Group No.: 3; ENPM663, RWA3, Design Rationale

Rationale for Architecture:
The overall architecture is hybrid (hierarchical-based and behavior-based). The control is passed from one function to another depending on whether the previous task was completed or not. We receive orders only when the competition is in the start state, then we process the received orders. Once orders are processed only then AGV is locked. Only after AGV is locked AGV is shipped. Only after AGV reaches the destination order is submitted. Only after all orders are submitted does the competition end. This is a Hierarchical Structure as the control flow is dependent on the previous task being completed.

Particularly to handle the high-priority order challenge we have used a reactive architecture. It seemed a good choice as we must change the code's behavior based on the incoming input order. In this assignment, we did not need to represent a world model and just control the movement of AGV based on the orders received. This architecture gives us a high response speed.

Explanation of High Priority Order Challenge Control Flow:

1. We use 5 lists: high priority, low priority, active , interrupted and completed.
    a. high priority: list to hold high priority orders
    b. low priority: list to hold low priority orders
    c. Active: list to hold active orders
    d. Interrupted: list to hold interrupted orders
    e. Completed: list to hold completed orders
2. As orders are received they are appended to the to high-priority list or low priority based on their inherent priority.
3. If the high-priority list is not empty we pop and append the first element of this list to the active orders and execute the active orders for 15 seconds and then the ship order.
4. If the high-priority list is empty and the interrupted list is empty we add the first element of low priority order to the active list,
5. Execute the order, but while executing the order if we receive a high priority order, we stop the execution and append the active order to the interrupted order list with execution time.
6. Then we follow step 3.
7. If there are no high-priority orders but interrupted orders we append the interrupted order to active orders and execute from step 5.
8. After all orders have been executed and shipped we submit the orders
9. Once all orders are submitted we end the competition.

The Activity diagram is given on the next page.

Activity Diagram: