### **1. Basic Commands**

* **Navigate Directories**cd — Change directory  
  cd .. — Go up one level  
  pwd — Print working directory  
  ls — List files in the directory  
  ls -l — Detailed list (permissions, size, etc.)  
  ls -a — List all files (including hidden)  
  ls -lh — List files with human-readable file sizes
* **File Operations**cp source destination — Copy a file  
  mv source destination — Move or rename a file  
  rm filename — Delete a file  
  rm -r directory — Delete directory recursively  
  touch filename — Create a new empty file  
  cat filename — Display contents of a file  
  nano filename — Edit a file with nano editor  
  chmod +x script.sh — Make script executable

### **2. User Management**

* **Add a New User**sudo adduser username — Create a new user  
  sudo usermod -aG groupname username — Add user to a group  
  sudo passwd username — Change user password
* **Switch Users**su username — Switch to another user  
  sudo su — Switch to root user  
  exit — Exit from the current user or root

### **3. System Monitoring**

* **CPU & Memory Usage**top — Display running processes  
  htop — Interactive process viewer (requires sudo apt install htop)  
  free -h — Show memory usage  
  df -h — Disk space usage  
  uptime — System uptime
* **Network Tools**ifconfig — Show network interfaces  
  ip a — List IP addresses  
  ping hostname — Ping a host to check connectivity  
  netstat -tuln — List listening ports  
  curl http://example.com — Test HTTP connection

### **4. Package Management (Raspberry Pi OS)**

* **Install, Update, and Remove Packages**sudo apt update — Update package lists  
  sudo apt upgrade — Upgrade installed packages  
  sudo apt install package-name — Install a package  
  sudo apt remove package-name — Remove a package  
  sudo apt autoremove — Remove unused dependencies
* **Search Packages**apt search package-name — Search for a package  
  dpkg -l — List installed packages

### **5. GPIO Pin Control**

* **Enable GPIO** (if not already enabled)  
  Use raspi-config to enable the GPIO pins:  
  sudo raspi-config  
  Navigate to **Interfacing Options** > **GPIO** > Enable.

**Control GPIO Pins**Install gpio tools:  
sudo apt install wiringpi (or sudo apt install python3-rpi.gpio for Python)  
Set a pin mode:  
gpio mode 0 out — Set GPIO pin 0 as output  
gpio write 0 1 — Set GPIO pin 0 high (3.3V)  
gpio write 0 0 — Set GPIO pin 0 low (0V)  
**Example (Python)**python  
Copy code  
import RPi.GPIO as GPIO

GPIO.setmode(GPIO.BCM) # Or GPIO.BOARD

GPIO.setup(18, GPIO.OUT)

GPIO.output(18, GPIO.HIGH) # Set GPIO 18 high

GPIO.cleanup() # Reset GPIO pins

### **6. File Permissions & Ownership**

* **Change Permissions**chmod 755 file — Set file permissions (read/write/execute)  
  chmod 777 file — Allow everyone full access (be cautious)  
  chmod +x file.sh — Make a script executable
* **Change Ownership**sudo chown user:group file — Change owner and group of a file