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

Referee I:	
Notes on TBM 2 to teams/referee/organizer: 1. The cover plates are organized in the conveyor belt with the order of unusal unusable-faulty-faulty (yes, specifically in this order). The reasoning is because process unusable cover plate is "simpler" than processing faulty ones. As such the only way to ensemble fairness is to have a specific ordering of the cover plates. 2. Each cover plates needs to be processed entirely before the robot move to processing the next cover plate. Unusable cover plate should be delivered to the transfer box and faulty cover plate should be fixed with the drilling machine. Please in that processing of each cover plates doesn't have to be successful, yet the robot need to show the expected behavior to complete the process. This is to prevent any achievement mining (repeatedly only picking a cover plate from the conveyor belt's exit ramp).	
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Achievements	sing sur on rasl not
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	

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 reque	ested to manipulate:
The robot damages the test bed:	
The robot damages the test bed:	
Comment:	
WARNING: A disqualifying behaviors discard all other achievement only when it is really necessary (e.g. cheating).	t in the current task. Use it
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:						
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	d time:						
Notes:							
• The	e duration is l	pased on the	ne referee sto	p watch.			
	neout is checl ation.	ked when t	the robot car	nnot detec	t the object	within the	specified test
• GT	is the ground	d truth whi	ich is the info	ormation p	rovided by t	the referee b	ox.
• Ob.	ject identifier:						
_	- EM-01(1)=	aid trav, El	M-02(2) = cov	er plate bo	ΟX		
	- AX-01(4)=1					me B	
	- AX-02(6) = 1	_	· - ·	` '		ро В	
	1111 02(0)—1	ocaring, 112	1 05(1)—11100	01, 1111 00	(9)—axis		
Run 1 🛭	Ouration:		l Timeout				
Object D	etection						
CT	Contai	ner	Bearing	g Box		Transmission	n
GT	EM-01(1)	EM-02(2)	()	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Robot	Contai		Bearing			Transmission	
	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose						T	
GT	X	У	θ	Robot	X	У	θ
Commen	ts:						
	05.						
D 0.F		_	1 m: ,				
	Ouration:		l Timeout				
Object D		T	D :	D	П		n
GT	Contain EM-01(1)		Bearing AX-01(4)	$\frac{g \text{ Box}}{AX-16(3)}$	AX-02(6)	$\frac{\text{Transmission}}{ \text{AX-09}(7) }$	AX-03(5)
	Contai	` ′	Bearing		\ /	Transmission	
Robot		EM-02(2)		AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)
Pose							
GT	X	у	θ	Robot	X	У	θ
O I							

Object I	Duration:							
Object 1	Detection		·		П			
GT	Conta		Bearin	_		Transmission		
<u> </u>	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Robot	Conta	iner	Bearin	g box		Transmission		
1,0000	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Pose								
- CF	X	у	θ		X	у	θ	
GT				Robot				
Commo	nts:	ı						
Jonniner	.105.							
Run 4	Duration:	Γ	l Timeout					
Object I	Detection							
GT	Conta			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	Conta	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								
	77	***	θ		37	77	θ	
GT	X	У	0	Robot	X	У	U	
Commer	nts:							
			l Timeout					
Run 5	Duration:							
	Duration: Detection							
Object I	Detection		Regrin	g Roy		Transmissio	n	
	Detection Conta	iner	Bearin	~		Transmission		
Object I	Detection Conta	iner EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Object I	Conta EM-01(1) Conta	iner EM-02(2)	AX-01(4) Bearin	AX-16(3) g box	AX-02(6)	AX-09(7) Transmission	AX-03(5)	
Object I	Conta EM-01(1) Conta	iner EM-02(2)	AX-01(4) Bearin	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
Object I	Conta EM-01(1) Conta	iner EM-02(2)	AX-01(4) Bearin	AX-16(3) g box	AX-02(6)	AX-09(7) Transmission	AX-03(5)	
Object I GT Robot Pose	Conta EM-01(1) Conta	iner EM-02(2) iner EM-02(2)	AX-01(4) Bearin	AX-16(3) g box AX-16(3)	AX-02(6)	AX-09(7) Transmission AX-09(7)	AX-03(5)	
Object I GT Robot	Conta EM-01(1) Conta EM-01(1)	iner EM-02(2) iner	AX-01(4) Bearin AX-01(4)	AX-16(3) g box	AX-02(6) AX-02(6)	AX-09(7) Transmission	AX-03(8	
Object I GT Robot Pose	Conta EM-01(1) Conta EM-01(1) X	iner EM-02(2) iner EM-02(2)	AX-01(4) Bearin AX-01(4)	AX-16(3) g box AX-16(3)	AX-02(6) AX-02(6)	AX-09(7) Transmission AX-09(7)	AX-03(5)	

	$\frac{\text{Detection}}{\ }$	ainer	Bearin	g Roy		Transmission	n	
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	· /	` ′	Transmission		
Robot	EM-01(1)	$\frac{\text{EM-02}(2)}{\text{EM-02}(2)}$	AX-01(4)	$\frac{g}{AX-16(3)}$	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							
Container		ainer	Bearing Box			Transmission	n	
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 Container				Bearing Box		Transmission		
GI	EM-01(1)	EM-02(2)	AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
<u> </u>	Cont		Bearin	_		Transmission		
Robot	EM 01/1)		AX-01(4)	AX-16(3)	AX-02(6)	AX-09(7)	AX-03(5)	
	EM-01(1)	EM-02(2)	\ /					
	EM-01(1)	EMI-02(2)						
Robot	EM-01(1)	y y	θ	Robot	Х	У	θ	

Run 9 I	Ouration:] Timeout				
Object I	Detection						
GT	Cont	ainer	Bearin	ig Box		Transmission	n
GI	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	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	θ		у	θ
GI				Robot			
	Duration						
	Duration: _		☐ Timeout				
Object L	Detection						
GT	Cont			ng Box		Transmission	
	EM-01(1)	()	AX-01(4)		AX-02(6)	\ /	AX-03(5)
Robot	Cont		Bearin			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	У	θ	Robot	X	У	θ
Commen	nts:						
Benchn	narking dat	a delivered	l appropria	ately: 🗆 ye	es / \square 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 obje	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 , \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: \Box 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.	d 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:,
Run 2 Duration:	□ Timeout, Finished complete path: □ Yes □ No
area deviation:	, constant deviation:,
Comments:	
	□ Timeout, Finished complete path: □ Yes □ No, constant deviation:,
Comments:	
Run 4 Duration:	□ Timeout, Finished complete path: □ Yes □ No
area deviation:	, constant deviation:,
Comments:	
Run 5 Duration:	\square Timeout, Finished complete path: \square Yes \square No
area deviation:	, constant deviation:,
Comments:	
_	elivered appropriately: \square yes $/$ \square no
	e:
Referee signature:	