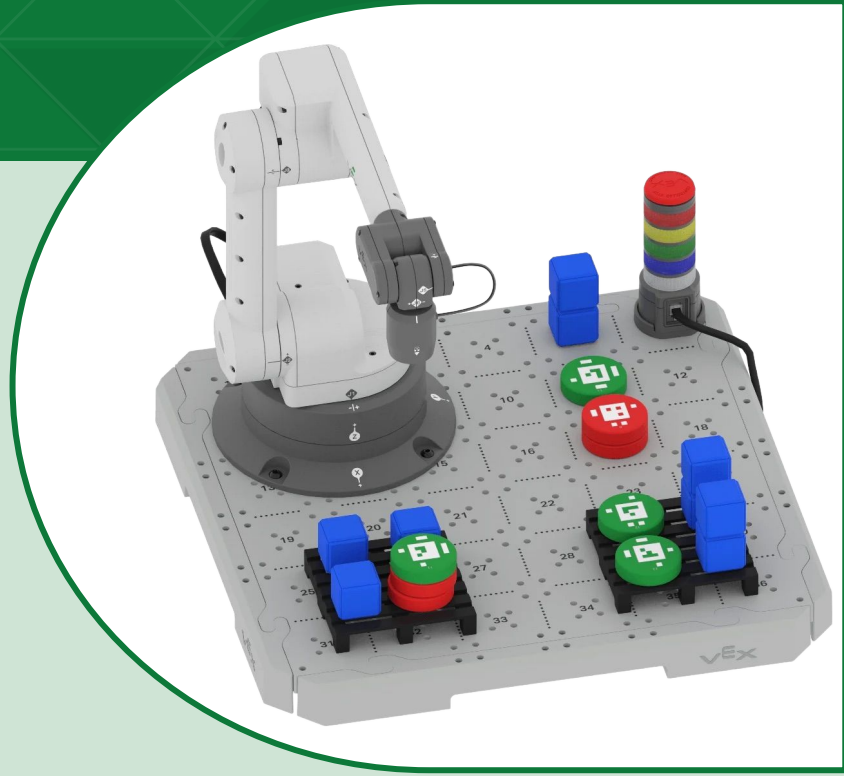
Using the AI Vision Sensor with VEX CTE



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VEX CTE

Workshop Goals

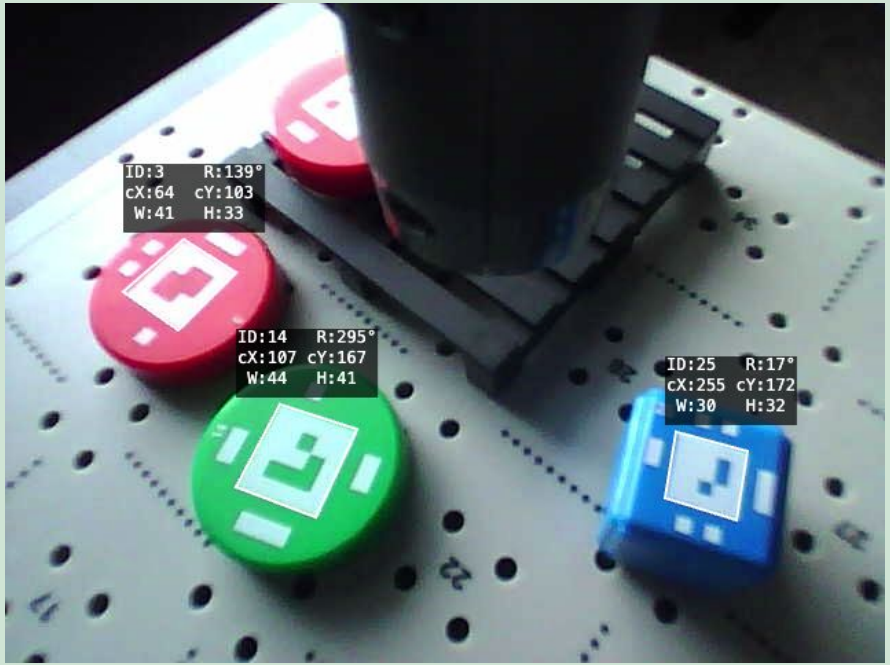
- Explain what the AI Vision Sensor sees and how the CTE arm moves
- Use AI Vision Sensor data to guide arm movement
- Build and run a working CTE project using the AI Vision Sensor

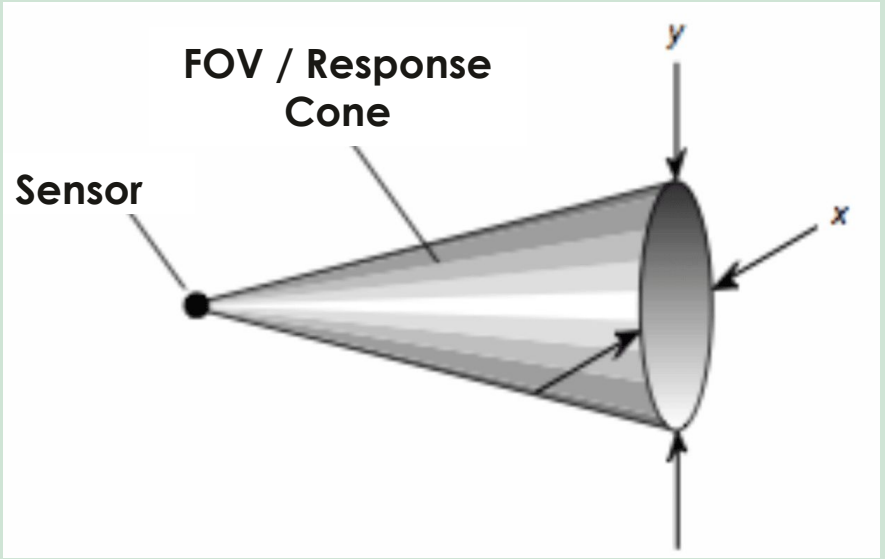
AI Vision Sensor

AI Vision Sensor & Privacy

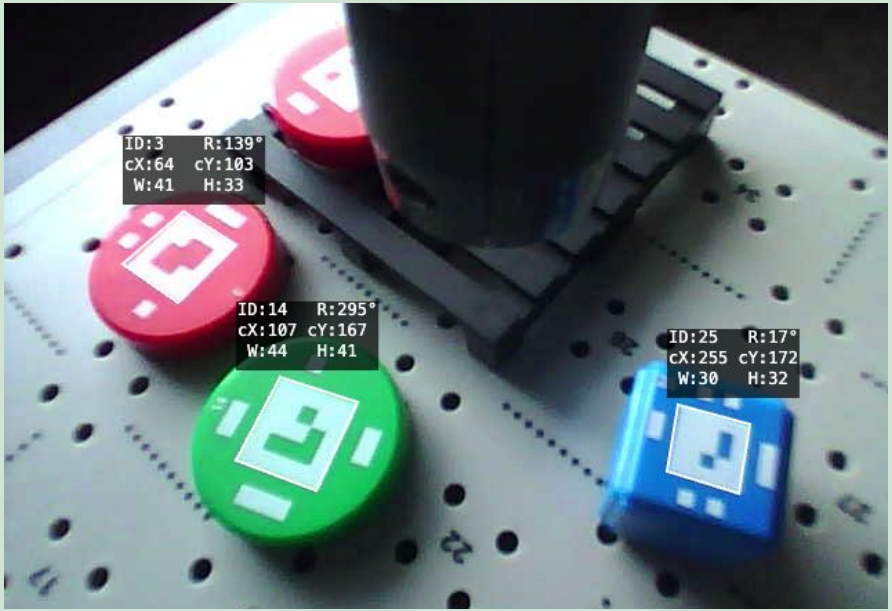
- The model runs entirely on the sensor
- No data is sent or stored externally
- Supports student data privacy (FERPA, GDPR)

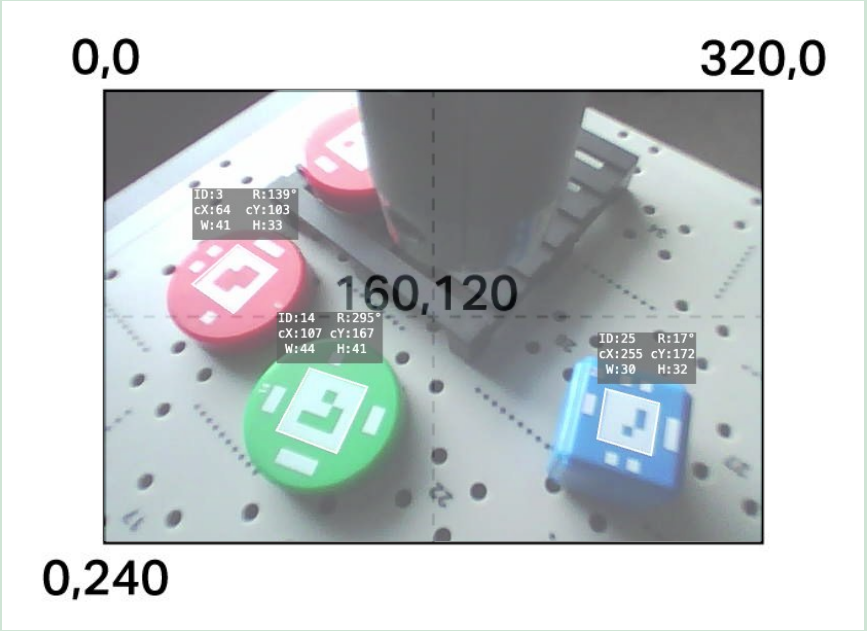
Field of View



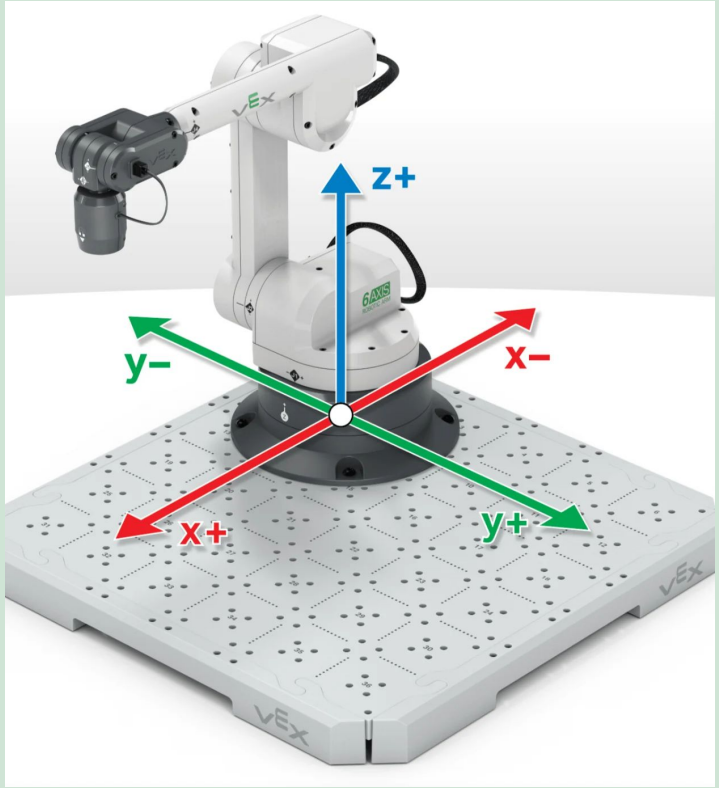


Seeing in Pixels

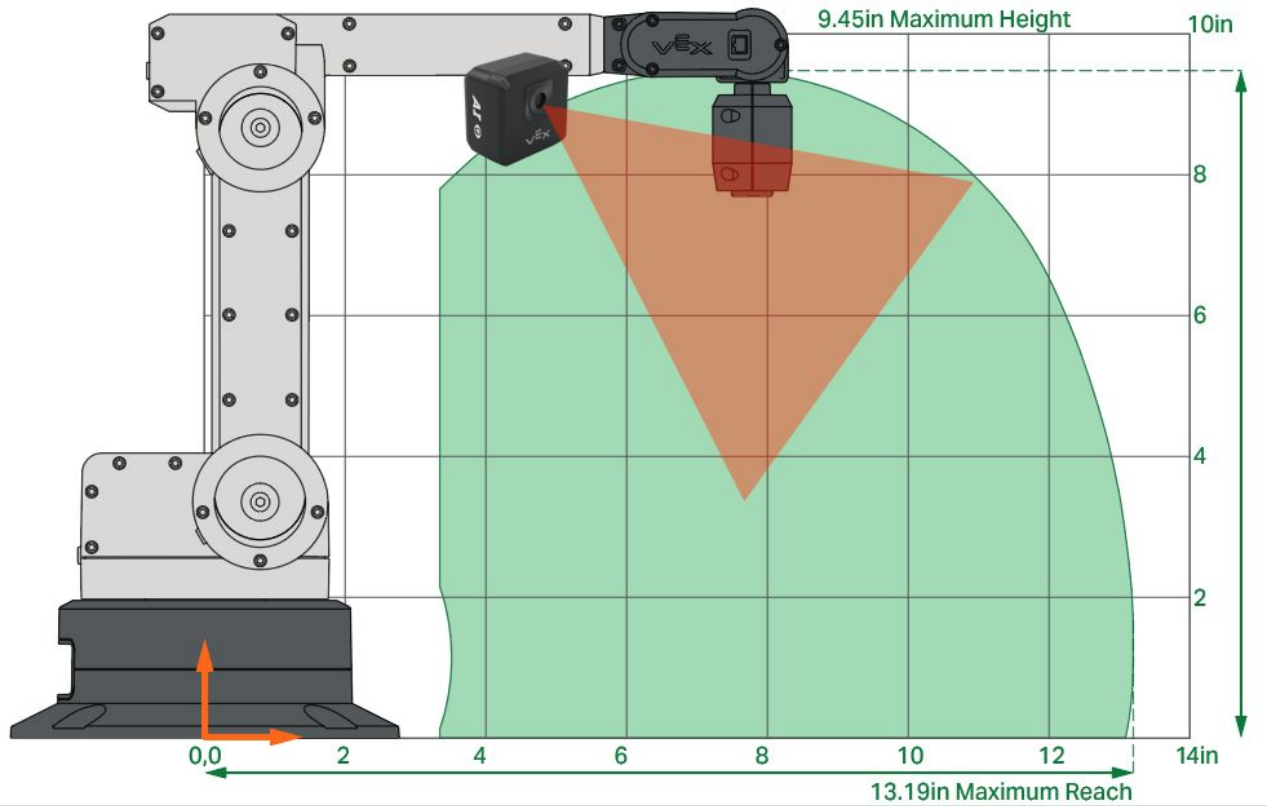


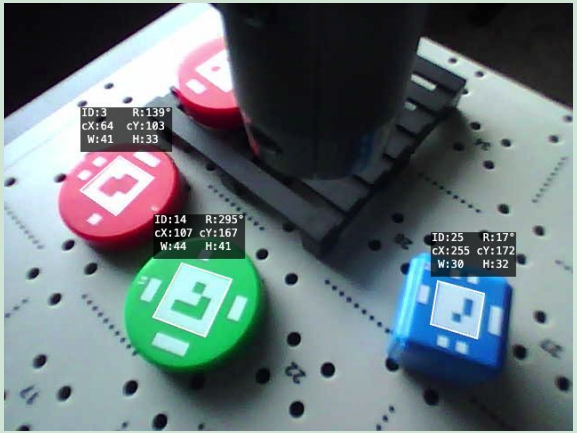


Arm Movement in 3D Space



Data in Different Spaces

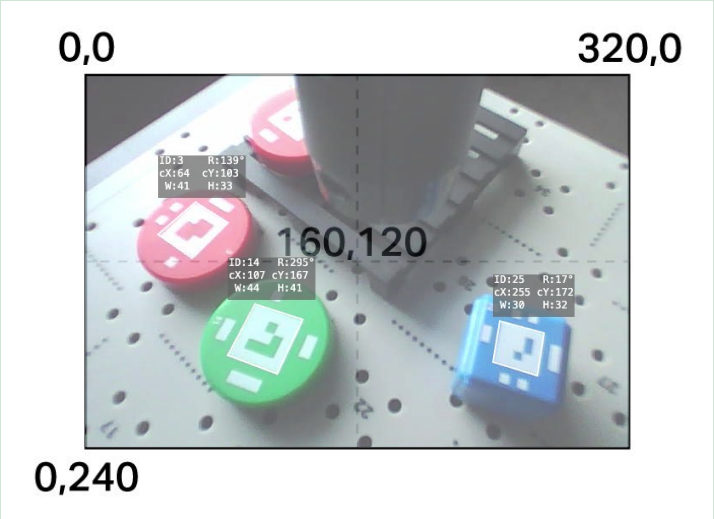




Bridging the Gap

If we can't directly convert pixels to millimeters, how do we use the data?

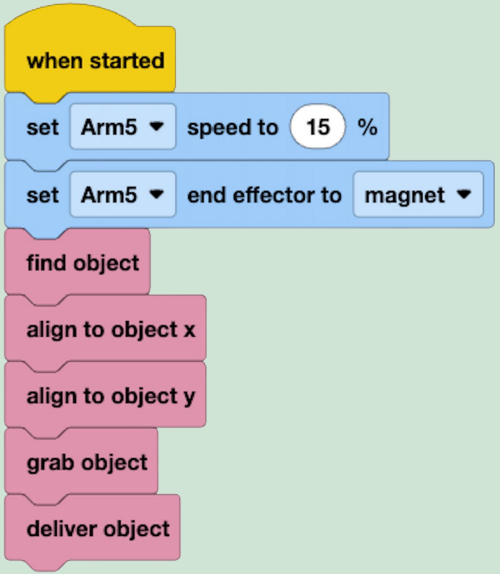
- Look at where the object is (CX, CY)
- Compare it to the center of the AI Vision Sensor's view
- Adjust the arm step-by-step until the object is centered



Code Overview

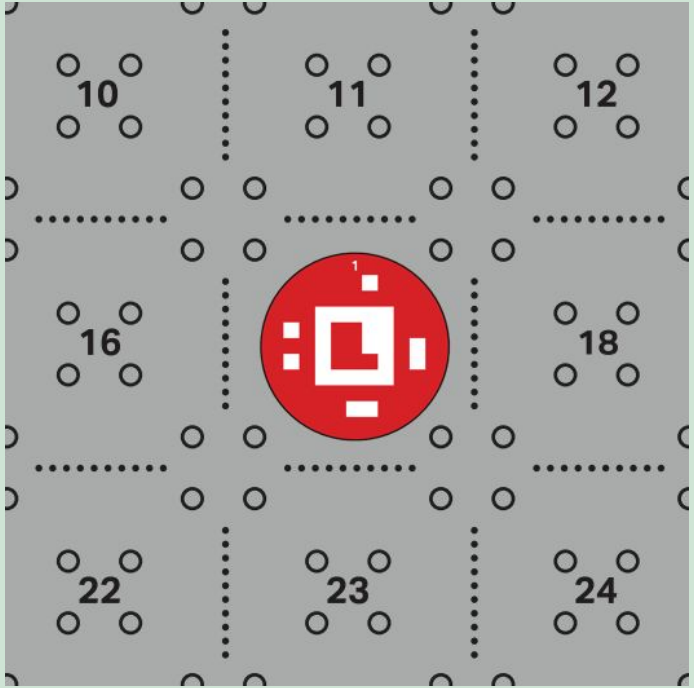
We're going to build the code in phases:

- **Phase 1:** Scan until we find an object
- **Phase 2:** Align the object along the x-axis
- **Phase 3:** Align the object along the y-axis
- **Phase 4:** Pick up the object
- **Phase 5:** Deliver the object



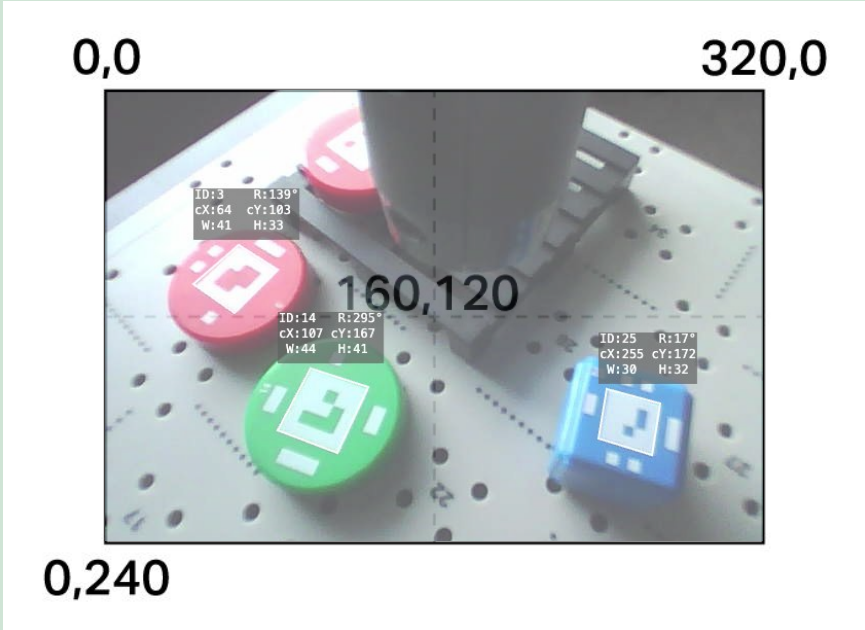
Phase 1: Scan to Find Object

- Open the **Phase 1** example project.
- View the arm's (x, y, z) coordinates using the **Devices** screen.
- Place a disk on tile position 17 before testing.



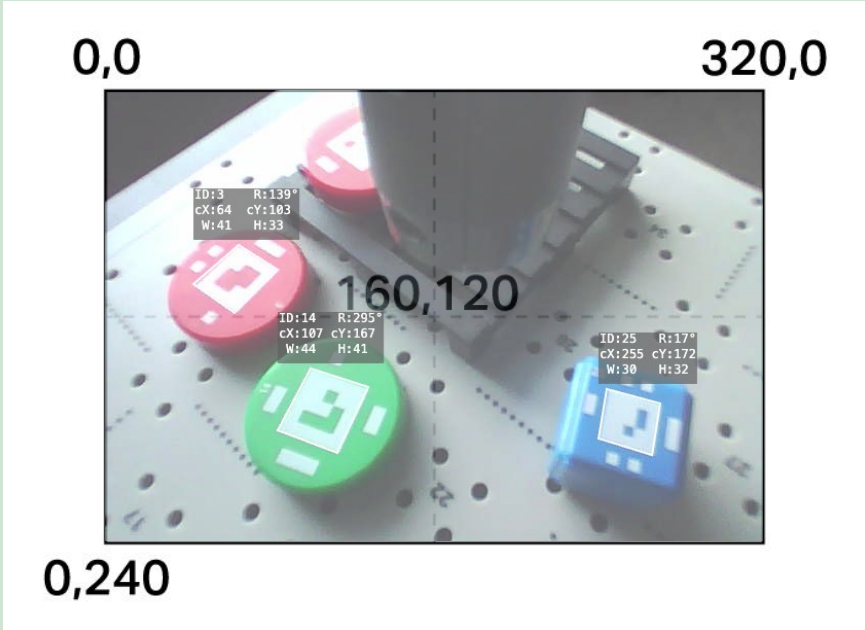
Phase 2: Align to Object X

- Open the **Phase 2** example project.
- Fill in the values for centerX and how much the arm will increment while moving.
- Place a disk on tile position 17 before testing.



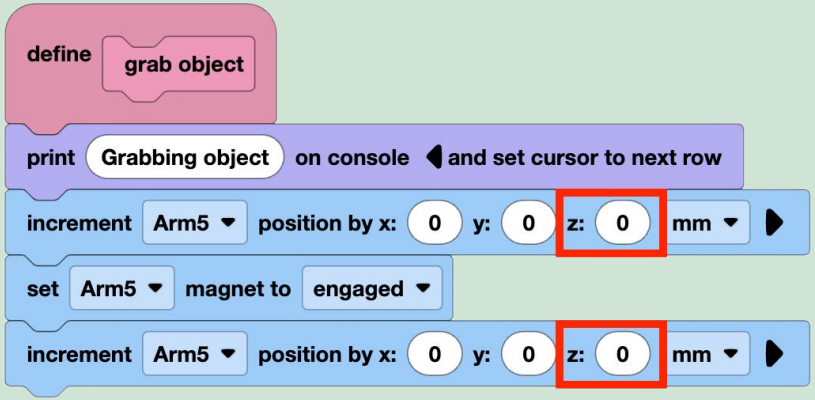
Phase 3: Align to Object Y

- Open the **Phase 3** example project.
- Fill in the values for centerY and how much the arm will increment while moving.
- Place a disk on tile position 17 before testing.



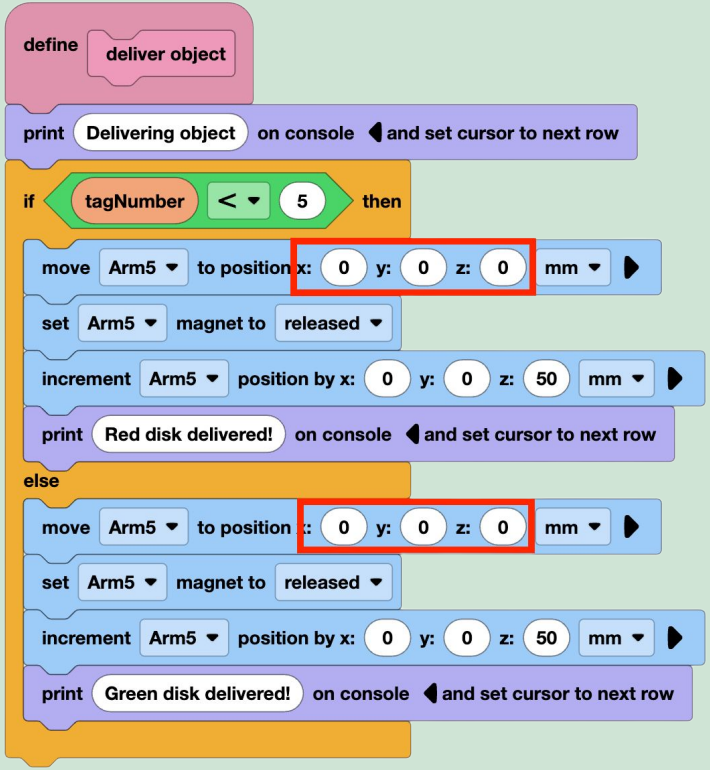
Phase 4: Grab Object

- Open the **Phase 4** example project.
- Fill in the values for how the z-coordinate should change to pick up the disk.
- Place a disk on tile position 17 before testing.



Phase 5: Deliver Object

- Open the **Phase 5** example project.
- Fill in the (x, y, z) values for where to deliver a red and green disk.
- Place a disk on tile position 17 before testing.



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- Email: Lauren@vex.com

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