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RWA-4: Build a whole kit

ENPM809B : Spring 2020
Due **Wednesday, April 1, 2020**

Contents

Assignment

The goal of this assignment is to build a whole kit using products from both the conveyor belt and from bins.

Instructions

- Write a ROS package that is capable of building a whole kit. Starting the competition, reading order, querying sensors/cameras, delivering kits, etc must be done through the GEAR interface.
- The kit to build along with products specifications can be found in sample-rwa4.yaml. You are not allowed to directly read this file, use the topic ariac/orders.
  - Only one order specified in sample-rwa4.yaml: order_0
  - The order has 3 products:
    - 1 piston_rod_part
      - piston_rod_part can ONLY be found on the conveyor belt.
    - 2 gear_part
      - gear_part can be found in a bin and on the conveyor belt.
  - Faulty products are part of the assignment so you need to watch out.
  - Placing products in a kit is not enough, you must place them with the correct pose, as defined in sample-rwa4.yaml
- You need to create a config file for sensors/cameras.
  - You are free to use any type and any number of sensors/cameras.
- The base version of the package ariac_manager (provided in class) is capable of picking up parts from bins and the package you wrote for RWA-3 is capable of picking up parts from the belt. Reuse these 2 packages for RWA-4.
- You are NOT allowed to change the speed of the conveyor belt for this assignment. We will run your code using the normal speed of the conveyor belt.
- Good luck!

Grading Rubric (15 pts)

8 pts– **Building a full kit**: Full points if the kit has all the products, they are in the correct pose, and none of them is faulty.

2 pts– **Package submission**: Name or rename your package in the format **groupName_RWANumber**. When we unzip group1_rwa4.zip, we should get a directory named group1_rwa4. Full points for package named per instruction.

4 pts– **Architecture**: Using what you learned from the Architecture lecture, document the architecture you think works best for this assignment. Come up with a very detailed diagram of the architecture (1 page) along with text documentation (1-2 pages). **Note**: We are not asking you to implement this architecture for RWA-4 but to only design it for RWA-4. Full points if you provide a very detailed documentation of the architecture.

1 pt– **Instructions**: Provide instructions on how to run your program through a Readme.txt, located inside your package. Full points for providing instructions.

-3 pts– **Hardcoding information**: Picking up and placing products require that you get pose data from orders, topics, tf frames, etc. You are not allowed to hardcode these poses in your code. For instance, to grasp a product from the bin, you are not allowed to hardcode the pose of this product. Instead, you will use sensors and transforms.

There are certain things that you can hardcode if you cannot get them using the GEAR interface. Hardcoding information that is usually retrieved using the GEAR interface will cost you 3 pts from your final score for this assignment.