USE CASE SCENARIOS

1.

Title: Tracking Specific Types of Space Objects
Actor: Scientist
Preconditions: Scientist has logged into the system and selected their role.
Main Flow:

1. The Scientist selects the “Track Objects in Space” option.
2. The system displays four categories: Rocket Body, Debris, Payload, Unknown.
3. The Scientist selects “Debris”.
4. The system retrieves and displays a list of all debris with the following information:
    - Record ID, Satellite Name, Country, Orbit Type, Launch Year, Launch Site, Longitude, Avg. Longitude, Geohash, Days Old
5. The Scientist reviews the data and may choose to track additional categories.

Postconditions:
The data is displayed successfully, and the interaction is logged with a timestamp.

2.

Title: Assessing if Debris is Still in Orbit
Actor: Scientist
Preconditions: Scientist is logged into the system and has selected “Assess Orbit Status.”
Main Flow:

1. The Scientist selects “Assess if debris is still in orbit.”
2. The system analyzes debris using the following criteria:
    - Still in orbit if:
        - orbit type is defined
        - longitude is valid
        - days old < 15,000
        - conjunction count ≥ 1

- Exited orbit if:
    - orbit type is missing
    - longitude is missing/zero
    - days old > 15,000
    - conjunction count = 0

3. The system calculates orbital drift:
    - |longitude - avgLongitude|
    - Risk level is assigned as:
        - Drift > 50 → High
        - Drift > 10 → Moderate
        - Else → Low
4. A new CSV is written with:
    - still_in_orbit column (true/false)
    - risk_level column (Low, Moderate, High)
5. A TXT report is created listing all exited debris with full metadata.
6. System logs the action.

Postconditions:
CSV and TXT reports are created, and orbit status is updated for each object.