

Functions, Jobs, and Subjobs:

Name: _____

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Linear - a type of movement where the end tool moves to a point in a straight line.

Joint - a type of movement where the end tool moves to a point through the fewest movements.

Point - a user-defined and recallable position for the ORA.

Efficiency - measured in cycle time, the time taken to complete a product from start to finish.

Engage

You will observe a program run on the ORA. “Chunk” the program into different tasks in the space below. Name the “chunk” and give a brief pseudocode description of the task.

“Chunk” 1: Grab and move A1 Cylinder to the edge of the mat

“Chunk” 2: Grab and move B1 Cylinder to the edge of the mat

“Chunk” 3: Grab and move C1 Cylinder to the edge of the mat

“Chunk” 4: Grab and move D1 Cylinder to the edge of the mat

Explore

What do the four functions appear to code for? What would be a good name for each?

	Name this function	What does it do?
Function 1	ORA A1 to D1	Moves the ORA from A1 to D1. Includes some wait blocks
Function 2	Random ORA Movement	Generates random number and moves to A1, between B1 and C1, or D1 based on outcome
Function 3	Evo Square Dance	Evo moves along the perimeter of a 150mm square.
Function 4	Concurrent Flashing and Moving	Evo flashes different colors while ORA moves Evo from A1 to D1

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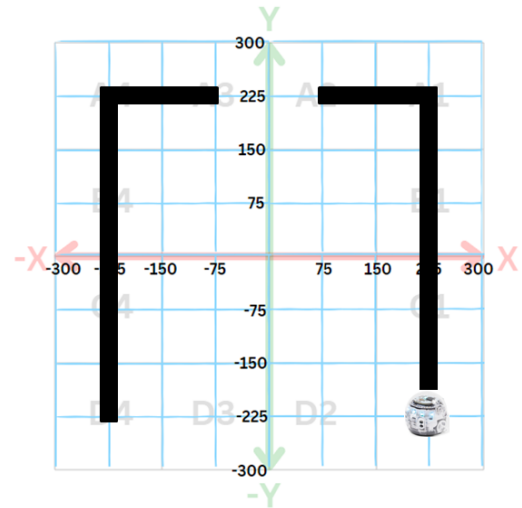
Date: _____

Elaborate

In this challenge, you will define and call functions independently. Then, combine functions using concurrency to increase efficiency.

Task Requirements:

1. ORA must start in the Initial Position.
2. Students must create functions to:
 - a. Program ORA to move Evo from D1 to D4.
 - b. Program Evo to follow the line from D4 to A3 and begin to flash the top lights.
 - c. Program ORA to move Evo from A3 to A2.
 - d. Program Evo to follow the line from A2 to D1, and begin to play at least 4 notes.
3. Students must also use concurrency block(s) to perform all the same actions but in a shorter time frame. Times of function-only and using concurrency will be reported in the Evaluate Section.
4. ORA must finish in the Initial Position.



Pseudocode	Code Blocks
Answers will roughly follow A-D above	Example code Share Code: uixcazu

After testing your code, was it successful? If not, what changes do you need to make to accomplish the task at hand? **Answers May Vary**

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Evaluate

Please answer the following prompts.

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

1. Why is it important to both name and add descriptions to your functions?

You may not be the only person working on your code. Additionally, if you take a break from coding and come back to it, you may have no idea what the function you created does. When code gets lengthy, this means spending time looking through the code to understand what is going on.

2. How would you “chunk” this job into subjobs? How many functions would you create?

Subjob 1: ORA Picks up Evo at A1

Subjob 2: Evo Plays sounds and lights

Subjob 3: ORA Moves Evo to D2

Bonus: Some of these could easily run concurrently



3. From the Elaborate activity, what was the time it took to get Evo back to D1 using only functions? What was the time when using concurrency blocks? How could you potentially decrease the time needed to complete the task?

Student Answers may vary, but using concurrency with the functions should decrease the time for Evo to get back to D1. Other ways of decreasing time could include answers like timing the two machines to see which is the slower/limiting factor and finding other ways of speeding up processes (i.e. changing Evo move speed or changing ORA movement type).