ENPM 663: RWA-1

Group 4

1. Architecture:

For this assignment we decided to go with hybrid architecture. Hybrid architecture is a combination of deliberative and reactive architectures which consists of three layers: sensing, planning and action. It offers the best of both architectures, with allowing it to be collision free while following the shortest distance path from deliberative architecture and generates safe and time minimal navigation path while using reactive architecture.
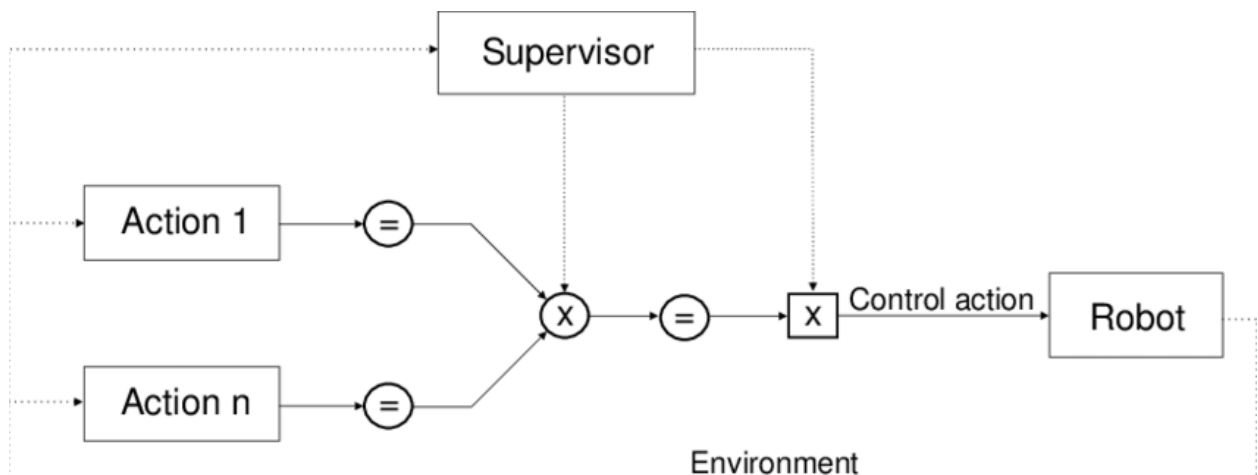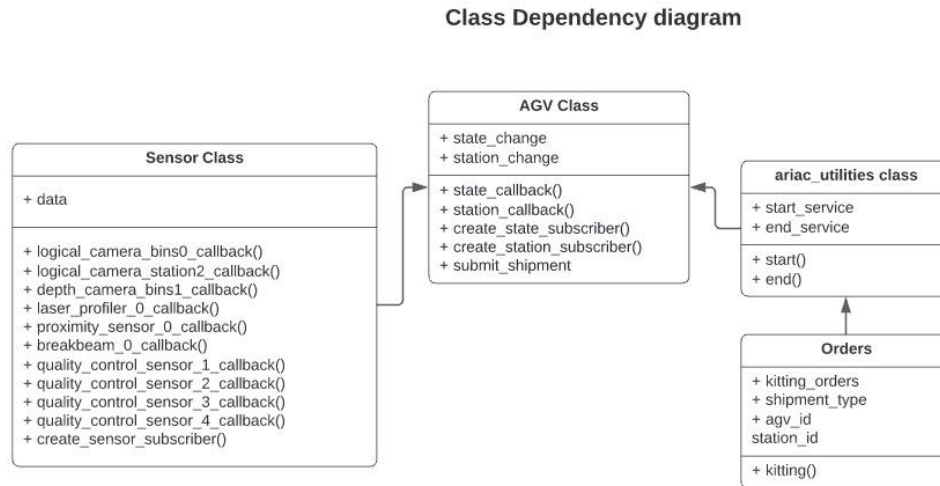

Figure from Behavioral control of robot teams, Jo˜ao Sequeira and Isabel Ribeiro

2. Class Diagram:

The following figure shows the class diagram:

Class Dependency diagram

a) **Sensor class** – It consists of the various sensors used during the competition and receives data from the sensors during runtime. It includes the logical camera, depth camera, laser profiler, proximity sensor, break beam sensor and four quality control sensors.
b) **AGV class** – It consists of the functions that allow the kitting operation to be done on the correct AGV and to submit the AGV to the correct assembly station. It receives the data from the sensor and utilities classes.
c) **Ariac_utilities class** – Its used to send service calls implying the start and end of the competition. It operates until the orders are being published to the topic.
d) **Orders** – Sends data regarding the kitting operation, shipment type, AGV ID and the station ID on which its being assembled.

3. Sequence Diagram:

The following shows the sequence diagram:

Sequence diagram
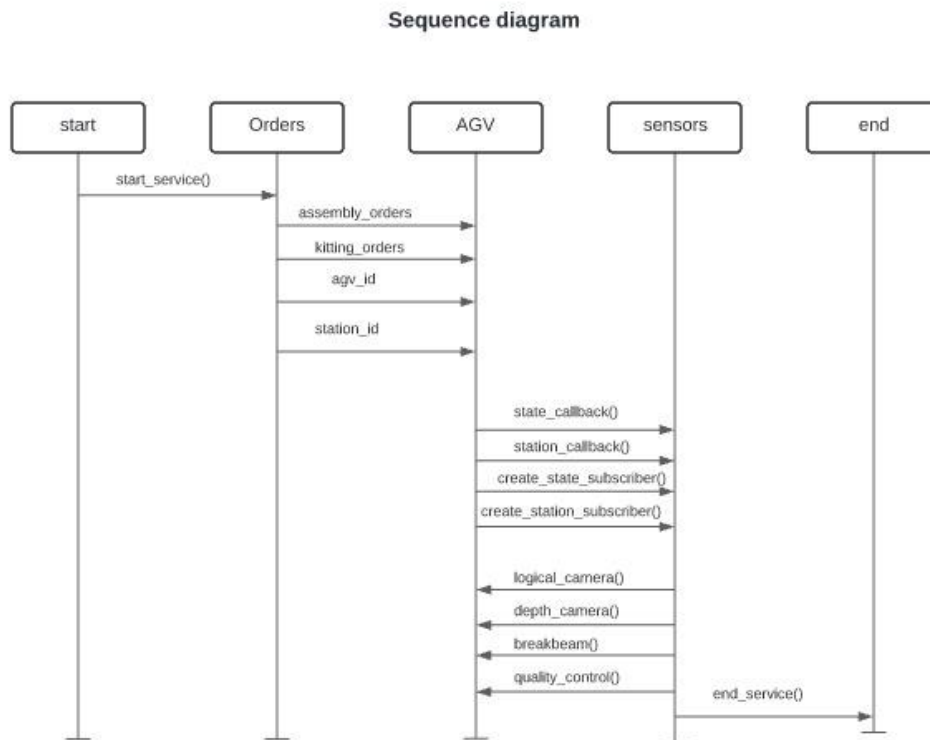
It can be summarized in the following steps –

Step 1) *Start* – It implies the start of the competition.

Step 2) *Orders* – Once the program has started, it will receive instructions of the type, color, and the pose of each part to be placed in a kit (for kitting) or in a briefcase (for assembly). The order also specifies where to build kits, which is usually either on the AGVs (for kitting) or at assembly stations (for assembly), as many times as the number of shipments required.

Step 3) *AGV* – The parts are placed on the specified AGV. This is taken back to the assembly station, even if assembling is not required and then further to the quality station once finished to evaluate the product.

Step 4) *End* – After the orders stop being published and the shipment is done, the competition ends and the final score is displayed.