

OzoBlockly Editor Challenge

Precision Placement – ORA Places Marbles on a Special Pallet

Student Guide

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Introduction

Welcome to this exciting challenge! In this project, you will be working with ORA, a 6-axis collaborative robot (cobot) to master the art of precision placement. Your task is to program ORA to use a vacuum gripper to pick and place marbles onto a 3D-printed pallet designed with two rows and four columns. As you navigate this challenge, you'll develop crucial skills in robotics programming and problem-solving. Focus on accuracy **and coding efficiency** as you strive to successfully complete the marble placement task. Get ready to innovate and showcase your creativity in this hands-on learning experience!

The Challenge Setup

Figure 1 shows the setup for this challenge. All marbles, each about 1 inch in diameter, are initially on the downward sloping ramp on the left. When one marble is picked up, the rest of the marbles roll down the ramp and are stopped by a barrier at the far right of the ramp. ORA picks up each marble at the pickup location with its vacuum gripper. The first marble is placed at (R0, C0), filling row R0 from left to right. Then row R1 is filled in the same manner. STL files are provided for the 3D-printed ramp and marble pallet. The ramp and pallet are held in place on the tabletop with strong double-stick tape.

In order to gain a better feeling for the result expected from this challenge, please view the 9-second time-lapse video that accompanies this challenge lesson.



Figure 1

Two **VERY IMPORTANT** 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 with the table or squares that have already been placed by ORA. 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.

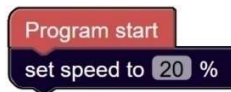


Figure 2

2. Make sure that the **Emergency Stop Button**, shown in Figure 3, 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.

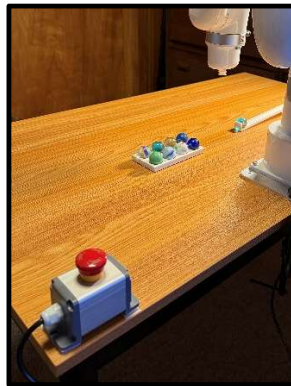


Figure 3

Take on the OzoBlockly Editor Challenge and unlock your potential in robotics! With ORA, the 6-axis collaborative robot, you'll learn the exciting skills of precision placement and programming as you guide marbles to their precision spots on a 3D-printed pallet. Embrace this hands-on opportunity to innovate and enhance your problem-solving abilities. Remember, every challenge is a chance to unleash your creativity and make mistakes that lead to mastery. Get ready to make your ideas come to life!
