1 Definition of initial Domain.pddl

```
(define (domain specific_plan)
  (:requirements :strips :typing)
  (:types agent tool location operation)
  (:predicates
    (at ?a - agent ?l - location)
    (move_to_workstation_done ?a - agent)
    (move_to_done ?a - agent)
    (holding ?a - agent ?t - tool)
    (tool_at ?t - tool ?l - location)
    (can_operate ?t - tool ?op - operation)
    (wait_done ?a - agent)
    (pick_done ?a - agent)
    (place_done ?a - agent)
    (pick_op22_co_done)
    (place_op22_co_done)
    (pick_op23_co_done)
    (place_op23_co_done)
    (pick_op32_done)
    (place_op32_done)
    (pick_op33_done)
    (place_op33_done)
  )

  ;; Generic Move Action
  (:action move_to
    :parameters (?a - agent ?from - location ?to - location)
    :precondition (at ?a ?from)
    :effect (and
      (at ?a ?to)
      (not (at ?a ?from))
      (move_to_done ?a))
  )

  ;; Move to Workstation Action
  (:action move_to_workstation
    :parameters (?a - agent ?from - location ?to - location)
    :precondition (at ?a ?from)
    :effect (and
      (at ?a ?to)
      (not (at ?a ?from))
      (move_to_workstation_done ?a))
  )

  ;; Pick OP22_CO Action
  (:action pick_op22_co
    :parameters (?a - agent ?t - tool ?l - location)
    :precondition (and (tool_at ?t ?l)
    (can_operate ?t op22_co) (at ?a ?l) (move_to_done ?a))
    :effect (and
      (holding ?a ?t)
      (not (tool_at ?t ?l))
      (pick_op22_co_done))
  )

  ;; Place OP22_CO Action
  (:action place_op22_co
    :parameters (?a - agent ?t - tool)
    :precondition (and (holding ?a ?t) (pick_op22_co_done)
    (can_operate ?t op22_co) (at ?a loc_workstation))
    :effect (and
      (tool_at ?t loc_workstation)
      (not (holding ?a ?t))
      (place_op22_co_done))
  )

  ;; Waiting Action
  (:action wait
    :parameters (?a - agent)
    :precondition (and (place_op22_co_done))
    :effect (wait_done ?a)
  )

  ;; Pick OP32 Action
  (:action pick_op32
    :parameters (?a - agent ?t - tool ?l - location)
    :precondition (and (wait_done ?a) (tool_at ?t ?l)
    (can_operate ?t op32) (at ?a ?l) (move_to_done ?a))
    :effect (and
      (holding ?a ?t)
      (not (tool_at ?t ?l))
      (pick_op32_done))
  )

  ;; Place OP32 Action
```

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```pddl
   (:action place_op32
     :parameters (?a - agent ?t - tool)
     :precondition (and (holding ?a ?t) (pick_op32_done)
     (can_operate ?t op32) (at ?a loc_workstation))
     :effect (and
       (tool_at ?t loc_workstation)
       (not (holding ?a ?t))
       (place_op32_done))
   )

   ;; Pick OP23_CO Action
   (:action pick_op23_co
     :parameters (?a - agent ?t - tool ?l - location)
     :precondition (and (place_op32_done) (tool_at ?t ?l)
     (can_operate ?t op23_co) (at ?a ?l) (move_to_done ?a))
     :effect (and
       (holding ?a ?t)
       (not (tool_at ?t ?l))
       (pick_op23_co_done))
   )

   ;; Place OP23_CO Action
   (:action place_op23_co
     :parameters (?a - agent ?t - tool)
     :precondition (and (holding ?a ?t) (pick_op23_co_done)
     (can_operate ?t op23_co) (at ?a loc_workstation))
     :effect (and
       (tool_at ?t loc_workstation)
       (not (holding ?a ?t))
       (place_op23_co_done))
   )

   ;; Pick OP33 Action
   (:action pick_op33
     :parameters (?a - agent ?t - tool ?l - location)
     :precondition (and (place_op23_co_done) (tool_at ?t ?l)
     (can_operate ?t op33) (at ?a ?l) (move_to_done ?a))
     :effect (and
       (holding ?a ?t)
       (not (tool_at ?t ?l))
       (pick_op33_done))
   )

   ;; Place OP33 Action
   (:action place_op33
     :parameters (?a - agent ?t - tool)
     :precondition (and (holding ?a ?t) (pick_op33_done)
     (can_operate ?t op33) (at ?a loc_workstation))
     :effect (and
       (tool_at ?t loc_workstation)
       (not (holding ?a ?t))
       (place_op33_done))
   )
```

Definition of initial Problem.pddl

```pddl
(define (problem task)
(:domain specific_plan)
(:objects
    agent_r - agent
    tool_op22_co tool_op23_co tool_op32 tool_op33 - tool
    loc_base loc_workstation - location
    op22_co op23_co op32 op33 - operation
)
(:init
    (at agent_r loc_base)

    (tool_at tool_op22_co loc_workstation)
    (tool_at tool_op23_co loc_workstation)
    (tool_at tool_op32 loc_workstation)
    (tool_at tool_op33 loc_workstation)

    (can_operate tool_op22_co op22_co)
    (can_operate tool_op23_co op23_co)
    (can_operate tool_op32 op32)
    (can_operate tool_op33 op33)

)
(:goal (and
    (place_op33_done)
))
)
```