W15: CIM [G] 3.1.2H RoboCell [ER-4u] Handshaking

Introduction

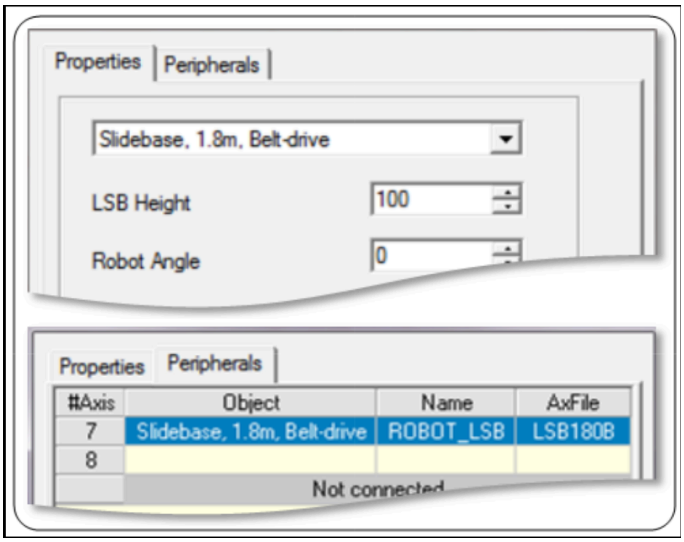
Handshaking is the process of communication that occurs between the robot and mill. The robot can be programmed to load and unload parts to the mill. In this activity you will write a program to simulate communication between the robot and mill.

Equipment

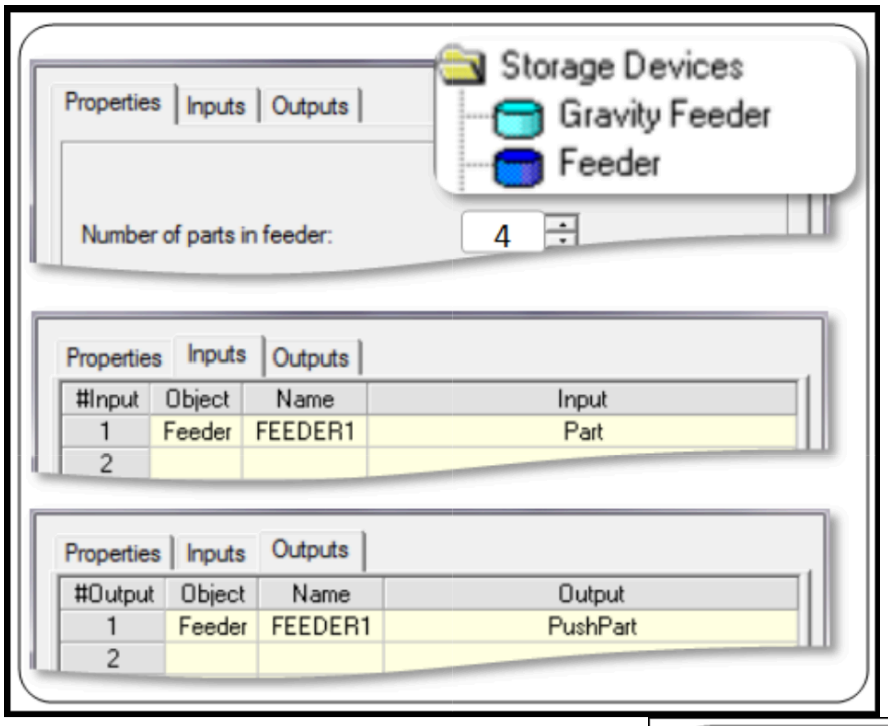
Computer with intelitek® RoboCell software

Procedure

1. Open CellSetup and create the graphics in CellSetup using the specifications below.
   a. Robot
      i. 1.8 mm Slidebase
      ii. Peripherals tab: slide up to Axis 7
   b. Table
      i. X: 1500 mm
      ii. Y: 4000 mm



   c. Feeder
      i. Parts: 4
      ii. Inputs tab: slide up to Input 1
      iii. Outputs tab: slide up to Output 1
      iv. Position: 287, 0

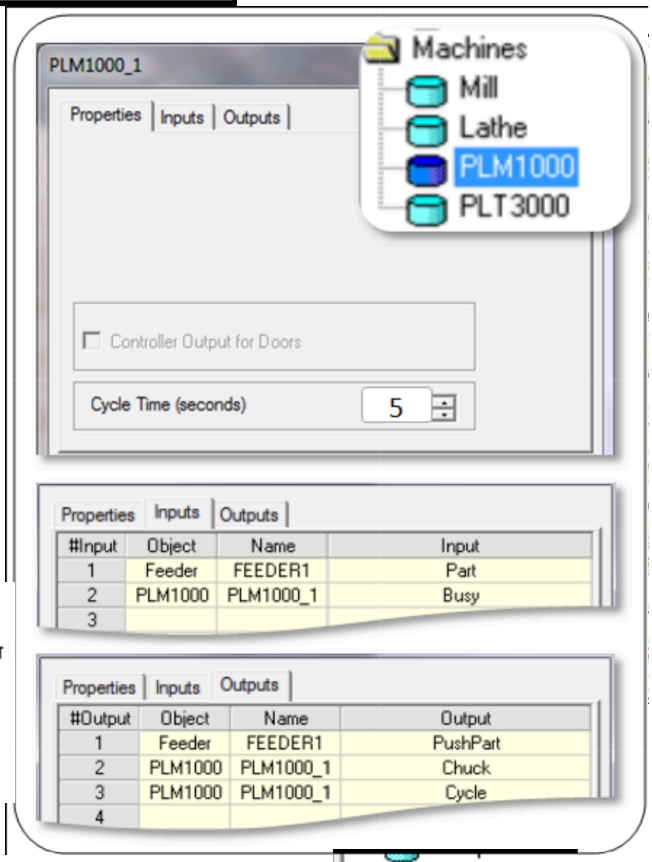


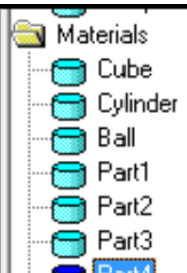
v. Rotate: 180°

d. Mill: PLM1000
   i. Cycle Time: 5 seconds
   ii. Inputs tab: slide up to Input 2
   iii. Outputs tab: slide Chuck up to Output 2
   iv. Outputs tab: slide Cycle up to Output 3
   v. Rotate: –90
   vi. Position: –90, 640

e. Rack
   i. Position: 300, –600

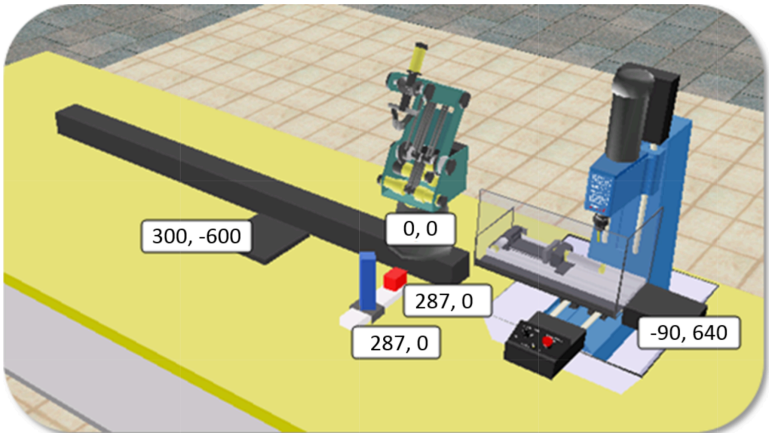
Figure 4. Rack Setup





f. Part 4
   i. Place one Part 4 onto the Feeder
   ii. Part4
   iii. Position: 287, 0

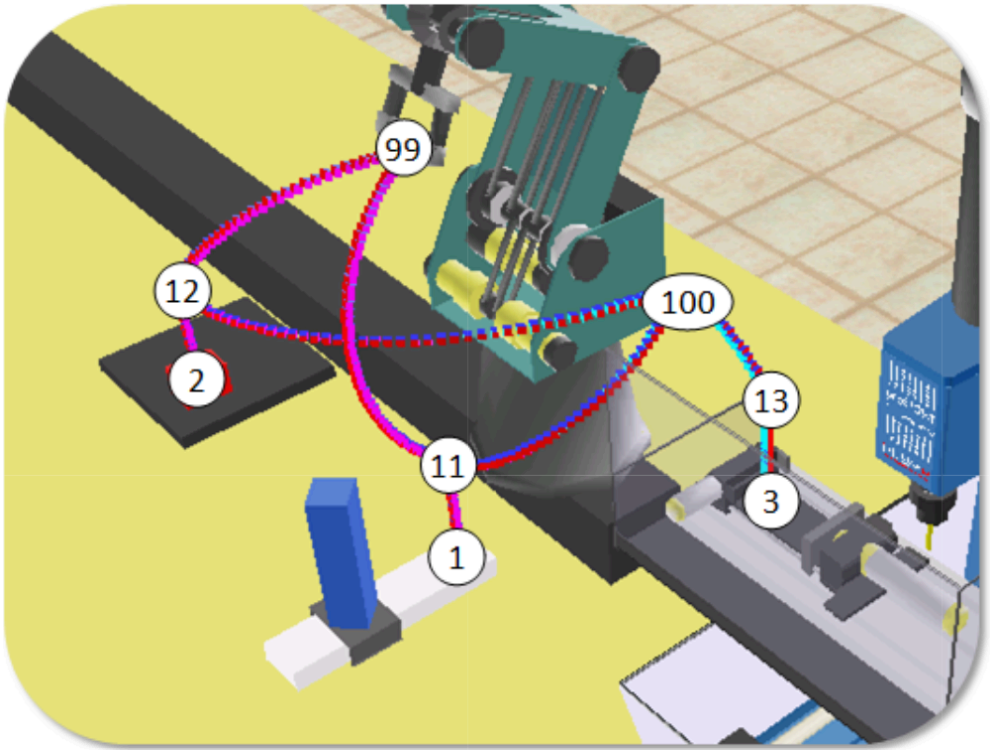
2. Confirm that the cell resembles the final configuration shown below.



3. Program the positions shown below. See the image below for guidance.

a. 1 - Pick part from the feeder
b. 11 - Above pickup point at feeder
c. 2 - Drop-off position at rack
d. 12 - Above the drop-off point at rack
e. 99 - Home
f. 100 - Above shield, safe position
g. 3 - At the vise
h. 13 - Above vise

4. Program the robot to perform the following functions. Use the image below for guidance.



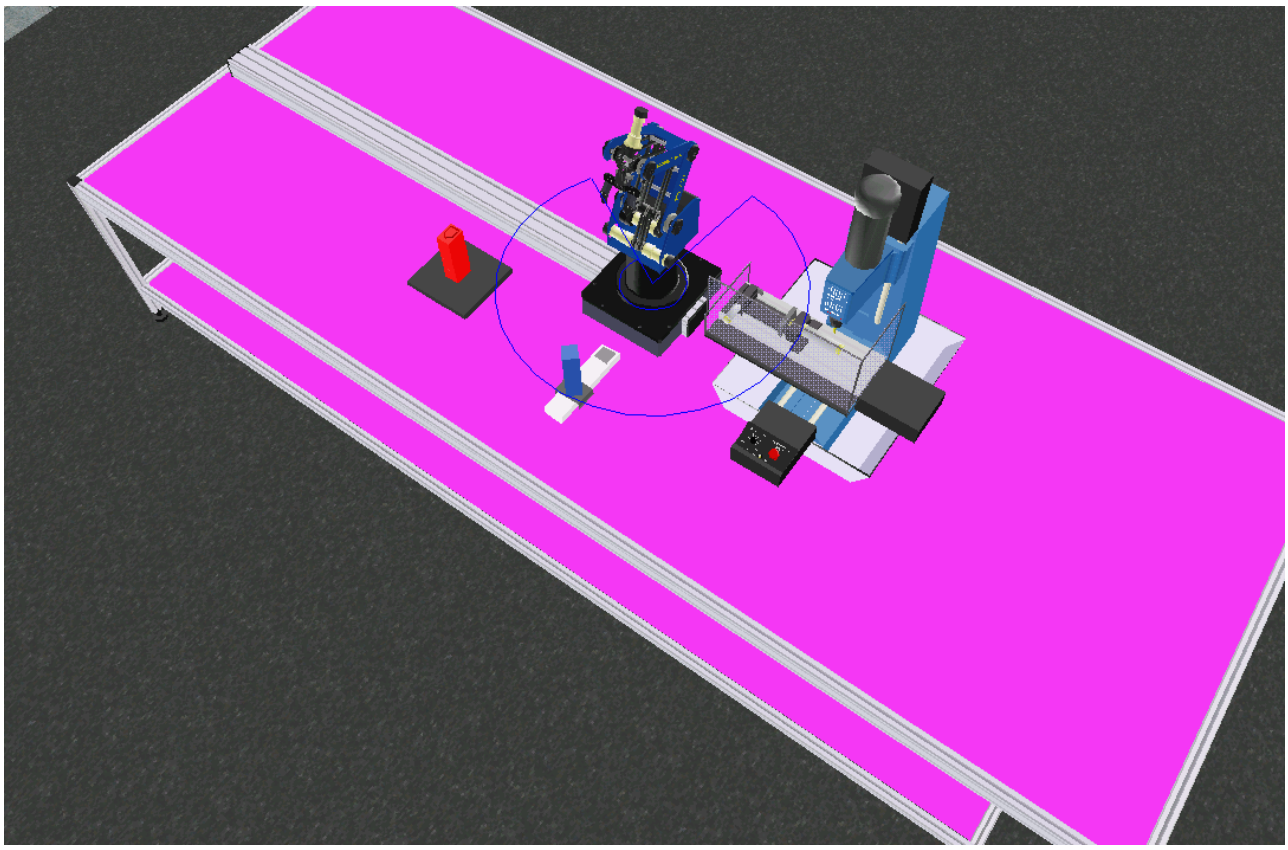
a. Robot starts at home with its **gripper** open.
b. Robot sends signal to feeder to push part and recycle.
c. Robot picks up a part from the feeder.
d. Robot places the cube in the vise.
e. Robot sends signal to mill to close the vise.
f. Robot moves to safe position.
g. Robot sends signal to start cycle.
h. Robot waits for mill to finish milling cycle.
i. Robot sends signal to open vise.
j. Robot picks up part from mill.
k. Robot places part on Rack.
l. Robot returns to home.

Going Beyond

6. As directed by your teacher, develop a more advanced program to complete the following operation.
Modify the program to loop the current process to mill the remaining

three parts from the part feeder. Create a process that will allow the robot to palletize the rest of the finished parts onto the rack.

6. Attach the screenshot below of the RoboCell Work Envelope

Screenshot of RoboCell Work Envelope


7. Attach the Code below with the

Remark: 3.1.2G Palletization & Storage
Remark: Name
Remark: Date

RoboCell **Code** with the Work Envelope
Remark: 3.1.2H Handshaking

```
Remark: Matthew Jeide

Remark: 11/27/25

Remark: ***

Remark: VARIABLES

Remark: CONSTANTS

Set Variable FEEDER  = 1

Set Variable VISE  = 2

Set Variable CYCLE  = 3

Set Variable COMPLETE  = 2

Remark: DYNAMIC

Set Variable PART  = 1
```

LOOP:

Go to Position 99 Fast

Turn On Output FEEDER

Wait 5 (10ths of seconds)

Turn Off Output FEEDER

Open Gripper

Go to Position 1 Fast

Close Gripper

Go to Position 11 Fast

Go to Position 100 Fast

Go to Position 13 Fast

Go to Position 3 Fast

Open Gripper

Go to Position 13 Fast

Turn On Output VISE

Wait 5 (10ths of seconds)

Turn On Output CYCLE

Wait 20 (10ths of seconds)

Wait Until Digital Input COMPLETE is OFF

Turn Off Output CYCLE

Turn Off Output VISE

Go to Position 3 Fast

```
Close Gripper

Go to Position 13 Fast

Go to Position 100 Fast

Go to Position 99 Fast

Go to Position 12 Fast

Set Variable DUNK  = 5 - PART

DUNK LOOP:

Go to Position 2 Fast

Set Variable DUNK  = DUNK-1

If DUNK>0 Jump to DUNK LOOP

Open Gripper
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Go to Position 12 Fast

Go to Position 99 Fast

Remark: update variable

Set Variable PART = PART+1

If PART<=4 Jump to LOOP

Positions - Jeide_312H

#	Coor.	Axis 1 X (mm)	Axis 2 Y (mm)	Axis 3 Z (mm)	Axis 4 Pitch (deg)	Axis 5 Roll (deg)	Axis 7 mm/deg	Axis 8 mm/deg	Type
1	Joint	4.21	11.21	64.39	14.40	0.00	-21.15	0.00	Abs. (Joint)
	XYZ	286.99	21.11	-53.00	-90.00	0.00	-21.15	0.00	
2	Joint								
	XYZ	0.00	0.00	-50.00	0.00	0.00			Rel. Cur. (XYZ)
3	Joint	89.01	-21.62	58.92	52.70	0.00	-21.15	0.00	Abs. (Joint)
	XYZ	6.84	397.19	151.50	-90.00	0.00	-21.15	0.00	
11	Joint	4.21	-15.49	90.06	15.43	0.00	-21.15	0.00	
	XYZ	287.00	21.12	50.00	-90.00	0.00	-21.15	0.00	Abs. (XYZ)
12	Joint	0.00	-34.96	97.25	27.68	0.00	-605.56	0.00	
	XYZ	300.00	0.00	135.00	-89.96	0.00	-605.56	0.00	Abs. (XYZ)
13	Joint	89.01	-36.56	59.36	67.20	0.00	-21.15	0.00	
	XYZ	6.84	397.19	250.00	-90.00	0.00	-21.15	0.00	Abs. (XYZ)
99	Joint	0.00	-120.28	95.02	88.81	0.00	-21.15	0.00	Abs. (Joint)
	XYZ	169.03	0.00	504.33	-63.55	0.00	-21.15	0.00	
100	Joint	90.00	-72.45	120.63	41.81	0.00	-21.15	0.00	
	XYZ	0.00	230.00	250.00	-90.00	0.00	-21.15	0.00	Abs. (XYZ)

8. Updated portfolio with video.

E-Porfolio Published link with video file. Use the Snipping Tool to record. Then upload the

Conclusion Answer in complete sentences each of the questions below.

Describe a product that could be produced using the operation in this activity.

You could make a lot of keychains with this operation.