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 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: _____	☐	☐

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**

Achievements

	yes	no
The robot collect the cover plate box from the shelves Comment: _____	☐	☐
The robot place the cover plate box to the correct workspace Comment: _____	☐	☐
The robot correctly grasp the plates Comment: _____	☐	☐
The robot correctly sort the plates Comment: _____	☐	☐
The robot perform the drilling process for faulty plates Comment: _____	☐	☐

Penalized Behaviors

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

The robot drops a plate: ☐ ☐ ☐ ☐ ☐

~~The robot misses a report:~~

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: _____

TBM 3: Fill a Box with Parts for Manual Assembly

Team name: _____

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

Date and time: _____

Duration: _____ ☐ **Timeout**

Achievements

	part 1	part 2	part 3	part 4	part 5
The robot correctly grasp object:	☐	☐	☐	☐	☐
The robot place object in the container:	☐	☐	☐	☐	☐

Comment: _____

	yes	no
The robot correctly grasp the container	☐	☐
The robot correctly place the container (complete with all parts)	☐	☐

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:

- Start and end time are 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 start and the end time for each run are 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: _____