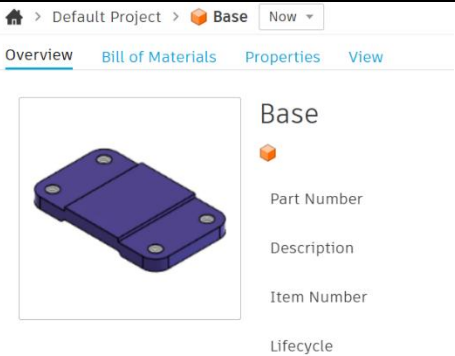
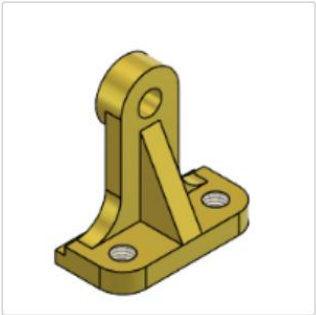
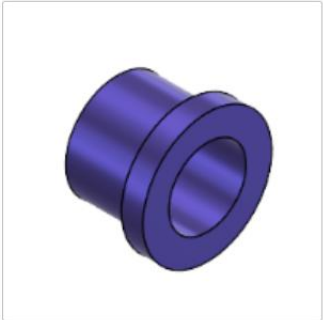
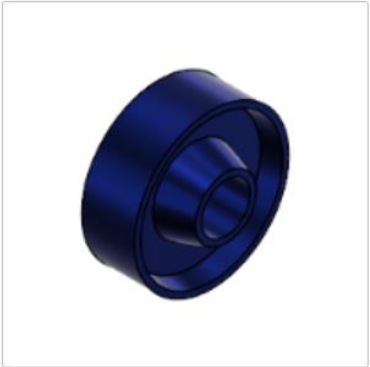




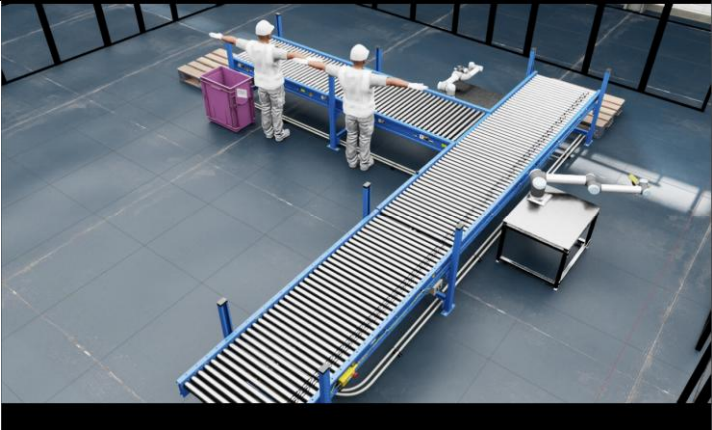
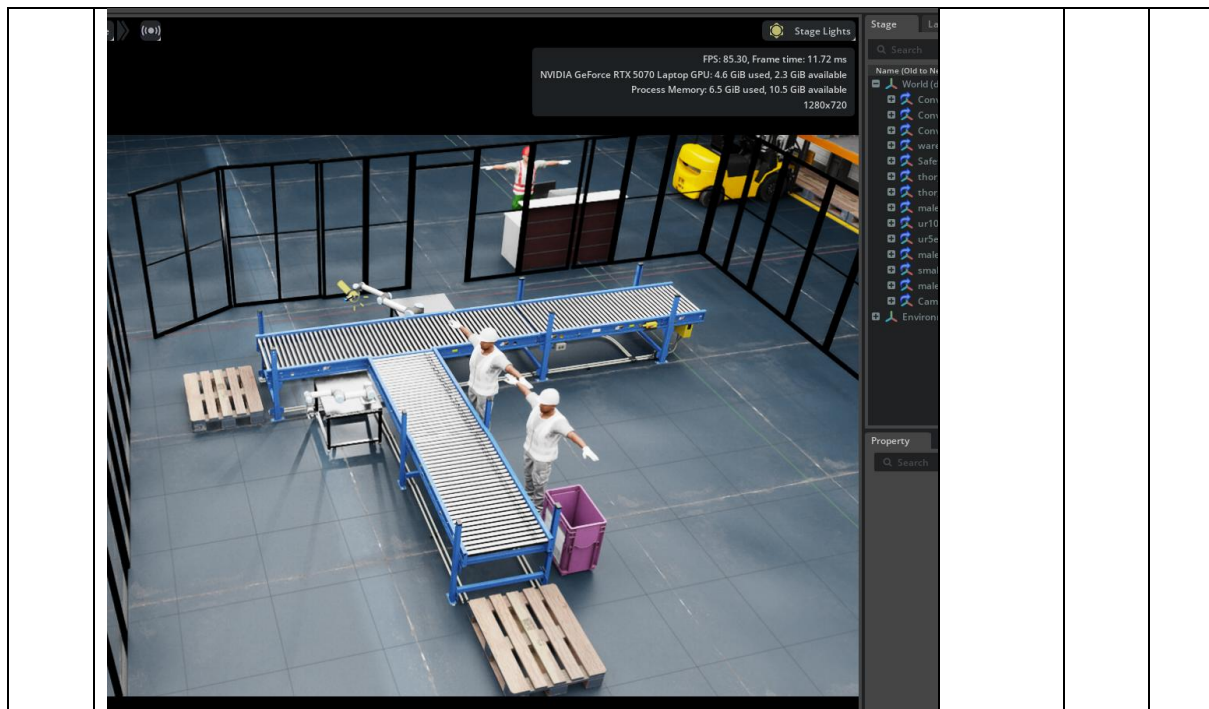


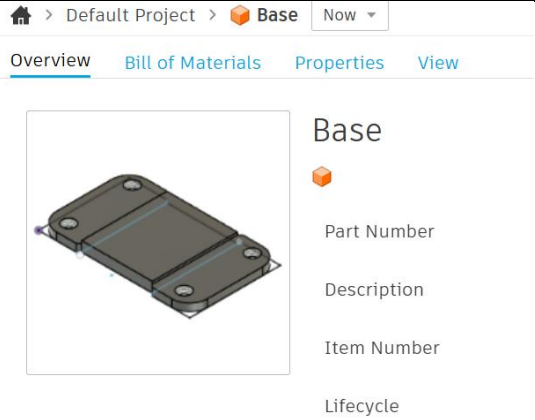
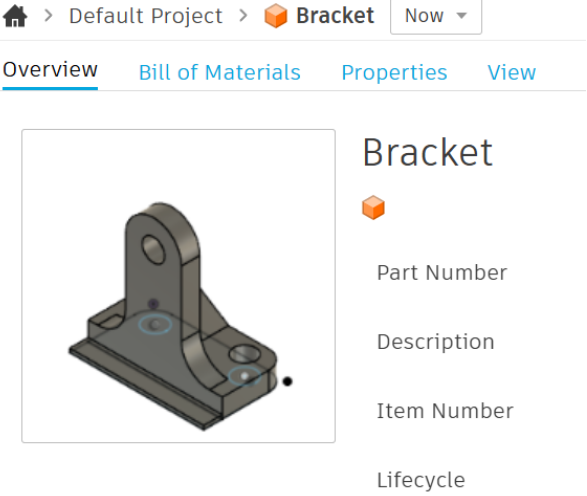
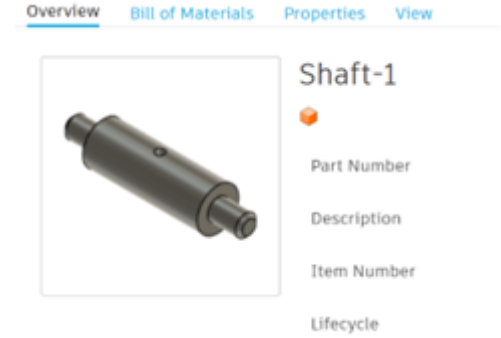

Item Name	Image	Code variable	Description
Base		Base_C	This component will be picked by the magnetic gripper and placed into the T-shape conveyor
		Bracket_C	
		Bush_C	
		Roller_C	

	 <h2>Shaft</h2>  <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>		
	 <h2>Screw</h2>  <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>		
Environment (task.usd)			
			

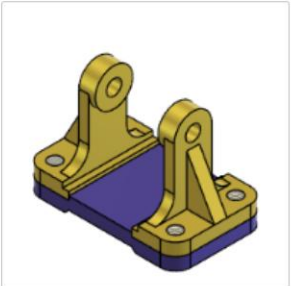
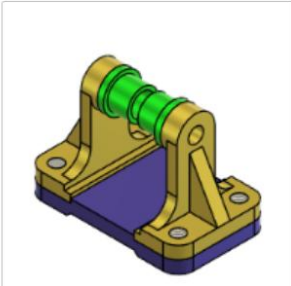
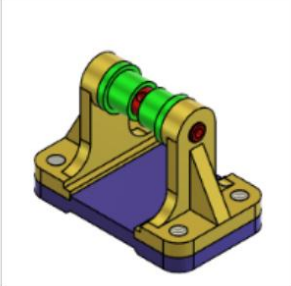



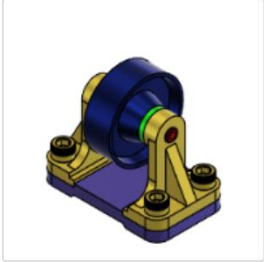
File location of component: C:\Users\ardiw\OneDrive\Documents\Fusion\Belt Roller Support\Component

File location of environment: C:\Isac-sim\Robot-Environment


Item Name	Image	Code variabel	Description
base-1		Base-d_C	Wrong size
Bracket-1		Bracket-d_C	Wrong hole placement
Shaft-1		Shaft-d_C	Wrong drilling
BUSH-1		Bush-d_C	Wrong size, these components will not be picked by UR10 with the magnetic gripper because all of these products have defects

File location: C:\Users\ardiw\OneDrive\Documents\Fusion\Belt Roller Support\Defect Component


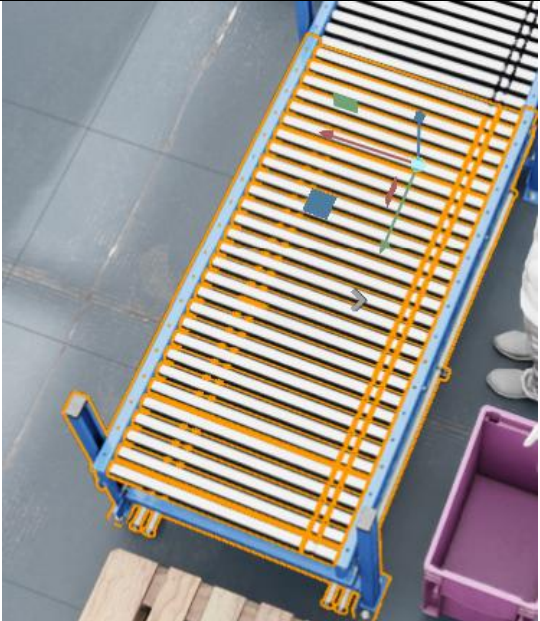
Item Name	Image	Code variable	Description
	 <p>Assemble (1)</p> <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>	AS1_C	Step 1(this item will be spawn beside male_adult_construction_03 and male_adult_construction_02 will be put into small_KLT_visual_collision)
	 <p>Assemble (2)</p> <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>	AS2_C	Step 2(this item will be spawn beside male_adult_construction_03 and male_adult_construction_02 will be put into small_KLT_visual_collisio)
	 <p>Assemble (3)</p> <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>	AS3_C	Step 3(this item will be spawn in front of UR5 robot it aims is to create illusion of crafting robot, the male_adult_construction_03 will pick up these component and put some animation of work )

	 <p>Assembly</p> <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>	AS4_C	Step 4, it spawns from human 1(when the male_adult_construction_03 put down AS3_C it will despawn and spawn AS4_C)
Belt Roller Support	 <p>Belt Roller Support</p> <p>Part Number</p> <p>Description</p> <p>Item Number</p> <p>Lifecycle</p>	AS5_C	The product (AS4_C) will be picked up by male_adult_construction_03 and will include some animation of checking and screwing the component. After that, it will put into the conveyor, and it will despawn and spawn AS5_C as a final product

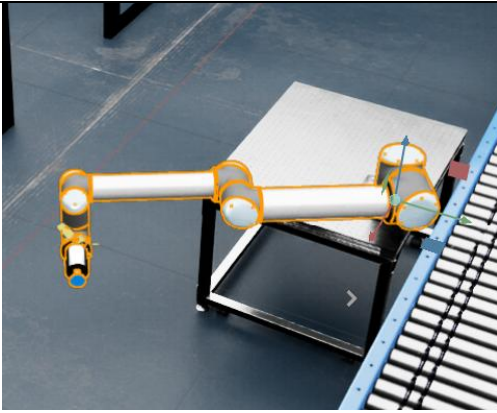
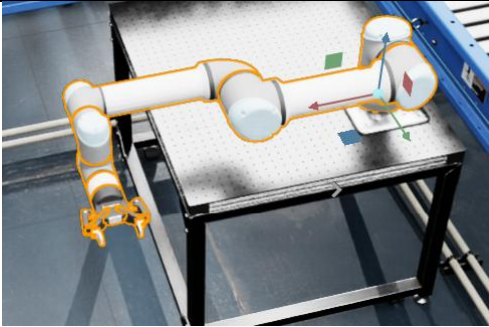
File location: C:\Users\ardiw\OneDrive\Documents\Fusion\Belt Roller Support\Assembled step

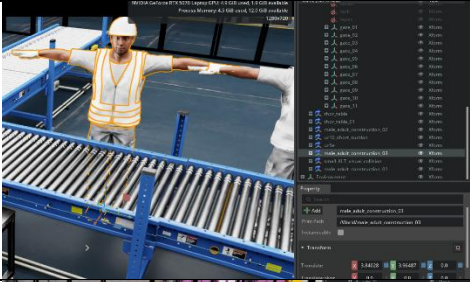

Item Name	Image	Code variable	Description
ConveyorBelt_A08		Base-Start_C	It's A normal conveyor, all components will be spawned here, including some defect components and its actual component, the movement of the conveyor and the robots need to work in a range of 1.7 meters and with a repeatability of 0.3 mm to assemble a Belt Roller and Support is expected to assemble 200 units per day(1)




Convey orBelt_ A23		Base- T_C	It's a T-shaped conveyor. Its functionality is to deliver the components from the robot (UR10), and the components that are not listed or wrong are delivered to the end of the conveyor. (2)
Convey orBelt_ A05		Base- End_C	It's the final conveyor where the components are being assembled(theoretically), and then spawn components, the aim is to create an illusion so that the robot can assemble the components into a complete set. (3)



Case Study: The robot needs to work in a range of 1.7 meter and with a repeatability of 0.3 mm to assemble a Belt Roller Support. The production line is expected to assemble 200 units per day. The assembly components will be delivered in a conveyor belt in sequence, and the robot need to pick them one by one and perform the operations. Then the robot needs to place the assembled parts in another conveyor belt. In case of any failure in the assembly, the robot needs to scrap the assembled part by putting it in a side bin. The total weight of assembled parts is around 1.2 KG. Calculate the needed time for the robot to perform the assembly and satisfy the desired number of assembled parts per day (200 units). Suggest at the end how many hours the robot need to be up and running.




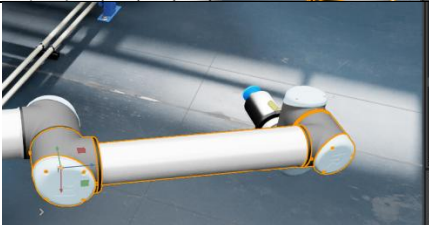

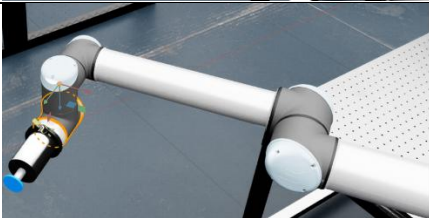

Item Name	Image	Code variabel	Description
ur10_short_suction		UR10_MG	This robot functionality is to separate a template product and its components. The robot will do a pick and place to the end of Conveyor Belt A23, and after that, it will be processed by the robot UR5e. The template will be delivered by the conveyor so that it will be dropped off by the conveyor. (1)
ur5e		UR5_HG	This robot has the role of grasping the component and assembling it partly before the human takes responsibility to fully assemble it. The limitation is the robot cannot replicate the assembling the component so it's best way that the robot creates an illusion to assemble the part to create a belt roller. (2)

Item Name	Image	Code variabel	Description
male_adult_construction_03		Human_W	This human has the responsibility to continue assembling the components until screwing, this human also can spawn almost a completed product.
male_adult_construction_02		Human_W1	This Human has the responsibility to supervise, where this human will spawn a complete product and also separate product where the uncomplete product will be put in the trash bin where is



			located beside him, and the complete one will be dropped by the conveyor into wooden Plack.
male_adult _constructi on_01		Human_ S	This human has the responsibility to check the conveyor and use the sit and investigate pc for a given amount of time. This human is designed to move near the robot, where the aim of this movement is to check if there are humans; the UR5 and UR10 will slow down or avoid reaching the human.

Item Name	Image	Code variable	Description
Camera_SG2_OX03 CC_5200_GMSL2_H 60YA		UR10_S	This sensor works together with the UR10 robot. If the sensor detects a component, the conveyor belt (ConveyorBelt_A23) will slow down, and it has the responsibility of delivering the defective component to the end of the conveyor line.
small_KLT_visual_collision		UR5_T	This is the trash bin that will be used to drop an incomplete set of the product from the male_adult_construction_02.


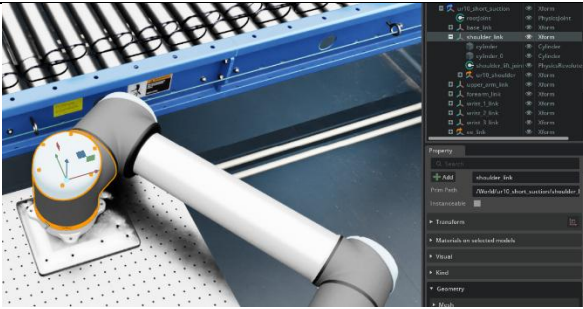
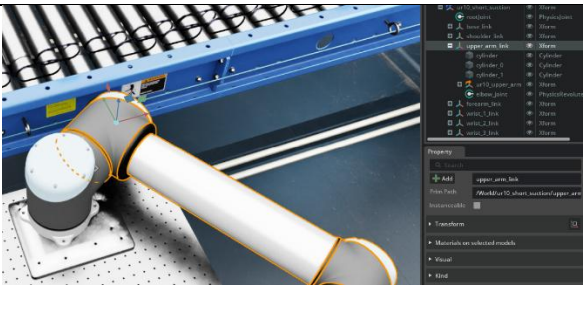
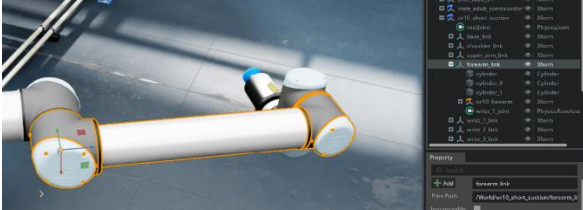
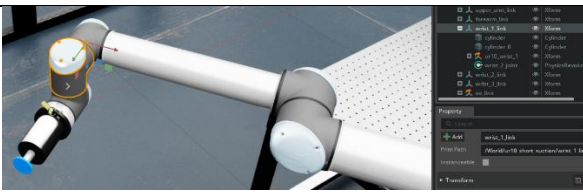
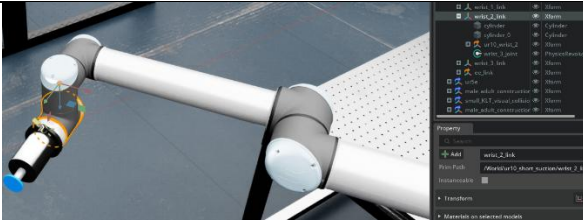
UR10 Joint Name	Image	Code variabel	Description
base_link		UR10_B	This gripper is a magnet gripper; this gripper has functionality to grasp a component that is made from metal
shoulder_link		UR10_SL	
upper_arm_link		UR10_UL	
forearm_link		UR10_FL	
wrist_1_link		UR10_w1 L	
wrist_2_link		UR10_w2 L	
wrist_3_link		UR10_w3 L	

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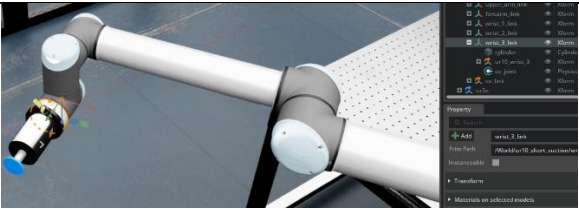
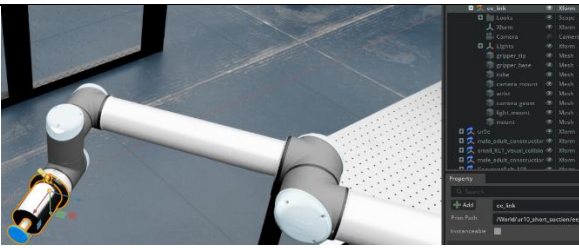
ee\_link

UR10\_G



UR10 Joint Name	Image	Code variabel	Description
base_link		UR5_B	This gripper is a two-hand gripper its function is to assemble the components. Unfortunately, due to complexity and being very hard to translate it an algorithm is necessary to put an illusion were, at some stage, the program will spawn a half-done product.
shoulder_link		UR5_SL	
upper_arm_link		UR5_UL	
forearm_link		UR5_FL	
wrist_1_link		UR5_w1 L	
wrist_2_link		UR5_w2 L	



wrist_3_link		UR5_w3 L
Gripper		UR5_G

Q Search			Y, ≡
Name (Old to New)			Type
World (defaultPrim)			Xform
ConveyorBelt_A23			Xform
Physics_materials			Scope
Looks			Scope
SM_ConveyorBelt_A23_02			Mesh
SM_ConveyorBelt_A23_Decal_02			Mesh
Rollers			Xform
Rollers_01			Xform
Rubberbands_01			Xform
Rubberbands			Xform
Anchorpoint			Xform
Anchorpoint_01			Xform
ConveyorBelt_A08			Xform
Physics_materials			Scope
Looks			Scope
SM_ConveyorBelt_A08_02			Mesh
SM_ConveyorBelt_A08_Decal_02			Mesh
Rollers			Xform
Rubberbands			Xform
Anchorpoint			Xform
ConveyorBelt_A05			Xform
Physics_materials			Scope
Looks			Scope
SM_ConveyorBelt_A05_02			Mesh
SM_ConveyorBelt_A05_Decal_02			Mesh
Rubberbands			Xform
Rollers			Xform
Anchorpoint			Xform

Name (Old to New)	Type
World (defaultPrim)	Xform
ConveyorBelt_A23	Xform
ConveyorBelt_A08	Xform
ConveyorBelt_A05	Xform
warehouse_with_forklifts	Xform
Safety_Net	Xform
thor_table	Xform
thor_table_01	Xform
<b>male_adult_construction_02</b>	<b>Xform</b>
Looks	Scope
ManRoot	Xform
ur10_short_suction	Xform
ur5e	Xform
male_adult_construction_03	Xform
Looks	Scope
ManRoot	Xform
small_KLT_visual_collision	Xform
male_adult_construction_01	Xform
male_adult_construction_01	Xform
Camera_SG2_OX03CC_5200_GMSL2_H60YA	Xform
Environment	Xform

ur10_short_suction	Xform
rootJoint	PhysicsJoint
base_link	Xform
shoulder_link	Xform
upper_arm_link	Xform
forearm_link	Xform
wrist_1_link	Xform
wrist_2_link	Xform
wrist_3_link	Xform
ee_link	Xform
Looks	Scope
Xform	Xform
Camera	Camera
Lights	Xform
gripper_tip	Mesh
gripper_base	Mesh
tube	Mesh
camera_mount	Mesh
wrist	Mesh
camera_geom	Mesh
light_mount	Mesh
mount	Mesh
ur5e	Xform
Gripper	Xform
Robotiq_2F_85	Xform
joints	Scope
Looks	Scope
base_link	Xform
shoulder_link	Xform
upper_arm_link	Xform
forearm_link	Xform
wrist_1_link	Xform
wrist_2_link	Xform
wrist_3_link	Xform
root_joint	PhysicsFixedJoin

