**Linux User & Group Management + Process Management**

**📘 Linux User & Group Management**

**🔹 1. User Management Basics**

* Linux madhe pratyek user la ek **UID (User ID)** asतो.
* System users (UID < 1000) → system daemons.
* Normal users (UID ≥ 1000) → login users.

**📌 Important Files**

* /etc/passwd → User account info
* sagar:x:1001:1001:Sagar Gharge:/home/sagar:/bin/bash
  + Username: sagar
  + Password: x → stored in /etc/shadow
  + UID: 1001
  + GID: 1001
  + Comment field (Full name)
  + Home directory: /home/sagar
  + Shell: /bin/bash
* /etc/shadow → Encrypted password & aging info
* /etc/group → Group details

**🔹 2. User Management Commands**

# Add new user

useradd sagar

# Add user with home dir & shell

useradd -m -s /bin/bash sagar

# Set password

passwd sagar

# Modify user (change shell)

usermod -s /bin/zsh sagar

# Delete user

userdel -r sagar

**🔹 3. Group Management Commands**

# Add group

groupadd developers

# Add user to group

usermod -aG developers sagar

# Change user’s primary group

usermod -g developers sagar

# Delete group

groupdel developers

**🔹 4. Sudo Access**

* Sudo means → Superuser privileges.
* Config file: /etc/sudoers
* Edit with → visudo

sagar ALL=(ALL) NOPASSWD:ALL

**🔹 Interview Q&A (Users & Groups)**

* **Q:** Where are user account details stored?  
  **A:** /etc/passwd (UID, GID, shell, home dir), /etc/shadow (password), /etc/group.
* **Q:** Difference between primary & secondary groups?  
  **A:** Primary group is default group of user, secondary groups provide extra access.
* **Q:** How to lock a user account?  
  **A:** passwd -l username or usermod -L username.

**📘 Linux Process Management**

**🔹 1. What is a Process?**

* Running instance of a program.
* Each process has a **PID (Process ID)**.
* Types:
  + **Foreground process** → runs in terminal.
  + **Background process** → runs behind (&).
  + **Daemon process** → system services (sshd, cron).

**🔹 2. Process Commands**

**Check Running Processes**

ps # Show processes

ps -ef # Full details

top # Live monitoring

htop # Advanced monitoring

**Control Jobs**

& # Run in background

Ctrl+Z # Suspend process

bg # Resume in background

fg # Resume in foreground

jobs # List jobs

**Kill Processes**

kill -9 PID # Kill by PID

pkill processname # Kill by name

killall processname # Kill all with same name

**Scheduling**

# Crontab (repeated tasks)

crontab -e

0 2 \* \* \* /backup.sh # Run daily at 2 AM

# One-time job

at now + 5 minutes

**🔹 3. System Performance Monitoring**

uptime # Load average

free -m # Memory usage

vmstat 2 # CPU, memory, I/O

iostat # Disk I/O

sar -u 5 # CPU usage

**🔹 Interview Q&A (Process Management)**

* **Q:** Difference between process & thread?  
  **A:** Process = independent execution, Thread = lightweight sub-process sharing resources.
* **Q:** How to find top CPU consuming processes?  
  **A:** top or ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%cpu | head.
* **Q:** What is zombie process?  
  **A:** Process completed but entry remains in process table (needs parent to clean up).
* **Q:** What is orphan process?  
  **A:** Process whose parent has terminated, adopted by init (PID 1).

✅ **Summary for Interview**:

* User management (useradd, /etc/passwd)
* Group management (groupadd, usermod -aG)
* Sudo configuration (visudo)
* Process monitoring (ps, top, htop)
* Job control (fg, bg, jobs)
* Kill commands (kill, pkill, killall)
* Scheduling (cron, at)
* Zombie vs Orphan process