Here is a detailed **sentence-by-sentence study guide** for the document **“Disk Usage Commands Notes”**, formatted into **bullet-point study notes** and aligned with **CompTIA A+ 220-1102 Objective 1.9** (Linux commands).

**🧮 Study Notes – Disk Usage Commands in Linux (df and du)**

**📘 Overview**

* The lesson covers two key Linux disk-related commands:
  + df – Displays **file system disk space usage**.
  + du – Displays **directory-level disk usage**.

**📊 The df Command – Display File System Disk Space Usage**

**🧪 Getting Help with df**

* Typing df --help displays usage information for the df command.
* To avoid overwhelming output, use a **pipe (|) with more** to scroll one screen at a time:
  + df --help | more

**⚙️ How df Works**

* Basic syntax: df [options] [file]
* Shows:
  + File system details
  + 1K blocks (disk blocks)
  + Used space
  + Available space
  + Percentage used
  + Mount location

**🧾 Example Output (Explained)**

* Example:
  + udev – A virtual file system (0% used, mounted at /dev)
  + Root (/) directory:
    - Mount point: /
    - Uses approx. **55%** of disk space
    - Device: /dev/sd5
    - Total used: ~8.7 GB
* The command df | more helps you scroll through the list.

**📌 Tip**

* Use clear before running df to reset your terminal view.

**📂 The du Command – Display Directory Usage**

**📖 Getting Help with du**

* Like df, use du --help | more to see documentation one page at a time.
* Basic syntax: du [options] [files or directories]

**🧰 How du Works**

* Summarizes disk usage for:
  + Individual files
  + Directories
  + Subdirectories (recursively)
* Example usage:
  + du ~/Downloads

**📁 Example Output Explained**

* Downloads folder shows:
  + Subfolders B\_words and C\_words each use **4K**
  + Full Downloads directory uses **12K**
    - Why? It includes:
      * B\_words (4K)
      * C\_words (4K)
      * . and .. (each 4K)
* Verification using ls -la shows folder sizes are consistent with du output (4096 bytes = 4K).

**🔒 Permissions Note**

* Running du / as a **regular user** shows many “Permission Denied” messages.
  + This happens because:
    - System directories require **admin (sudo)** rights.
  + Workaround:
    - Run du in user-accessible locations (e.g., ~/home).

**🏠 Home Directory Example**

* du ~ | more shows:
  + Folder sizes in your home directory (including hidden folders).
  + Example: total usage is ~8628K (≈ 8MB).
* Empty folders like Documents and Videos show only **4K**, indicating no contents.

**🧠 Summary – When to Use df vs du**

| **Command** | **What It Shows** | **Best Use** | **Output** |
| --- | --- | --- | --- |
| df | Overall disk usage of file systems | View free space, percentage used, and mount points | System-wide info |
| du | Usage of specific folders or files | Drill into which folders use the most space | Directory-level detail |

**📌 Key Takeaways**

* df:
  + Views device storage details: total size, used/available, percent used, and mount points.
* du:
  + Measures actual usage per file or folder.
  + Great for identifying large folders or cleaning up space.

**🧪 Linux Concepts Covered**

* **Piping (|) with more** – Allows paginated viewing of long command outputs.
* **Permissions** – Some system directories are not readable by standard users.
* **Unit Conversion** – Understand that:
  + 4096 bytes = 4 KB
  + 1024 KB = 1 MB
  + 1024 MB = 1 GB

**🎯 CompTIA A+ 220-1102 Exam Relevance**

You need to know:

* What df and du are used for
* Syntax and typical use cases
* How to read and interpret their outputs
* Difference between **file system usage** (df) vs **directory usage** (du)
* Navigating permissions and using tools like more to manage output

Would you like:

* A **quiz** based on these commands?
* A **cheat sheet** comparison?
* A **Linux troubleshooting scenario** using df or du?

Let me know how you want to continue!