<u>Status of the case study (02/07/2020)</u>

- **Task:** serving task

- Sequence of actions generated by FF- task planner:
    1. transit
    2. move
    3. transfer
    4. place
    5. release

- Motion planning to generate the collision-free path

- Knowledge will be used to reason on:

    1. Manipulation **behavior** such as from where the cup can be grasped, i.e., top-grasp or side-grasp. It includes the situation analysis, this means some situations are considered like if the object has constraints to be picked from its side (on a box) or from its top (on a shelf).

        ○ Query to ask how to grasp an object based on the current situation?

        ?- hold(hasParticipant(**situation**, object[])),
        ?- hold(hasSpatialRelation(object1, object2)),
        ?- hold(hasStatus(object1, status)),
        ?- hold(hasAction(object1, actionType)),

        Answer: object1 hasGraspBehavior ?graspType along … axis.

    2. Task constraints such as an object is pushable or pickable, i.e., the capability of the robot to pick an object, and the capacity of the gripper to hold the object. Moreover, capability to navigate if some objects are missing from the table.

        ○ Query to reason on *is the agent capable to execute* …….?

        ?- Capable(hasCapability(**Agent**, **capability**)),
        Answer: Boolean answer ? True, false.

        ?- Capable(hasCapacity(endEffector, capacity)),
        Answer: Boolean answer ? True, false.

    3. Available surface rooms for object placement

        ○ Query to retrieve the placement information

        ?- objectPlacement(hasPlacementRoom(materialobject, room)),
        Answer: room[].

<u>Validated concepts until this stage:</u>

1. Situation
2. Action
3. Task
4. Capability
5. Capacity
6. Behavior

7. Material object

Concepts and Relations to be used in the case study:

8. concepts used from ***CORA***
    1. Robot --> to describe which robot is used
    2. Robot Group --> to describe which group of robots are used

9. concepts used from ***Pos***
    1. PoseMeasure --> to identify the feasible grasping poses and the position of the objects in the world.

10. object ***properties*** from ***Pos***:
    1. measure
    2. orientedAt
    3. pose
    4. positionedAt