OzoBlockly Editor Challenge

ORA Unstacks Disks and Places Them On a Vertical Pegboard

Student Guide

by Richard Born, Associate Professor Emeritus, Northern Illinois University

Introduction

Welcome to your project featuring ORA! You will be exploring a classic industrial application: unstacking disks with a center hole and placing them onto a vertical pegboard. This task is quite common in automotive and gear manufacturing, demonstrating why 6-axis cobots are essential for modern automation.

Parts placed on pegboards are routinely inspected by factory workers to ensure assembly quality and accuracy. Commonly inspected items include electrical components like connectors and circuit boards, mechanical parts such as gears and brackets, wiring harnesses, fasteners, and subassemblies. This inspection process verifies proper fit, detects defects, and confirms the correct parts are utilized before advancing in the production line, enhancing overall product reliability.

In a real-world factory, a cobot uses its 6-axis range of motion to pick a disk with a center hole from a flat, horizontal stack and rotate it 90 degrees to align with a peg on a vertical fixture. One of the most exciting technical challenges you'll explore is the "peg-in-hole" insertion. In gear-cutting facilities, cobots perform this task alongside humans, using safety sensors to stop instantly if they contact an operator. Through this project, you will learn how precision and flexible movement allow ORA to solve complex mechanical problems just like the robots used in manufacturing today.

The Challenge Setup

Figure 1 shows the setup for this challenge.

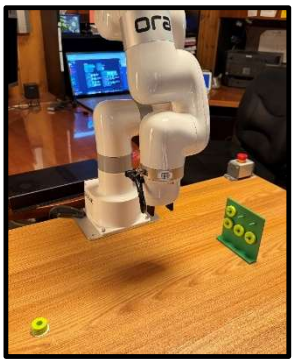

Figure 1

The stack of disks with center holes is located in the bottom left corner of the figure. The photo was taken after ORA placed four disks onto the vertical pegboard, with two disks still remaining to be picked from the stack and be placed onto the pegboard.

In order to gain a better feeling for the result expected from this challenge, please view the 11-second time-lapse video that accompanies this challenge lesson.

Two <u>VERY IMPORTANT</u> Notes Regarding Safety

1. You should include the Ozobot Editor block shown in Figure 2 at the beginning of your program, perhaps right after the *Program start* block or in a function where you initialize a number of things required by your solution to the challenge. Why? When ORA is moving at a slower speed, say 20% or less, you have more time to prevent an impending collision. Of course, this also allows a person more time to move out of the way of ORA's moving arm! This is particularly important throughout the development process while creating your program, when you are more apt to make errors in coordinate values in *move to coordinates* blocks.

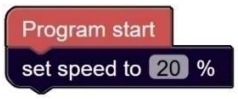

Figure 2

2. Make sure that the **Emergency Stop Button**, also shown in the middle-right side of Figure 1, is within easy reach. It might even be a good idea to have one student with his or her hand above the button when the program is started, in the event that it becomes necessary to instantly terminate all motion of ORA's arm and cancel any commands.

Step into the world of industrial automation with this ORA Challenge! You'll master this 6-axis cobot to solve a classic manufacturing puzzle: unstacking disks and precisely placing them onto a vertical pegboard. This project bridges the gap between coding and real-world engineering, teaching you the precision required for "peg-in-hole" insertion. Get ready to program like a professional, prioritize safety, and bring modern robotics to life!
