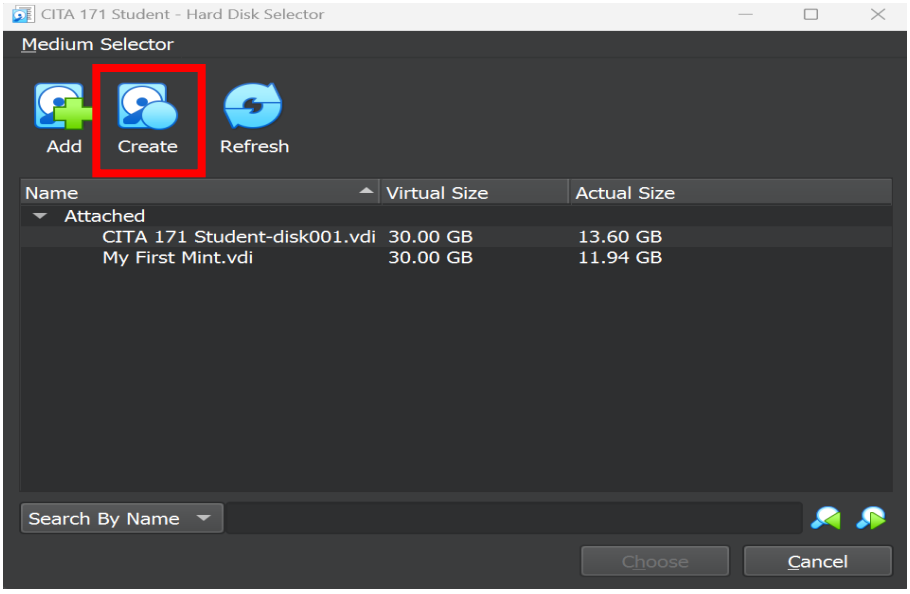

Figure 3. Creating a New Disk

6. Make sure **VDI** is selected. Click **Next**. See Figure 4.

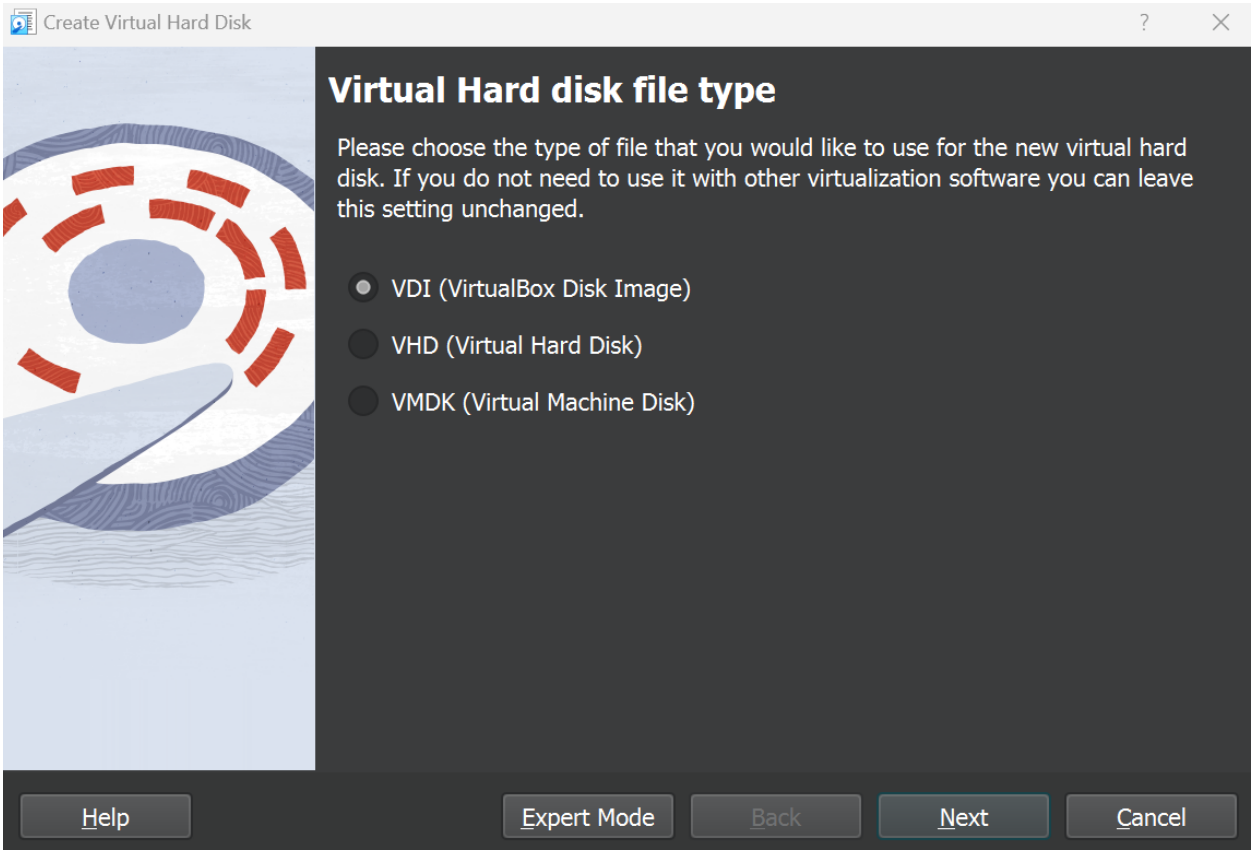

Figure 4. Choosing VDI Disk File Type

7. Make sure **Dynamically allocated** by leaving options unchecked. Click Next. See Figure 5.

Figure 5. Choosing Storage Type

8. Note the location where this virtual disk file will be created. Also, note the new virtual disk file name. Set the size to 8 GB and click **Finish**. See Figure 6.

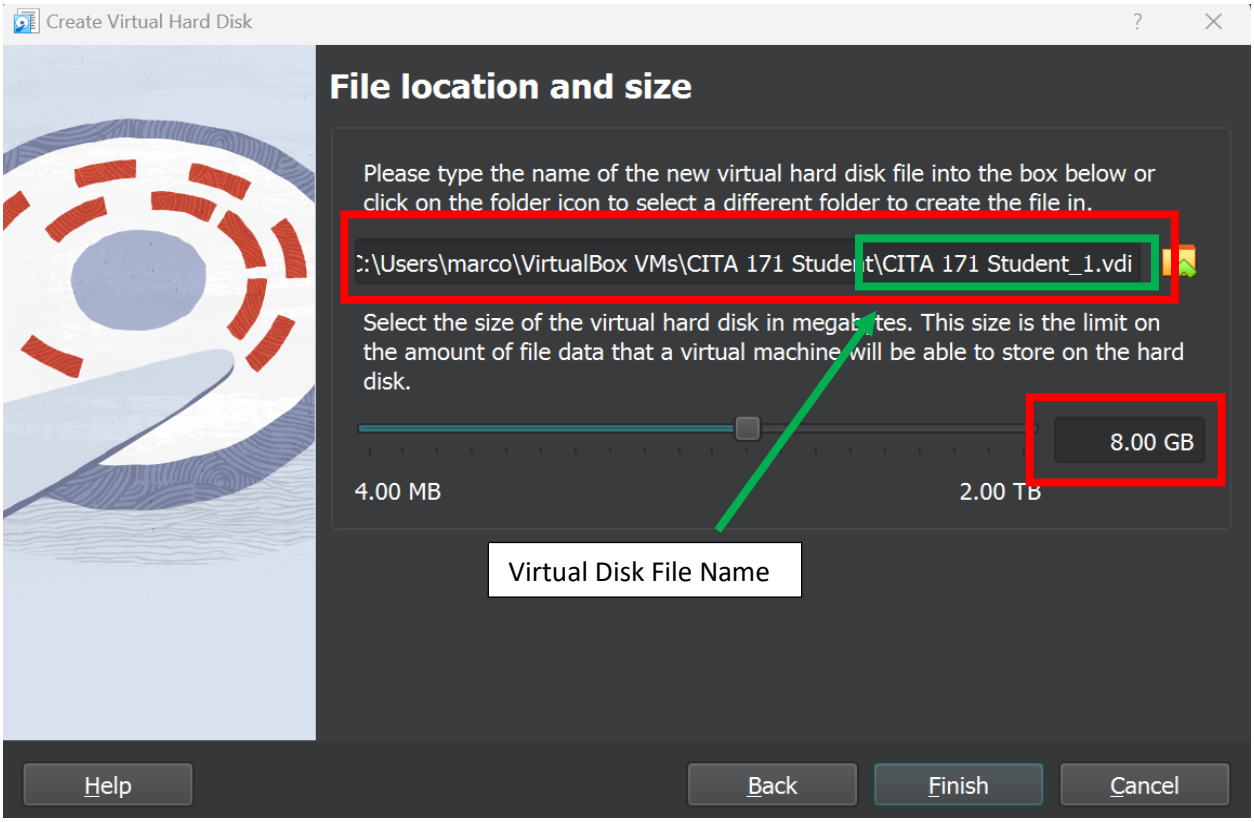

Figure 6. Choosing Disk File Location and Size

9. Scroll down to the **Not Attached** section. Make sure the correct new virtual disk file name (see Figure 6) is selected. Click **Choose**. See Figure 7.

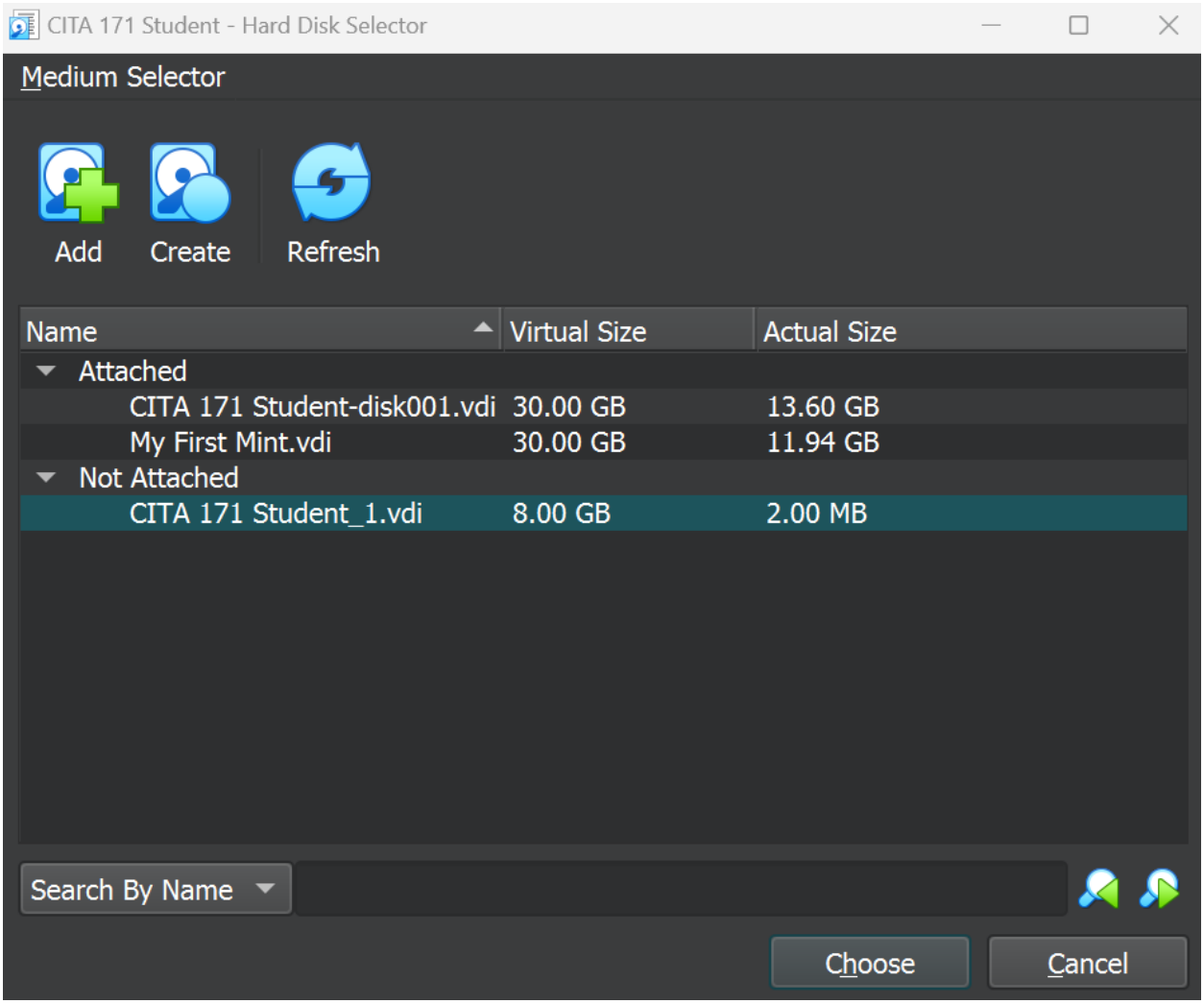

Figure 7. Selecting a New Virtual Disk

10. Note the new virtual disk and its information. See Figure 8. Click **OK**.

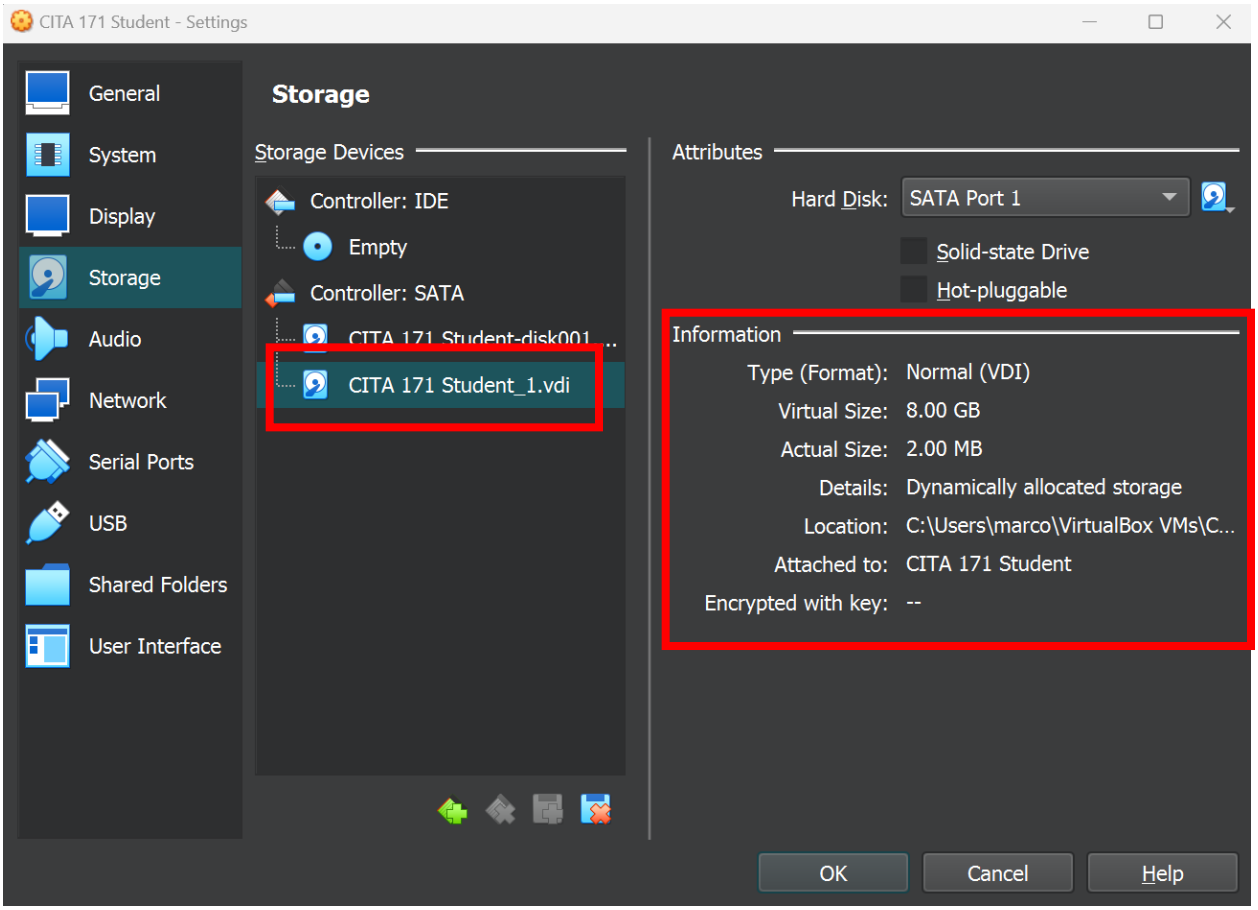

Figure 8. Created New Virtual Disk

11. Start the CITA 171 virtual machine and log in.

4 PARTITIONING AND FORMATTING A NEW DISK

Before a disk can be used for storage, the disk must be **partitioned** and **formatted**. A partition is a **logical** section of a disk. Formatting means installing a file system.

1. Start a Terminal program. (See Unit 03 Lab)
2. Execute the **lsblk** command. If a new disk named **sdb** is shown, it means the operating system has successfully detected the new virtual disk. See Figure 9. The OS Detected a New Disk. Linux uses the following disk naming convention.

Table 1. Linux Disk Naming Convention (sdb)

s	d	b
Disk Interface (SATA or SCSI)	Disk	Second disk (“b” is the second alphabet.)

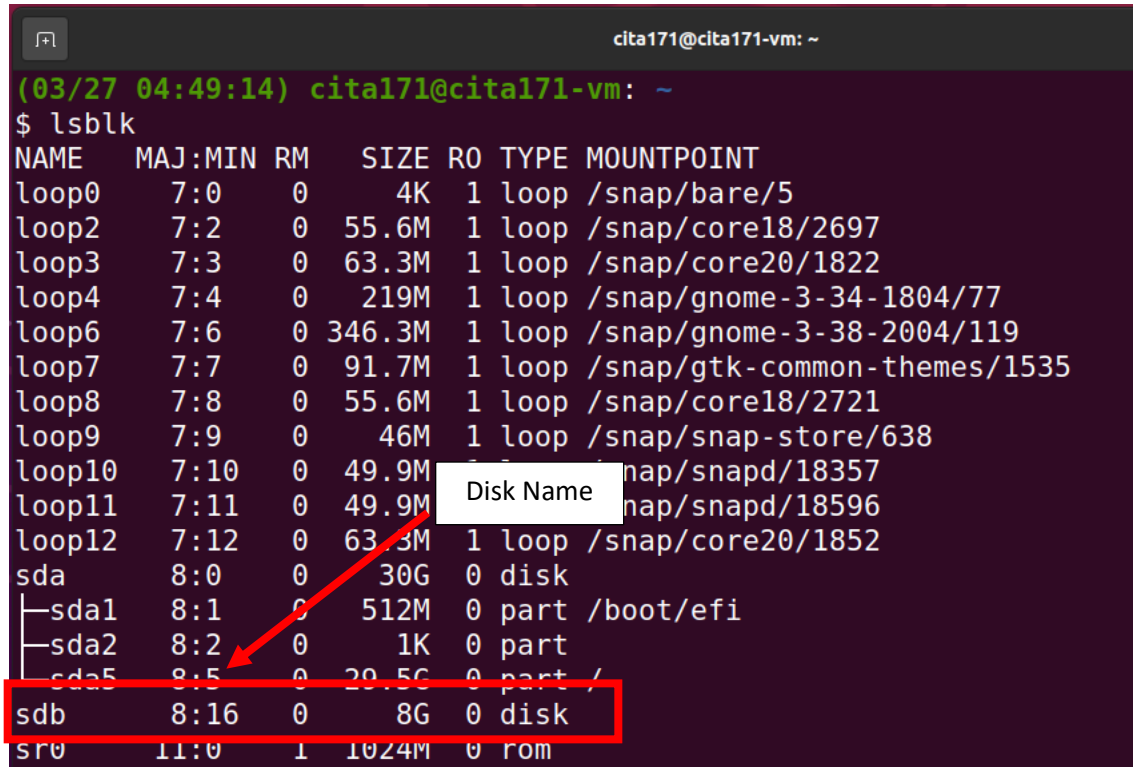

Figure 9. The OS Detected a New Disk

3. To partition, a GUI tool called **gparted** is used. This tool is not installed by default. To install, execute the following sudo command, as shown in Figure 10. When the system prompts for a password, type **cita171**. Press **Enter** when prompted Y/n.

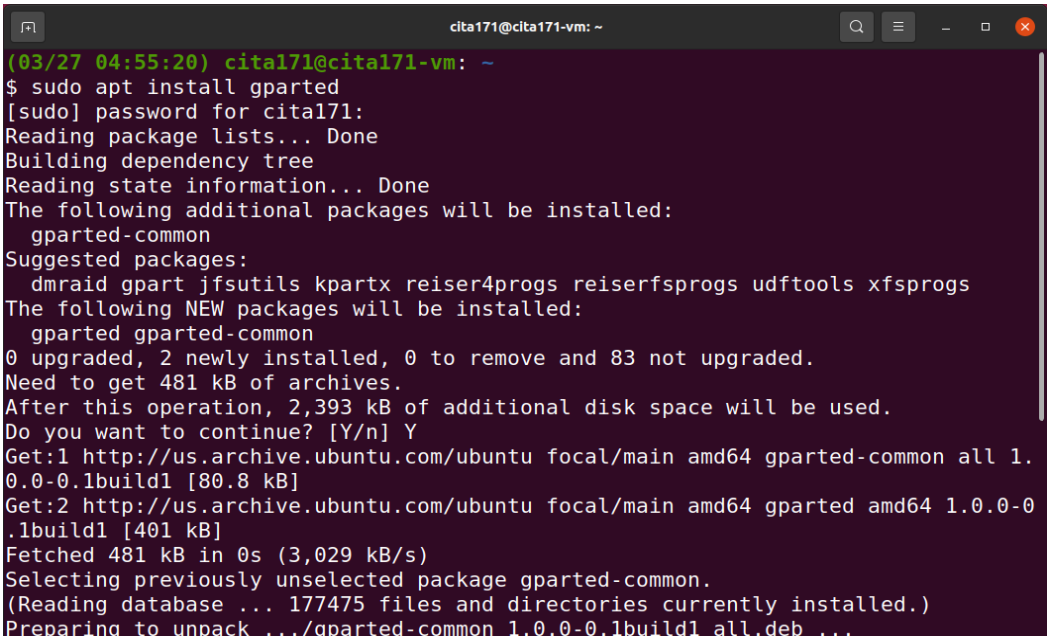

Figure 10. Installing gparted

4. To start gparted, press the App button and type gparted. Click the gparted icon. See Figure 11.

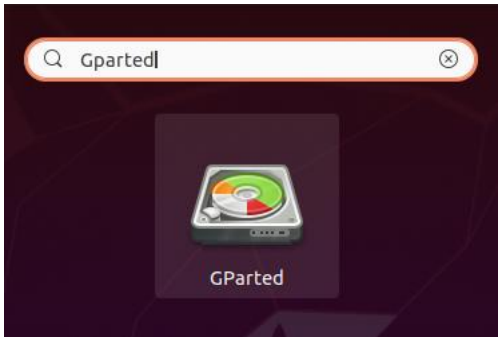

Figure 11.Starting gparted

5. Because partitioning a disk is a system administrator's task, regular users (non-administrator users) cannot use gparted. The user cita171 is a special user that can temporarily elevate itself to an administrator if the sudo command is used. Type **cita171** and press Enter. See Figure 12.

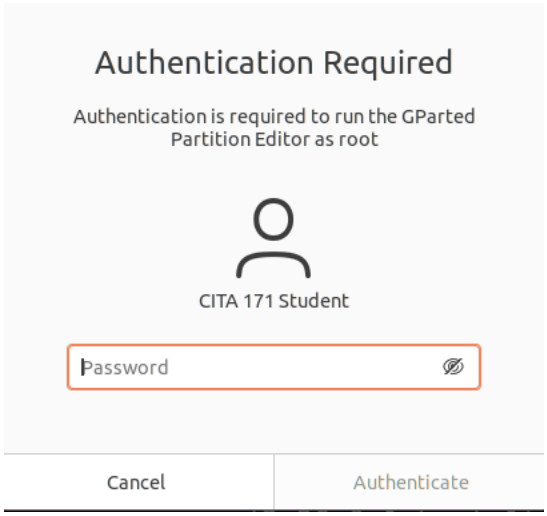

Figure 12. Temporarily Elevating to be an Administrator

6. Choose **sdb** disk. Notice that the entire disk space is shown to be **unallocated** (not partitioned). See Figure 13.

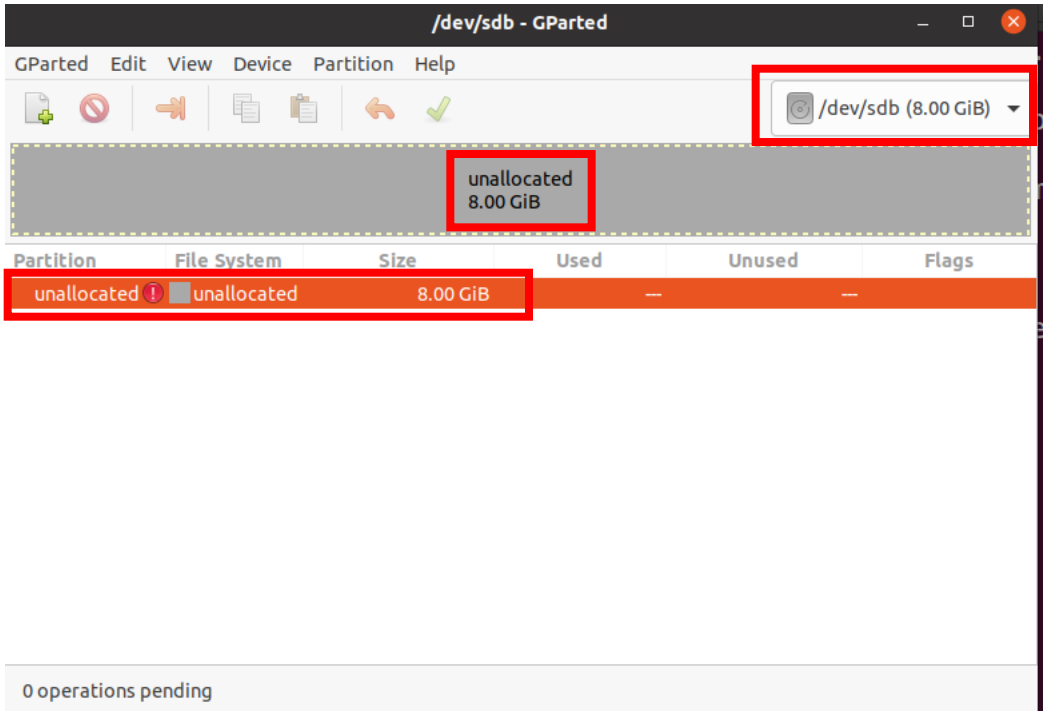

Figure 13. gparted Screen

7. Before partitioning a disk, the partition table layout format must be selected. A partition table is a data structure to hold the information about the partitions created on the disk. Before a partition can be created, a partition table must be created. There are two popular formats:
    a. MBR (also known as msdos for a historical reason)
    b. GPT

    MBR is older than GPT. To choose a format, choose **Device** > **Create Partition Table….** See Figure 14.

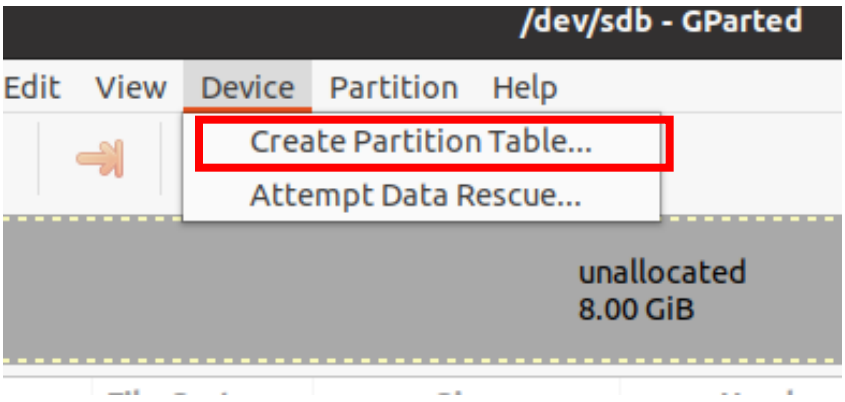

Figure 14. Creating a Partition Table

8. A warning is shown because creating a new partition table will make the data already stored on the disk inaccessible. See Figure 15. Note that MBR (msdos) is selected. Click **Apply** to create it.

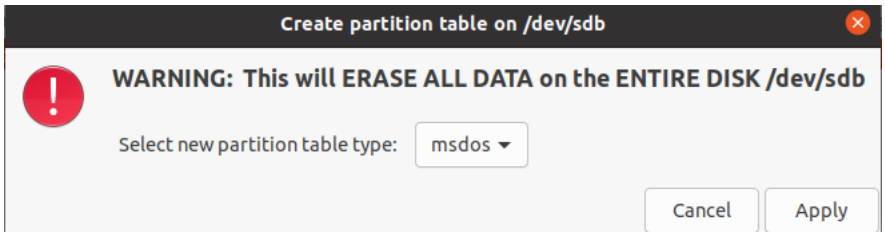

Figure 15. A Warning Because of Data Loss

9. To create a new partition, choose **Partition** > **New**. See Figure 16.

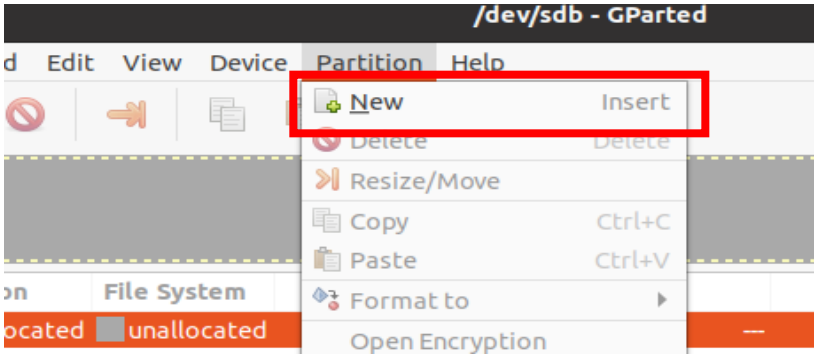

Figure 16. Creating a New Partition

10. To create a 4GB partition, enter **4096** into the **New size** box. Note that the file system is set to be **ext4**. Click **Add**. See Figure 17.

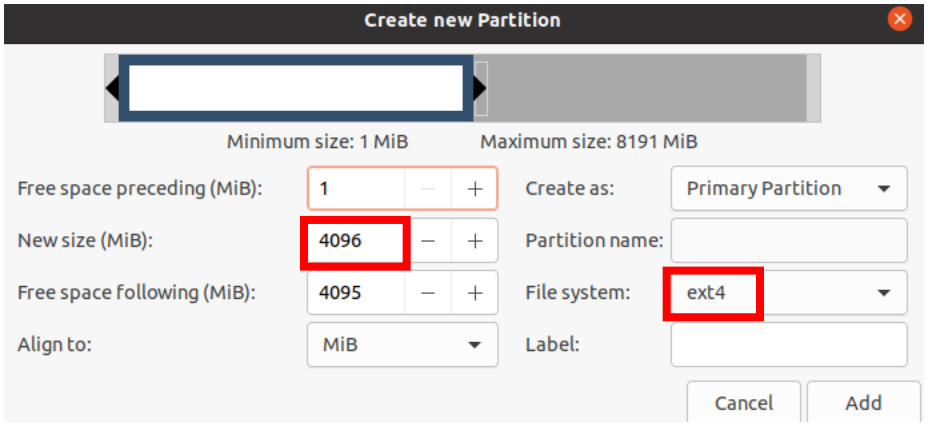

Figure 17. Creating a 4GB ext4 Partition

11. At this point. The partition information has not yet been saved to the disk. The operation is still pending. Note that there are still 4GB of unallocated space left. Because MBR is used, **three** more primary partitions can be created using this unallocated space. Click the green checkmark.

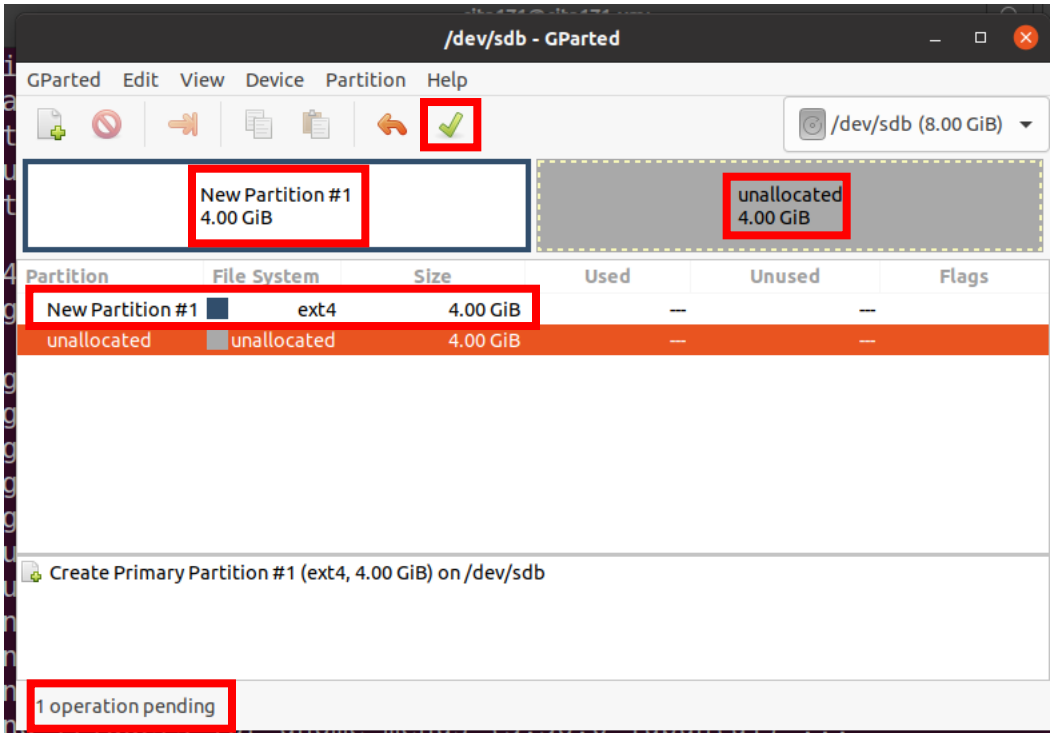

Figure 18. A New Partition Ready to be Created

12. A warning message appears because the creation of this new partition makes the data already stored on the disk inaccessible. Click **Apply**. See Figure 19.

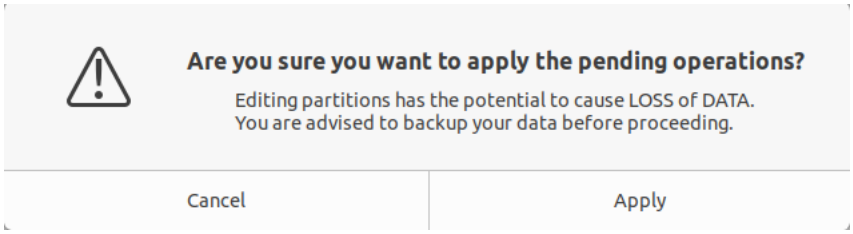

Figure 19. Last Warning

13. When the completion message appears, click Close. See Figure 20.

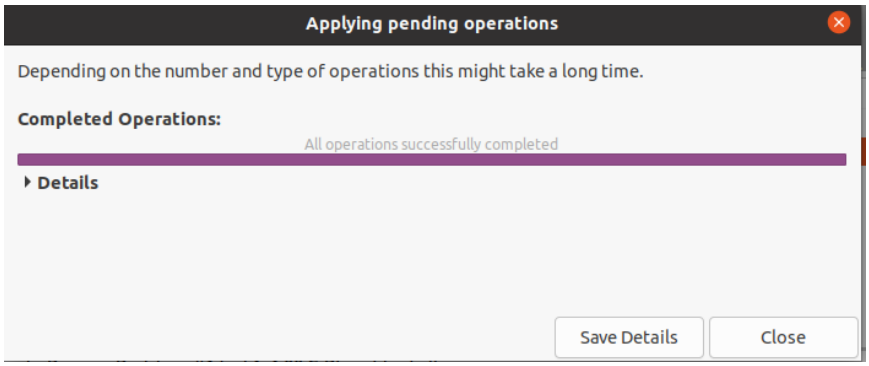

Figure 20. New Partition Created

14. Note that the partition name is **sdb1**. The number "1" means "partition 1". Close gparted.

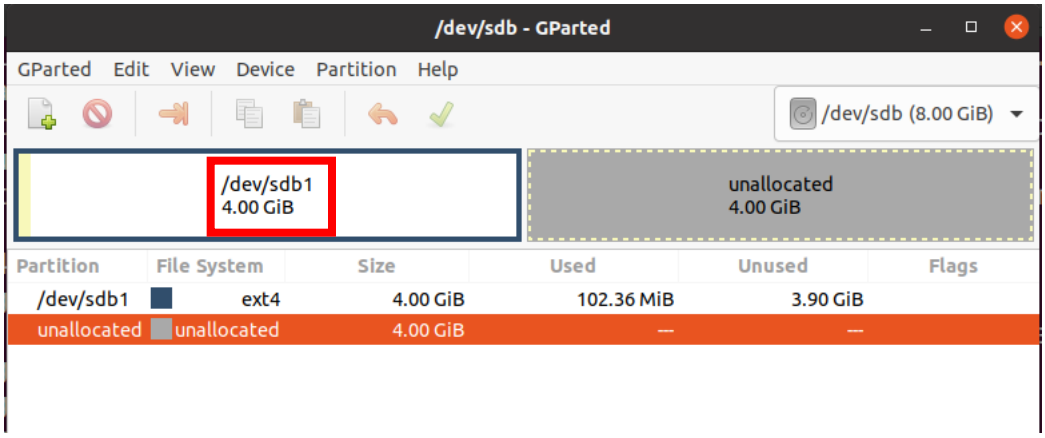

Figure 21. New Partition

15. Open **Files** (File Explorer for Ubuntu) and click Other Locations.

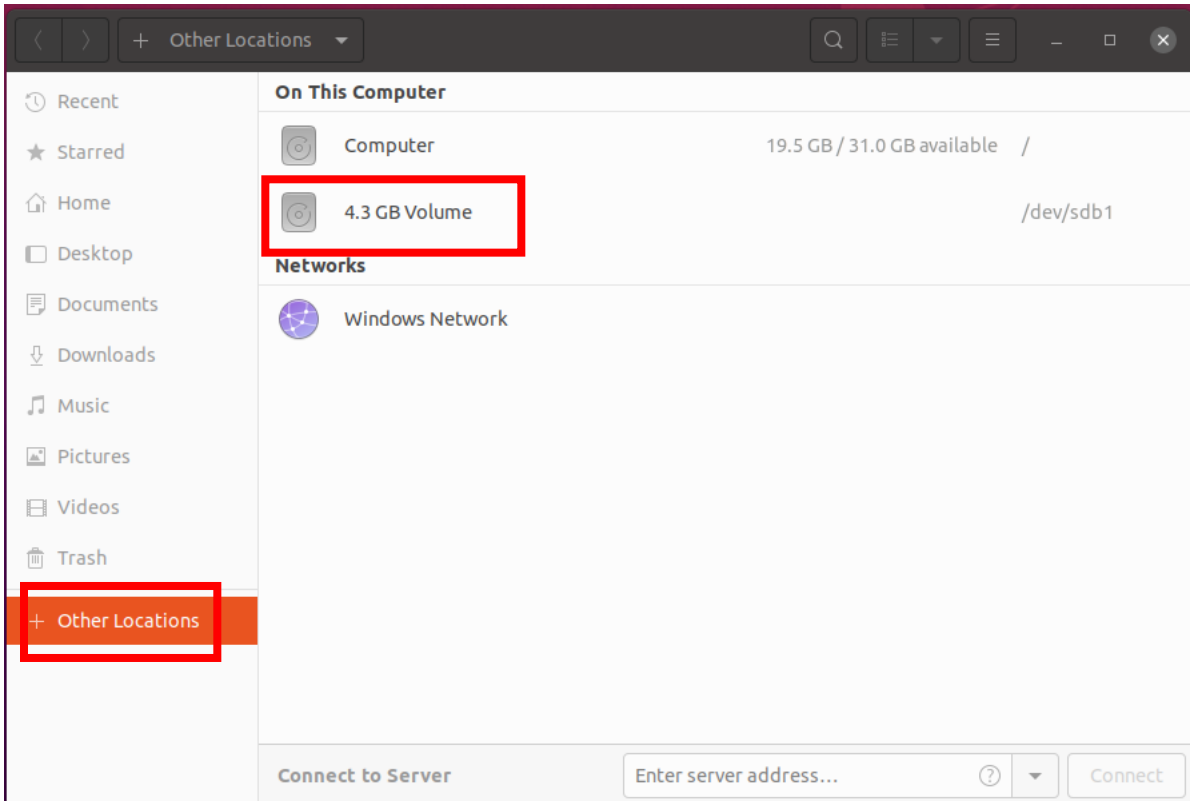

Figure 22. New Partition is Ready to be Used