**LVM**

The objective of this task is to provide hands-on experience with Logical Volume Management (LVM) on Ubuntu, whether it's running within WSL or VirtualBox. The task covers the creation of logical volumes, resizing, and working with snapshots.

* **Environment Setup:**
  + Ensure that Ubuntu is running within VirtualBox.

Verify that the required LVM packages are installed. If not, install them using the package manager (apt).

### **Adding a Disk to VirtualBox:**

In VirtualBox, adding a disk involves creating a new virtual hard disk and attaching it to the virtual machine.

* Open VirtualBox:
  + Open VirtualBox and select the virtual machine to which you want to add a disk.
* Create a New Virtual Hard Disk:
  + In the virtual machine settings, go to the "Storage" tab. Under the "Controller: IDE" or "Controller: SATA," click on the empty disk icon to add a new hard disk.
  + Follow the wizard to create a new virtual hard disk. Specify the size and location of the new disk file.
* Attach the Disk:
  + Once created, click on the "Empty" disk icon again and choose the newly created virtual hard disk from the list.
* Boot Virtual Machine:
  + Start the virtual machine. The new disk should appear as an additional drive within the virtual machine.
* Partition and Format:
  + Inside the virtual machine, use tools like fdisk, parted, or a graphical partition manager to create partitions on the new disk.
* Format the Partition:
  + Format the partition with a filesystem of your choice.
* Mount the Disk:
  + Mount the disk to a directory within the virtual machine.

**Partitioning and Physical Volume Creation:**

* + Use a tool like fdisk or parted to create partitions on a virtual disk within your Ubuntu environment. Initialize these partitions as Physical Volumes (PVs) for LVM.

sudo pvcreate /dev/sdX1

* **Volume Group Creation:**
  + Combine the created Physical Volumes into a Volume Group (VG) using the vgcreate command.

sudo vgcreate myvg /dev/sdX1

* **Logical Volume Creation:**
  + Create a Logical Volume (LV) within the Volume Group. Specify the name, size, and any other relevant parameters.

sudo lvcreate -n mylv -L 5G myvg

* **Filesystem Formatting and Mounting:**
  + Format the created Logical Volume with a filesystem (e.g., ext4) and mount it to a directory.

sudo mkfs.ext4 /dev/myvg/mylv

sudo mkdir /mnt/mylv

sudo mount /dev/myvg/mylv /mnt/mylv

* **Resizing Logical Volumes:**
  + Demonstrate the process of resizing Logical Volumes. Extend the size of the existing Logical Volume.

sudo lvextend -L +2G /dev/myvg/mylv

sudo resize2fs /dev/myvg/mylv

* **Snapshot Creation:**
  + Explore the concept of LVM snapshots. Create a snapshot of the existing Logical Volume.

sudo lvcreate --snapshot -n mylv\_snapshot -L 1G myvg/mylv

**Cleanup:**

* Perform cleanup by unmounting the logical volume, deactivating the volume

sudo umount /mnt/mylv

sudo lvremove /dev/myvg/mylv

sudo vgchange -an myvg