TBM 1: Prepare Assembly Aid Tray for Force Fitting

Team name:		
Referee I:, Referee II:		
Date and time:		
Duration: □ Timeout		
Achievements		
The robot correctly identifies the assembly aid tray QR code Comment:	yes	no
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:		

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 man	ipulate:	
The The robot damages the test bed:		
Benchmarking data delivered appropriately: \square yes / \square	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: The cover plates are organized in the conveyor belt with the order of unusable faulty-faulty (yes, specifically in this order). The reasoning is because processic cover plate is "simpler" than processing faulty ones. As such the only way to ensure to have the same ordering of the cover plates.	ng unusable
Achievements	
1. Cooperate with CFH and networked devices throughut the task	
Comment:	
The robot collect the cover plate box from the shelves The robot correctly grasp the plates The robot place the cover plate box to the correct workspace	
The robot correctly sort the plates 3.1 The robot pick up an unusable cover plate from the conveyor belt exit ramp 3.2 The robot place an unusable cover plate inside the trash box container 3.3 The robot collect one set of achievement 3.1 and 3.2 Comment:	
The robot perform the drilling process for faulty plates 4.1 The robot pick up a faulty cover plate from the conveyor belt exit ramp 4.2 The robot deliver a faulty cover plate to the drilling machine workstation 4.3 The robot inserted a faulty cover plate to the drilling machine 4.4 The robot collect one set of achievement 4.1, 4.2 and 4.3 (one set) Comment:	
5.1 The robot operate the drilling machine to fix a faulty cover plate 5.2 The robot pick up a perfect cover plate in the drilling machine 5.3 The robot place a perfect cover plate inside the cover plate box 5.4 The robot collect one set of achievement 5.1, 5.2 and 5.3 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: 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:

TBM 3: Fill a Box with Parts for Manual Assembly

Team name:						
Referee I:	, Refere	ee II: _				
Date and time:						
Duration: □ Timeout						
Achievements						
The robot communicates with CFH through out the test:	achieve	ed				
The team submit the benchmarking data by the end of the test:						
The robot picks up a required object or container from its storage location:	part 1	part 2	part 3	part 4	part 5	container
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 t	test bed:					
The robot drops an object:						
The robot stops working:						
Disqualifying Behaviors						
The robot damages or destroys the objection	ects requ	ested to	manipul	ate:		
The robot damages the test bed:						
Benchmarking data delivered appro	priately	y: □ yes	/ □ no			
Team leader signature:				-		
Referen signature						

FBM 1: Object Perception

Referee	I:	, Re	feree II: _			
Date an	nd time:					
Notes:						
• Th	e duration is based on	the referee sto	p watch.			
	meout is checked when ration.	the robot ca	nnot detec	t the object	within the	specified test
• GT	is the ground truth w	which is the infe	ormation p	rovided by t	the referee b	OX.
• Ob	ject identifier:					
-	– EM-01(1)=aid tray,	EM-02(2) = cov	er plate bo	ΟX		
	- AX-01(4)=bearing b				me B	
	- AX-02(6)=bearing,	· -	` /	· ·	ров	
	1111 02(0) 50011118,	111 00(1) 11100	,01, 1111 00	(9) (1111)		
Run 1 I	Ouration:	☐ Timeout				
Object I	Detection					
CT	Container	Bearing	g Box		Transmissio	n
GT	EM-01(1) EM-02(2	()	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Container	Bearin			Transmissio	
	EM-01(1) EM-02(2	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose			11 11		T	
GT	х у	θ	Robot	X	У	θ
Commen	ts:					
Run 2 I	Ouration:	☐ Timeout				
Object I	Detection					
GT	Container	Bearing	_	II	Transmissio	
	EM-01(1) EM-02(2		AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	$\begin{array}{ c c c }\hline Container\\\hline EM-01(1) & EM-02(2\\\hline \end{array}$	Bearin AX-01(4)	$\frac{\text{g box}}{\text{AX-16(3)}}$	AX-02(6)	$\frac{\text{Transmissio}}{\text{AX-09(7)}}$	n AX-03(5)
Pose			()	<u> </u>		1 7
GT	x y	θ	Dolor	X	у	θ
C = 1	H		Robot		-	+

Joject L	Octoction						
	Detection		·		П		
GT	Conta		Bearin		III.	Transmission	
0.1	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Conta	ainer	Bearin	Bearing box		Transmission	n
TODOU	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose							
- CTF	X	у	θ	D 1 .	X	у	θ
GT				Robot		V	
Common	its:						
Jonninen							
Run 4 I	Ouration:	Г] Timeout				
Object L	Detection						
GT	Conta		Bearin	<u> </u>	-	Transmission	
01	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		
Robot	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose					-11		
	37	77	θ		37	37	θ
GT	X	У	0	Robot	X	У	U
Commen	its:						
Run 5 I	Ouration:] Timeout				
Object I	Detection						
	Conta	ainer	Bearing Box		Transmission		
GT	EM-01(1)	EM-02(2)	AX-01(4)	$\frac{AX-16(3)}{AX-16(3)}$	AX-02(6)	AX-09(7)	$\frac{1}{\text{AX-03(5)}}$
	Conta	` ,	Bearin	. ,		Transmission	
Robot	EM-01(1)	EM-02(2)	AX-01(4)	$\frac{\text{AX-16}(3)}{\text{AX-16}(3)}$	AX-02(6)	AX-09(7)	$\frac{1}{ AX-03(5) }$
	DW-01(1)	DW-02(2)	1121-01(4)	7171-10(0)	1111-02(0)	1171-03(1)	1171-05(0)
Pose			θ		v	37	θ
Pose GT	X	У	0	Robot	X	У	U

	$\frac{\text{Detection}}{\ }$	ainer	Bearin	g Roy		Transmission		
GT	EM-01(1)		AX-01(4)	$\frac{\text{g box}}{\text{AX-16(3)}}$	AX-02(6)	AX-09(7)	AX-03(5)	
	Cont	` '	Bearin	()	` ′	Transmissio		
Robot	EM-01(1)	$\frac{\text{EM-02}(2)}{\text{EM-02}(2)}$	AX-01(4)	$\frac{\text{AX-16}(3)}{\text{AX-16}(3)}$	AX-02(6)	AX-09(7)	AX-03(5)	
Pose		2111 02(2)	1111 01(1)	1111 10(0)	1111 02(0)	1111 00(1)	1111 00(0)	
	X	у	θ		X	у	θ	
GT	A .	J J		Robot	A	J J		
 Comme	nts:							
Run 7	Duration:] Timeout					
Object 1	Detection							
OTT.	Cont	ainer	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	Cont	ainer	Bearin	g box		Transmissio	n	
πουσι	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
GT	X	У	θ	Robot	X	У	θ	
Comme	nts:							
Run 8	Duration:	Г] Timeout					
			1 Imeout					
Jbject 1	Detection							
GT	Cont		Bearin			Transmissio		
O I	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
———	Cont		Bearin AX-01(4)	~		Transmissio		
Robot	EM 01(1)		AA-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	EM-01(1)	EM-02(2)						
	EM-01(1)	EMI-02(2)						
Robot	EM-01(1)	у у	θ	Robot	X	у	θ	

Run 9 I	Ouration:] Timeout					
Object I	Detection							
GT	Cont	ainer	Bearin	ıg Box	Transmission			
GI	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Dobot	Cont	ainer	Bearin	ng box		Transmission		
Robot	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
C/T	x	у	θ	Dalas	X	у	θ	
GT				Robot				
	nts: Duration: _		□ Timeout					
	Detection =							
C/T/	Cont	ainer	Bearin	ıg Box		Transmission	n	
GT	EM-01(1)	EM-02(2)	AX-01(4)		AX-02(6)	AX-09(7)	AX-03(5)	
Robot	Cont	ainer	Bearin	ng box		Transmission	n	
Robot	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
GT	X	У	θ	Robot	X	у	θ	
Commen	nts:							
Benchn	narking dat	a delivered	l appropria	ately: 🗆 ye	es / 🗆 no			
Team le	eader signa	ture:						
Referee	signature:							

FBM 2: Visual Servoing

Team name:		
Referee I:	, Refere	ee II:
Date and time:		
Notes:		
• The duration for each	ch run is based on the re	eferee stop watch.
• Timeout is checked duration.	when the robot canno	t grasp the object within the specified test
• The sequence of objection	ects which are used in e	each run is defined by the team.
v	0 0 /	cardbox black, AX-01=bearing box type A, eg, AX-03=axis, AX-09=motor
Run 1 Duration:	Timeout	
		, \square Success, \square Dropped, \square Missed
Comments:		
Run 2 Duration:	□ Timeout	
Object id:	, Orientation:	, \square Success, \square Dropped, \square Missed
Comments:		
Run 3 Duration:	Timeout	
Object id:	, Orientation:	, \square Success, \square Dropped, \square Missed
Comments:		
Run 4 Duration:	□ Timeout	
Object id:	, Orientation:	, \square Success, \square Dropped, \square Missed
Comments:		
Run 5 Duration:	□ Timeout	
Object id:	, Orientation:	, \square Success, \square Dropped, \square Missed
Comments:		

Run 6 Duration:	\square Timeout	
Object id:	, Orientation:,	\Box Success, \Box Dropped, \Box Missed
Comments:		
Run 7 Duration:		
Object id:	, Orientation:,	\square Success, \square Dropped, \square Missed
Comments:		
Benchmarking data deliver	red appropriately: \square yes	s / \square no
Team leader signature:		
Referee signature:		

FBM 3: Control

Team name:	
Referee I:	, Referee II:
Date and time:	
Notes:	
• The duration for ea	ach run is based on the referee stop watch.
• Timeout is checked duration.	when the robot cannot execute the path within the specified test
• The specific path for	or this benchmark is defined before the competition.
Run 1 Duration:	\square Timeout, Finished complete path: \square Yes \square No
	, constant deviation:,
	□ Timeout, Finished complete path: □ Yes □ No, constant deviation:,
Comments:	
area deviation:	□ Timeout, Finished complete path: □ Yes □ No, constant deviation:,
area deviation:	□ Timeout, Finished complete path: □ Yes □ No, constant deviation:,
area deviation:	□ Timeout, Finished complete path: □ Yes □ No, constant deviation:,
_	elivered appropriately: yes / no e:
Referee signature:	