Linux Commands Assignment: Institute Infrastructure Simulation

Scenario:

You are the system administrator of *SunBeam Institute*, represented using directories and files in Linux.

- **SunBeam** → Main Building (parent directory for this project)
- **Floors** → Subdirectories (ground_floor, first_floor, second_floor)
- **Halls** → Subdirectories inside each floor (like KRISHNA, NIRA, etc.)
- **Courses** → Directories inside each hall with student files (for example: d1, d2, … for DAC students in KRISHNA hall).

Your task is to create, organize, and manage this structure using Linux commands. Answer the following step-by-step tasks. Use **both absolute and relative paths** wherever possible.

Part A: Directory and File Creation

1. Create a main directory named `SunBeam`.
2. Inside `SunBeam`, create three subdirectories: `ground_floor`, `first_floor`, `second_floor`.
3. In the `ground_floor` directory, create subdirectories `KAVERI`, `KRISHNA`, and `VENNA`.
4. In the `first_floor` directory, create subdirectories `WARANA`, `NIRA`, `INDRAYANI`, `PURNA`, `PRAVARA`, `KOYANA`.
5. In the `second_floor` directory, create subdirectories `Library`, `CT-01`, `CT-02`, and `CT-03`.
6. In the `KRISHNA` hall, create a directory named `DAC` and inside it create 10 student files: `d1`, `d2`, …, `d10`.
7. In the `NIRA` hall, create a directory `DESD` with student files `e1` to `e10`.
8. In the `PURNA` hall, create a directory `DITISS` with student files `c1` to `c10`.
9. In the `PRAVARA` hall, create a directory `DBDA` with student files `b1` to `b10`.
10. In the `WARANA` hall, create a directory `DMC` with student files `w1` to `w10`.

(Hint: Use `mkdir`, `touch`, and correct paths.)

Part B: File and Directory Operations

Add the following students in each course:

`student1 student2 student3 amit domnic keshav rudra bishop cyrus`

11. Move student `d5` from `KRISHNA/DAC` hall to `NIRA/DESD`.
12. Copy student `c3` from `PURNA/DITISS` to `PRAVARA/DBDA`.
13. Remove student `e10` from `NIRA/DESD`.
14. Rename student `w4` to `w4_updated`.
15. Move the directory `CT-02` into `Library`.

(Hint: Use `mv`, `cp`, `rm`, `rmdir` with both relative and absolute paths.)

Part C: Listing and Viewing

16. List all halls present in the `First` floor. (Use relative path).
17. List all student files inside `DAC` sorted alphabetically in **reverse order**.
18. Create a file `all_students.txt` in the `SunBeam` directory which contains a list of all students from all courses.
19. Display the content of `all_students.txt` using:

- `cat` (normal order)
- `tac` (reverse order)

20. Display the unique list of student names from `all_students.txt`.

(Hint: Use `ls`, `cat`, `tac`, `sort`, `uniq`.)

Part D: Path Practice

21. From your home directory, display the contents of the `DBDA` hall using **absolute path**.
22. From inside the `NIRA/DESD` directory, access students in `DAC` hall using **relative path**.
23. From inside the `Ground` directory, move `VENNA` hall to the `Second` floor using **relative path**.
24. From anywhere, remove the empty directory `CT-03` using an **absolute path**.

Part E: Cleanup

25. Delete the entire `SunBeam` structure with one command when all tasks are verified.

(Hint: Use `rm -r` carefully.)