**Project Title:** Student-Led Waste Collection Optimization

**Problem Description:** Optimizing waste collection in a hostel where students are responsible for disposing of waste when bins are full, ensuring efficient sorting and disposal.

**Scenario:** A hostel in Rome with multiple apartments needs to manage waste collection considering:

1. **Waste Sorting:** The student sorts the garbage into designated bins for Plastic, Paper, and Organic waste.
2. **Bin Monitoring:** Regular checks are conducted to monitor the capacity levels of the bins.
3. **Bag Replacement:** Full bins have their bags replaced with new ones by the student.
4. **Waste Disposal**: Full bags are taken outside the hostel for disposal in city dustbins.
5. **Weekly Collection:** A designated truck collects the full bins weekly for each waste category.
6. **Transport to Junkyard:** The collected waste is transported to the junkyard for final disposal.

**PDDL Specification:** The domain will include actions corresponding to each task listed above. At least five planning problems will be specified in PDDL, reflecting various scenarios and challenges within this domain.

**Planning and Solving**: The specified problems will be solved using a PDDL planner, with Fast Downward being the primary choice due to its robustness and support for various heuristics.

**Heuristics Testing:** The solution will be tested using three search heuristics:

hadd (Additive Heuristic)

hmax (Max-cost Heuristic)

hff (Fast-forward Heuristic)

These heuristics will help evaluate the efficiency of different planning strategies and their suitability for the defined problem.