

Recycling Robotic Arm:

Name: _____

Lesson 1

Date: _____

Single Stream Recycling - a form of recycling where all recyclables are placed in one bin

Recyclables - items that can be processed and remade into new products after they have been used

Physical Properties - properties of a physical object that are measurable like hardness

Job Outlook - the likelihood that the selected occupation will be available and hiring in the future

Engage

Without opening the bags, what are the different materials you can observe?

The bag contains rice, staples, and balls of aluminum foil.

What properties of these materials could be useful in creating an automated sorting process?

The staples are magnetic. The materials are also different sizes which could be helpful in sorting

Explore

The Recycling Robotic Engineer is a specific subset of Robotic Engineers. After watching the video, find the following information about Robotic Engineers:

Education needed to be a Robotic Engineer	The minimum is a bachelor's degree in an engineering field (mechanical, electrical, computer, etc)
Skills Needed to be a Robotic Engineer	Skills can include attention to detail, troubleshooting and diagnosing, etc
Duties of a Robotic Engineer	The duties could include building, programming, installing, and repairing robotic arms
What kind of work environment does a Robotic Engineer work in?	The environment could be in an office designing robot arms, in a factory building arms, and on-site at various locations installing or repairing the arms.
Average Salary in your state	The answer will vary by location. Average salaries range from \$73,000 to \$112,000 (source)
What is the job outlook for this career?	The outlook is positive as more companies are looking to adopt robotic technology.

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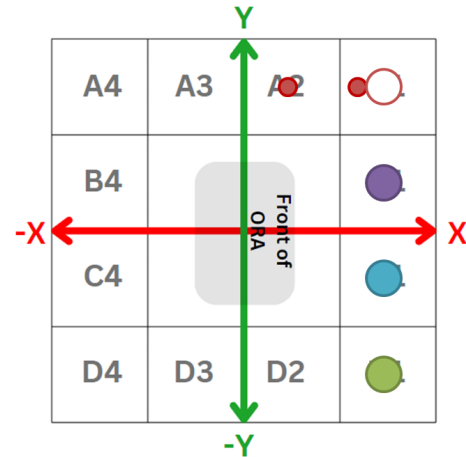
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Elaborate

In this challenge, you will receive a bag of mixed 'recyclables'. You will use the provided materials to sort the materials into three different containers located in B1, C1, and D1.

Task Requirements:

1. ORA must start in the initial position.
2. ORA must use the finger grippers to interface with various, student-created sorting devices to automatically place each material, by type, into the three different containers.
3. If a magnet is used, materials do not need to be removed from the magnet. Magnets can be placed in the material bin.
4. ORA must finish in the Initial Position.



Pseudocode	Code Blocks
Answers will vary	Example solution code

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Evaluate

Please answer the following prompts.

Remember to include your **name** and **date** on this paper!

1. Does the career of a Robotic Recycling Engineer interest you? Why or why not?

Answers will vary as this is subjective.

2. After testing your code, what do you think can be done to improve the process?

Answers will vary, but changing the order in which processes occur, changing how ORA manipulates the materials, and the physical construction of the separator sieve could be possible responses.

3. How would you change the process if you found out that your source material was contaminated with styrofoam (polystyrene) pellets?

Answers will vary, but the inclusion of a light blower or vacuum would be an interesting way of easily separating the pellets.