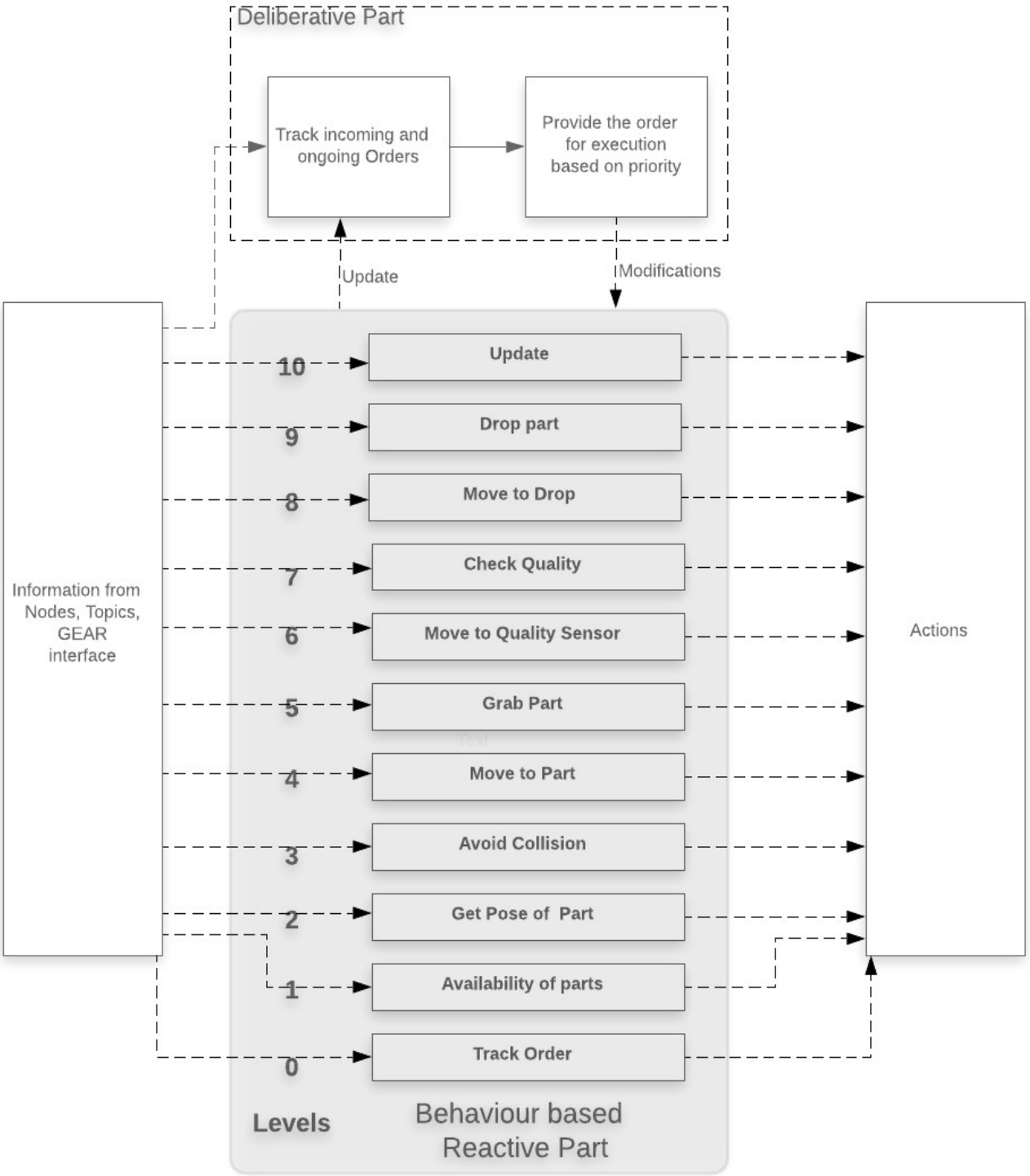
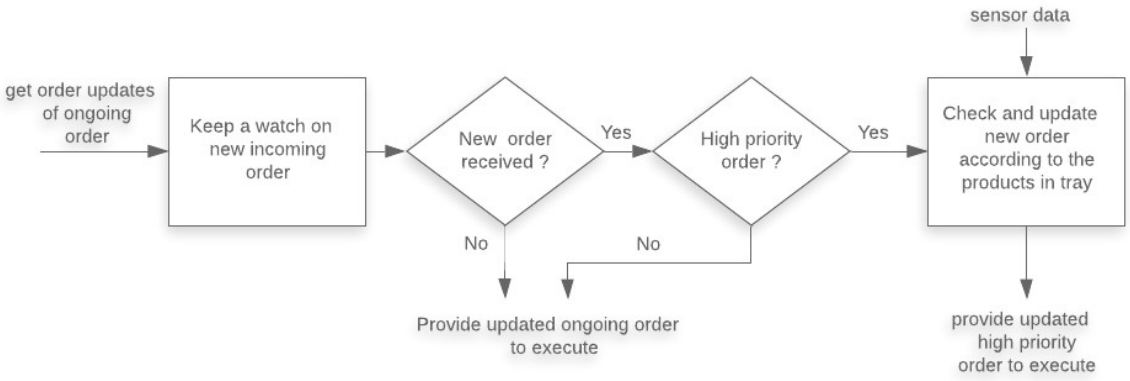
Architecture for ARIAC Competition



Architecture: Hybrid

Deliberative Part:

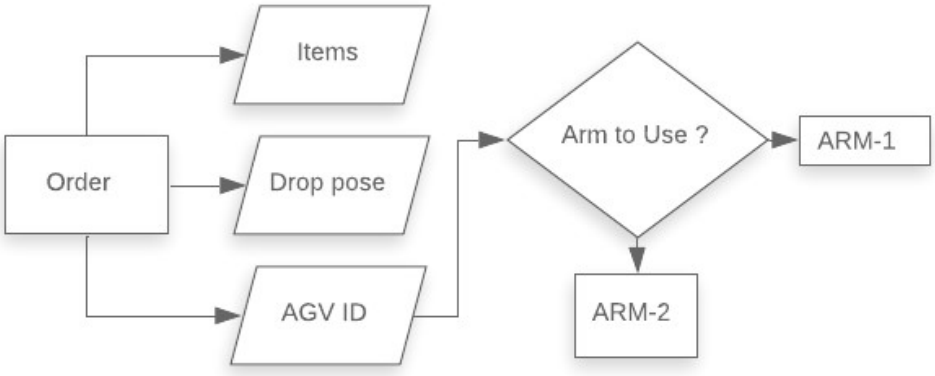
The deliberative part of the architecture would look after the ongoing order execution and remain updated with the world after processing of each order item. This part would continuously look after the incoming orders to fetch any high priority order if received. It would provide the high priority order to be executed after comparing the currently processed order and updating the new order with modifications to execute. Otherwise, it would provide the updated ongoing order to be executed if there is no high priority order.



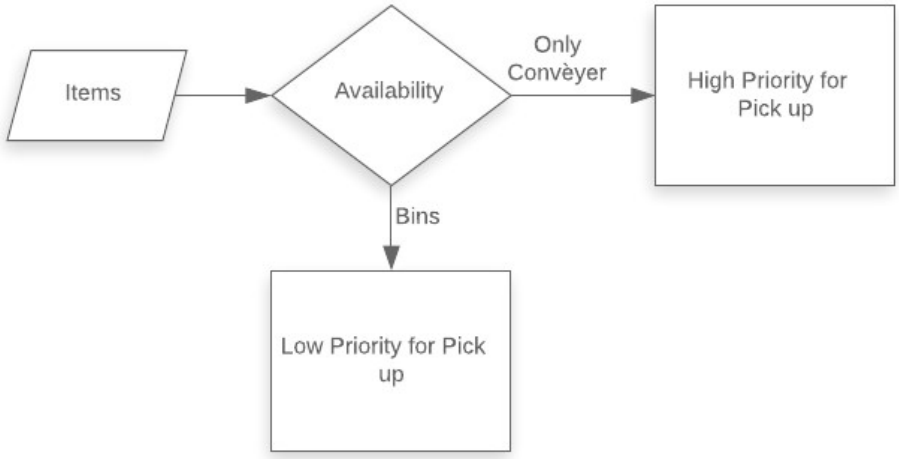
Reactive Part -> Behaviour based (Subsumption Architecture)

Levels with their respective tasks:

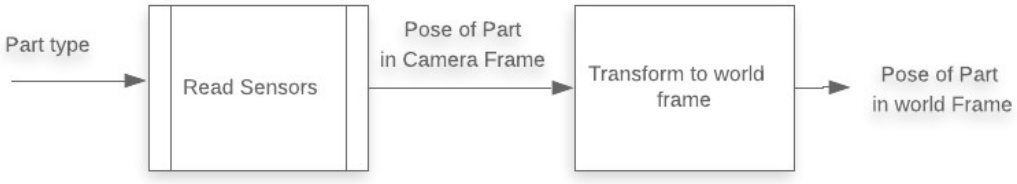
0. **Track Order** – This layer looks after the order that is to be completed. It looks after the received order i.e. order items and their respective drop pose in the kit tray, shipments and determines the arm to be used to build the order depending on the AGV ID.



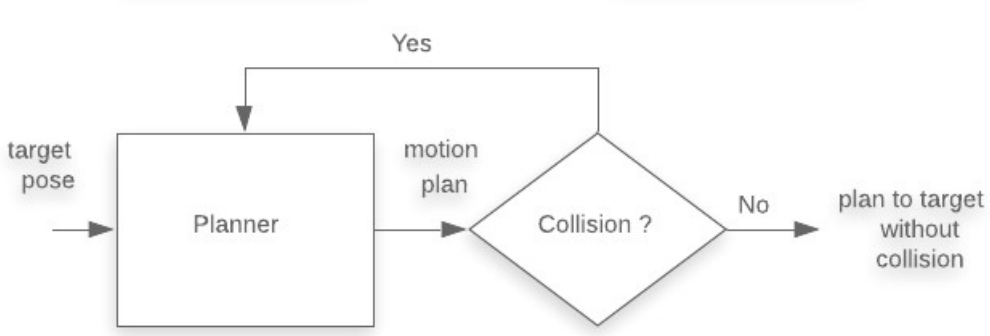
1. **Availability of the parts** – This layer looks after the order items and determines from wthe respective parts are supposed to be picked up (i.e conveyer or bins). Parts available only on the conveyer are prioritized to be picked up.



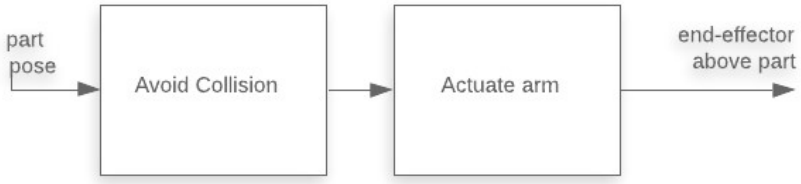
2. **Get Pose of Part** – This layer perceives the sensor information to the get the pose of the part from the logical cameras over the bin and conveyer. It also transforms the obtained part pose into world coordinates as the arms use the world coordinates for their motion.



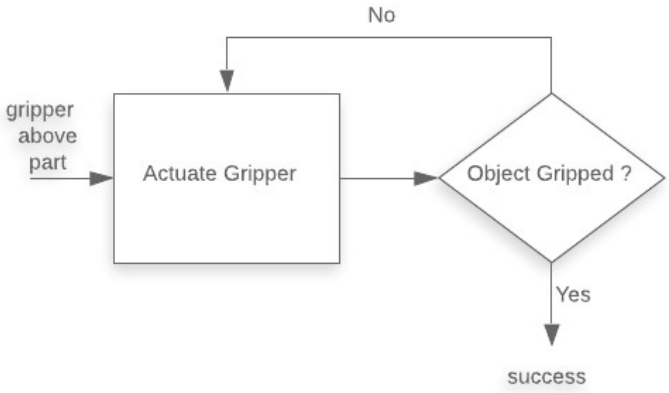
3. **Avoid Collision** : This layer makes sure that the arms never collide with the workspace components or with each other while moving.



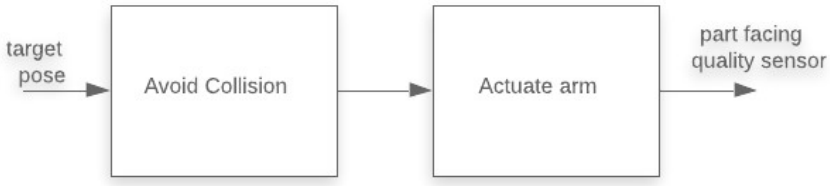
4. **Move to Part** : This layer ensures the motion of the arm to the obtained part position for picking it up. The arm moves just above the part position.



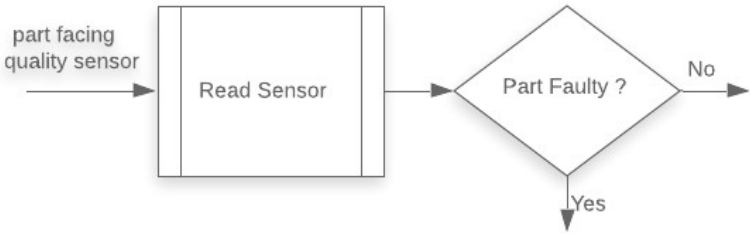
5. **Grab Part** – This layer actuates the gripper to grab the part. The gripper state is monitored to check if the part is grabbed or not.



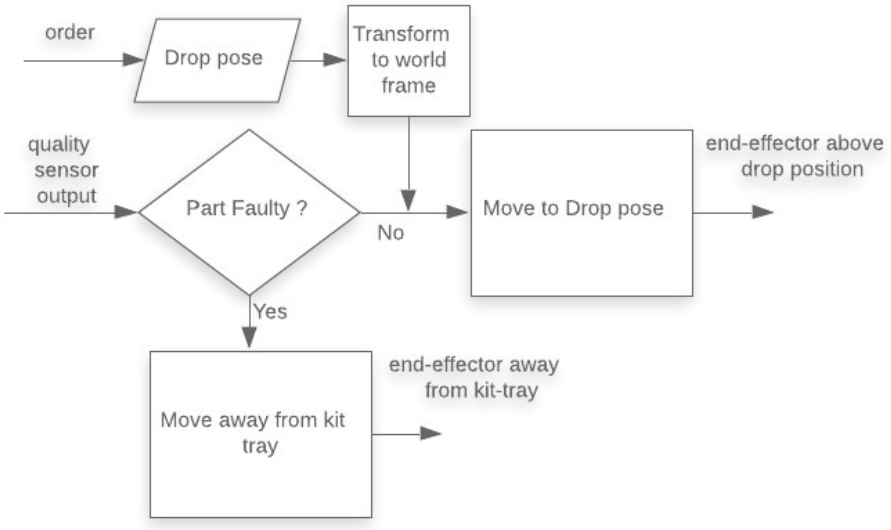
6. **Move to quality sensor** – This layer ensures the motion of the arm with the part attached to its end-effector to the kit tray facing the part towards the quality check sensor.



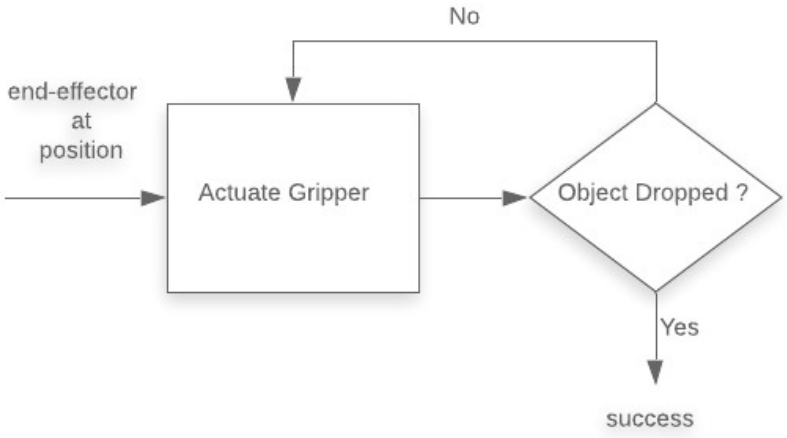
7. **Check Quality** : This layer checks if the part is faulty.



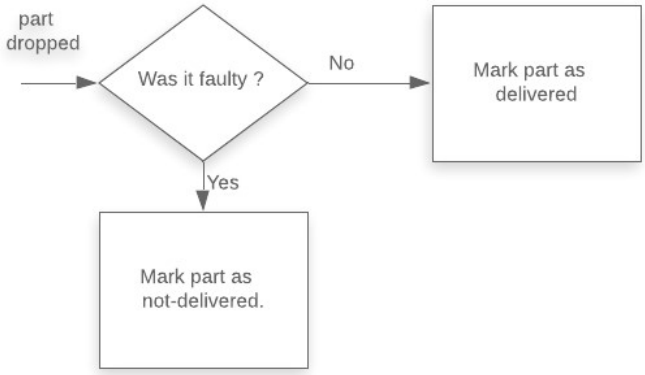
8. **Move to Drop** : This layer determines where to drop it depending on the quality of the part. If the part is the faulty the end-effector moves away from the kit tray otherwise it transforms the pose provided in the order from kit-tray frame to world frame and moves to that drop position.



9. **Drop part** - This layer actuates the gripper to drop the part. The gripper state is monitored to check if the part is dropped or not.



10. **Update :** This layer confirms if the part is delivered on the kit-tray and updates the order for the next execution cycle. It also updates the deliberative component looking after the new incoming orders about the order status.


part
dropped
Was it faulty ?
No
Mark part as
delivered
Yes
Mark part as
not-delivered.