**Example: Lift Control**

### Planning Domain Definition Language (PDDL)

- **Fixed domain**
  - (objects pa pb ... fa fb ...)
- **Closed-world states**
  - (init)
    - (passenger pa)
    - (origin pa fe)
    - (destin pa fa)
  
- **First-order formulas (closed-world semantics)**
  - (goal (not (exists (?x) (passenger x)))
  
- **Effect**
  - (lift_at(f) ^ passenger(p))
  - (and (origin(p,f) ^ served(p)))
  
- **Parameters**
  - (?p ?f)

### Rewriting ECQs into PDDL

Use standard techniques to rewrite CQs into closed-world UCQs:

- (and (lift_at(f) ^ passenger(p)))

**Not suited for state-of-the-art planners:**
- FO-formulas need to be pre-processed into ground DNF
- grounded UCQs are in DNF, but nested in other formulas

**Our solution:** Replace complex subformulas by new predicates

- (Φ = (Φ₁, Φ₂))

### Experiments

**Existing eKAB benchmarks:** Robot, TaskAssign

**Adapted planning benchmarks:** Cats, Elevator

**Adapted web service composition benchmarks:** TPSA, VTA(-Roles)

**Planning benchmarks with complex conditions:** Assembly, Miconic

**Artificial benchmark with huge CNFs:** GridPlacement

### Summary

- Simple pre-processing for eKAB PDDL encodings improves performance and can even help solve standard planning benchmarks.