TBM 1: Prepare Assembly Aid Tray for Force Fitting

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Duration: _____ ☐ **Timeout**

Achievements

	yes	no
The robot correctly identifies the assembly aid tray QR code Comment: _____	☐	☐
The robot correctly identifies the containers QR code Comment: _____	☐	☐
The robot correctly grasp the assembly aid tray: Comment: _____	☐	☐
The robot correctly grasp the first bearing box: Comment: _____	☐	☐
The robot correctly grasp the second bearing box: Comment: _____	☐	☐
The robot insert the first bearing box into the aid tray: Comment: _____	☐	☐
The robot insert the second bearing box into the aid tray: Comment: _____	☐	☐
The robot correctly deliver the tray to the force fitting station: Comment: _____	☐	☐
The robot completely processes the first bearing (from identifying to delivering): Comment: _____	☐	☐
The robot completely processes the second bearing (from identifying to delivering): Comment: _____	☐	☐
The robot cooperates with CFH and Networked Devices throughout the task: Comment: _____	☐	☐

Penalized Behaviors

The robot bumps into obstacles in the test bed: ☐ ☐ ☐ ☐ ☐

The robot drops an object (the object touches the ground): ☐ ☐ ☐ ☐ ☐

The robot stops working: ☐

Disqualifying Behaviors

The robot damages or destroys the objects requested to manipulate: ☐

The The robot damages the test bed: ☐

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____

TBM 2: Plate Drilling

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Duration: _____ ☐ **Timeout**

Notes on TBM 2 to teams/referee/organizer:

1. The cover plates are organized in the conveyor belt with the order of **unusable-unusable-faulty-faulty** (yes, specifically in this order). The reasoning is because processing unusable cover plate is "simpler" than processing faulty ones. As such the only way to ensure fairness is to have a specific ordering of the cover plates.
2. **Each cover plates needs to be processed entirely before the robot move on to processing the next cover plate.** Unusable cover plate should be delivered to the trash container box and faulty cover plate should be fixed with the drilling machine. Please note that processing of each cover plates doesn't have to be succesful, yet the robot need to show the expected behavior to complete the process. This is to prevent any achievement mining (e.g. repeatedly only picking a cover plate from the conveyor belt's exit ramp).

Achievements

Cooperate with CFH and Networked Devices througout the task ☐
Comment: _____
This is marked when the robot is, at the least, receive its task from CFH AND operate quality control camera.

~~The robot collect the cover plate box from the shelves~~
~~The robot correctly grasp the plates~~
The robot pick up a cover plate from the conveyor belt exit ramp ☐ ☐ ☐ ☐
Comment: _____
Lifting up the cover plate is considered a success.

~~The robot place the cover plate box to the correct workspace~~
~~The robot correctly sort the plates~~
The robot place the unusable cover plate inside the trash box container ☐ ☐
Comment: _____

~~The robot perform the drilling process for faulty plates~~
The robot place a cover plate in the drilling machine ☐ ☐
Comment: _____

The robot pick up a cover plate in the drilling machine ☐ ☐
Comment: _____
Again, lifting up the cover plate is considered a success.

The robot place a cover plate inside the cover plate box ☐ ☐
Comment: _____

Penalized Behaviors

The robot bumps into obstacles in the test bed: ☐ ☐ ☐ ☐ ☐

~~The robot drops a plate:~~
The robot collide with a networked device: ☐ ☐ ☐ ☐ ☐

Disqualifying Behaviors

~~The robot damages or destroys the objects requested to manipulate:~~
~~The robot damages the test bed:~~
The robot damages the test bed: ☐
Comment: _____
WARNING: A disqualifying behaviors discard all other achievement in the current task. Use it only when it is really necessary (e.g. cheating).

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____

RD: This is a very good first draft for TBM2

TBM 3: Fill a Box with Parts for Manual Assembly

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Duration: _____ ☐ **Timeout**

Achievements

	achieved
The robot communicates with CFH through out the test:	☐
The team submit the benchmarking data by the end of the test:	☐

	part 1	part 2	part 3	part 4	part 5	container
The robot picks up a required object or container from its storage location:	☐	☐	☐	☐	☐	☐
The robot places required objects into the container:	☐	☐	☐	☐	☐	
The robot delivers a correctly filled container at the designated workstation:						☐

Comment: _____

Penalized Behaviors

The robot bumps into obstacles in the test bed:	☐ ☐ ☐ ☐ ☐
The robot drops an object:	☐ ☐ ☐ ☐ ☐
The robot stops working:	☐

Disqualifying Behaviors

The robot damages or destroys the objects requested to manipulate:	☐
The robot damages the test bed:	☐

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____

FBM 1: Object Perception

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Notes:

- The duration is based on the referee stop watch.
- Timeout is checked when the robot cannot detect the object within the specified test duration.
- GT is the ground truth which is the information provided by the referee box.
- Object identifier:
  - EM-01(1)=aid tray, EM-02(2)=cover plate box
  - AX-01(4)=bearing box type A, AX-16(3)=bearing box type B
  - AX-02(6)=bearing, AX-09(7)=motor, AX-03(5)=axis

Run 1 Duration: _____ ☐ Timeout

Object Detection

	Container		Bearing Box		Transmission		
GT	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

Run 2 Duration: _____ ☐ Timeout

Object Detection

	Container		Bearing Box		Transmission		
GT	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

Run 3 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 4 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 5 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 6 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 7 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 8 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 9 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Run 10 Duration: _____ ☐ Timeout

Object Detection

GT	Container		Bearing Box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container		Bearing box		Transmission		
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)

Pose

GT	x	y	θ	Robot	x	y	θ

Comments: _____

_____

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____

FBM 2: Visual Servoing

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Notes:

- The duration for each run is based on the referee stop watch.
- Timeout is checked when the robot cannot grasp the object within the specified test duration.
- The sequence of objects which are used in each run is defined by the team.
- Objects: EM-01=aid tray orange, EM-02=cardbox black, AX-01=bearing box type A, AX-16=Bearing box type B, AX-02=bearing, AX-03=axis, AX-09=motor

Run 1 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

_____

Run 2 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

_____

Run 3 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

_____

Run 4 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

_____

Run 5 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

_____

Run 6 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

Run 7 Duration: _____ ☐ Timeout

Object id: _____, Orientation: _____, ☐ Success, ☐ Dropped, ☐ Missed

Comments: _____

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____

FBM 3: Control

Team name: _____

Referee I: _____, **Referee II:** _____

Date and time: _____

Notes:

- The duration for each run is based on the referee stop watch.
- Timeout is checked when the robot cannot execute the path within the specified test duration.
- The specific path for this benchmark is defined before the competition.

Run 1 Duration: _____ ☐ Timeout, Finished complete path: ☐ Yes ☐ No

area deviation: _____, constant deviation: _____,

Comments: _____

Run 2 Duration: _____ ☐ Timeout, Finished complete path: ☐ Yes ☐ No

area deviation: _____, constant deviation: _____,

Comments: _____

Run 3 Duration: _____ ☐ Timeout, Finished complete path: ☐ Yes ☐ No

area deviation: _____, constant deviation: _____,

Comments: _____

Run 4 Duration: _____ ☐ Timeout, Finished complete path: ☐ Yes ☐ No

area deviation: _____, constant deviation: _____,

Comments: _____

Run 5 Duration: _____ ☐ Timeout, Finished complete path: ☐ Yes ☐ No

area deviation: _____, constant deviation: _____,

Comments: _____

Benchmarking data delivered appropriately: ☐ yes / ☐ no

Team leader signature: _____

Referee signature: _____