### **Implement File Locking**

Learn how to use the flock command to implement file locking in Linux.

Create a Shared Resource:

* + Create a simple text file, for example, named shared\_resource.txt. This file will represent a shared resource that multiple processes may want to access.

Write a Script with File Locking:

* + Write a Bash script that uses the flock command to obtain an exclusive lock before reading or modifying the content of the shared\_resource.txt file.

Test the File Locking Script:

* + Create multiple instances of the script and run them simultaneously. Observe how the file lock prevents concurrent access to the shared resource.

Extend the Script:

* + Modify the script to perform specific operations on the shared resource (e.g., reading, appending data, etc.).
  + Observe the behavior when multiple processes try to access the shared resource concurrently.

Explore Locking Scenarios:

* + Test different locking scenarios, such as exclusive locks (flock -x), shared locks (flock -s), etc., and observe how they affect concurrent access.

### **User and Group Management**

### Learn how to manage user and group identities in Linux using commands like useradd, usermod, groupadd, and others.

* Create a New User:
  + Use the useradd command to create a new user named student1.
  + Use the passwd command to set a password for the newly created user.
  + Use the groupadd command to create a new group named class.
  + Use the usermod command to add the user student1 to the class group.
  + Create a directory named shared\_folder and set appropriate permissions.

sudo chmod 770 /shared\_folder

* + Log in as student1 and create a file in the /shared\_folder directory.
  + Check that the file is owned by student1 and belongs to the class group.
  + Use the id command to display the user and group IDs of student1.
  + Use the usermod and groupmod commands to modify the details of the student1 user and class group (e.g., change the home directory, shell, etc.).
* Cleanup:
  + Remove the user and group created in the previous steps.

sudo userdel -r student1

sudo groupdel newclass

**Linux Services**  
  
Service Management

# Install Apache web server

sudo apt-get update

sudo apt-get install apache2

* Start the service
* check the service status
* stop the service
* make the service run automatically after reboot

### Service Troubleshooting

# Edit Apache service file with intentional mistake

sudo nano /etc/systemd/system/apache2.service

* Check the status to identify issues
* View detailed logs

### Custom Service Creation

* Create a custom service file
* Reload Systemd and Enable/Start the Service
* start the service