

Activity 3.1.2g Palletization and Storage

PLTW

PALLETIZATION AND STORAGE

☰ Introduction

☰ Procedure

☰ Conclusion

Introduction

GOALS	MATERIALS	RESOURCES
<ul style="list-style-type: none">• Use variable programming to stack objects.• Modify a program for efficiency.		
GOALS	MATERIALS	RESOURCES
<ul style="list-style-type: none">• Computer with intelitek® RoboCell software		
GOALS	MATERIALS	RESOURCES

- **RoboCell Planning**
- **Activity 3.1.2g Palletization and Storage (Downloadable PDF)**

A robot can work with a variety of storage devices, such as gravity feeders, pneumatic feeders, or racks. In this activity, you will work with a parts feeder. You will get the parts from the feeder and palletize them on the table. Palletizing is the placement of parts in a uniform position, performed by pick-and-place robots.

Procedure

1

Open CellSetup and create the graphics in CellSetup using the following specifications:

- Table into the cell, 1000 x 1000.
- Robot: **Scorbot ER4**
- Feeder:
 - Open the Storage Devices folder and select **Feeder**.
 - In the FEEDER1 properties list, select **Capacity** and enter 8 in the Set Capacity field (Figure 1).
 - Click **Controller Setup** and then the **Outputs** tab.
 - Left-click and hold, then slide the Feeder information up to line 1 of the Outputs tab.
 - Place the Feeder onto the Table.
 - Double-click the **Feeder** and rotate it 90 degrees.

- Double-click the **Feeder** and position the feeder at 255,-200 (Figure 2).
- Place a Cylinder onto the Feeder (40 mm × 40 mm).
- Place Cylinder on the light grey square.
- Once the Cylinder is in place, double-click it and change the position to 255, -200 (Figure 3).

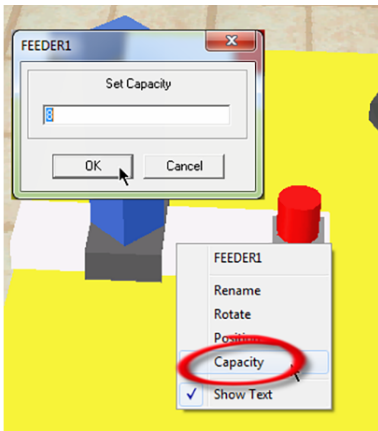


Figure 1. Feeder Popup

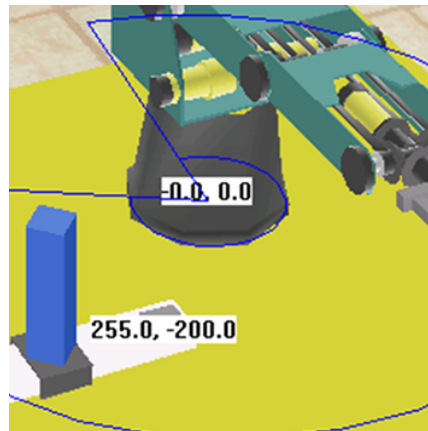


Figure 2. Feeder Coordinates

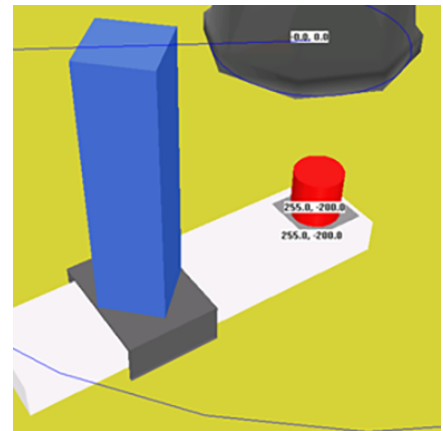


Figure 3. Cylinder

- 2 Save this graphic file as "LastName_A312g".
- 3 Exit CellSetup.
- 4 Display the cylinder in RoboCell. Initially, the cell does not display the Cylinder.

- To view the active and inactive inputs and outputs, click **View > Dialog Bars > Digital Outputs** and **Digital Inputs**. The bars pop up at the bottom of the screen.
- To display the cylinder, you need to turn on the output associated with the cylinder (in this case output 1). Insert the following three lines into the program to display the cylinder.

Program	Explanation
Turn on output 1	Cylinder will appear.
Wait 5 (tenths of a second)	Wait 0.5 second to allow output to be read and block to appear.
Turn off output 1	Feeder will reset and wait for another call for part.

5

Using the [RoboCell Planning](#) resource, create the program as follows:

- Remove the cylinders from the feeder and stack them on the table at the positions shown.
- Stack the eight objects two layers high with four objects in a layer.
- Use variable programming to stack the objects on the pallet (table).
- Use the Send Robot to Object command to direct the robot to pick up the Cylinder at Position 1.



Engineering Notebook

Copy the Position Coordinates table into your PLTW Engineering Notebook. Then, fill in all necessary position coordinates. Refer to the Robot Work Illustrations as needed.

Position Coordinates							
Position No.	Absolute or Relative	X	Y	Z	P ABS REL	R	Comments
99	Absolute				-90	0	Home - Recorded

							Position
100					-90 10	0	
1	Absolute	255	-200	42	-90	0	ATPICK - Taught Position
11					-90 10	0	
20					-90 10	0	
21					-90 10	0	
22					-90 10	0	
23					-90 10	0	
24					-90 10	0	

25					-90 0	0	
26					-90 0	0	
27					-90 0	0	
30					-90 0	0	
31					-90 0	0	
32					-90 0	0	
33					-90 0	0	

Commands

RE - Remark

Commands

Z for **Level 1** (20-23) = Absolute + 10mm

Z for **Level 2** (20-23) = Relative to (20-23) +40mm

SV - Set Variable to
Computation

Z for **Level 3** (20-23) = Relative to (20-23) +90mm

OG - Open Gripper

Z for Position 100 = Absolute 140mm

CG - Close Gripper

Z for Position 1 = Absolute 42mm (*Send Robot to Object*)

GP - Go to Position

Z for Position 11 = Relative to 1 + 60mm

GL - Go Linear to Position

LA - Label

JU - Jump To

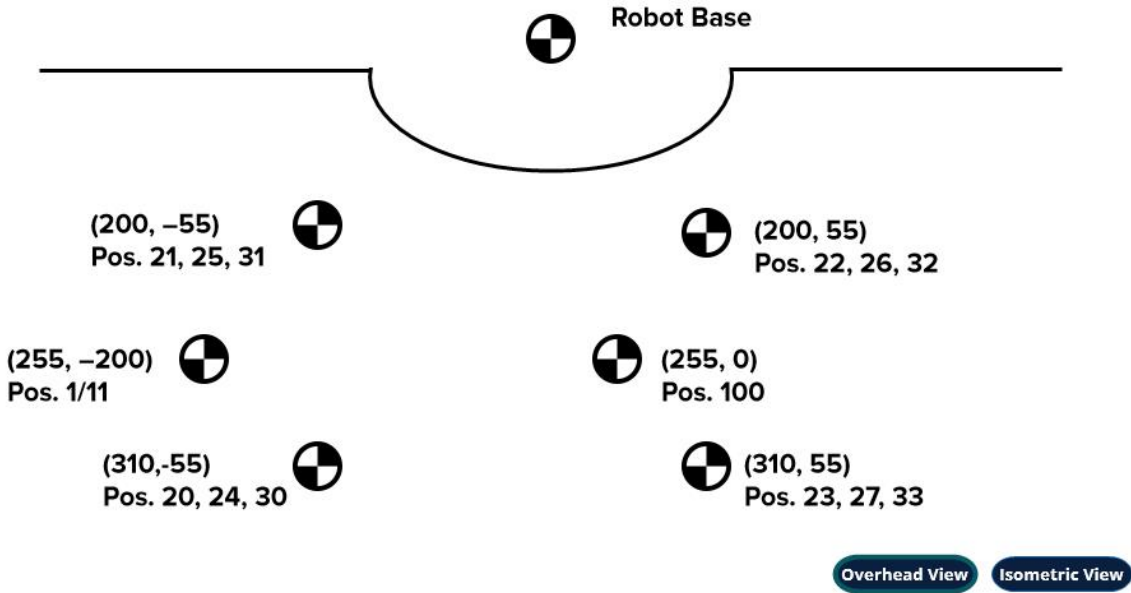
II- If Input # on Jump To

WT - Wait



Robot Work Cell Illustrations

Robot Base Position and Object Positions



Conclusion

Question 1

Describe how the program could be modified to be more efficient.

Question 2

Describe how this operation could be applied in a manufacturing environment.