

Save a copy of this document somewhere you can access.

This is ***your*** learning journal. Make sure that you keep it updated as you progress through the Project. Your teacher will let you know when to complete each step. Document both your successes and your failings as they provide the most important learning opportunities!

To get started, please type your name in the following box:

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# Step 1: Define

## Define the problem

After watching the video in the [Define](http://app.createbase.co.nz/project/magnebot/define) step on the platform, your teacher will have a discussion with the class about what has happened. Afterwards, they may ask you to answer the following questions. When you are done, move on to the Imagine step.

1. List 5 things you can observe from the video**.** Remember, an observation is what you can see, not what you think is happening!

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1. Using your observations from the previous question, come up with two inferences about what is happening in the video.Remember, an inference is a short conclusion made based on evidence (observations).

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1. Based on your inference made in the previous question, what do you think is the main issue being described in the video?

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1. How do you think this situation could have been avoided? List 3 things.

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# Step 2: Imagine

As a group, select EITHER the Intro to recycling module or the Intro to robotics module at <https://app.createbase.co.nz/project/magnebot/imagine> to complete. Discuss all of your answers as a team, but make sure that every member writes a summary in their own learning journal in the box below. Bullet points and incomplete sentences are acceptable. If you finish early, your teacher may ask you to complete the second module as well.

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Once you have finished, check out the content in the orange How to MagneBot module, then press the green Give it a go button in the bottom left-hand corner of the platform to control the robotic arm manually.

When manually controlling the robot, you should be thinking about three things at all times: what decisions am I making, what information am I using to make these decisions, and what actions am I performing based on my decisions.

Keep going until you have gained an understanding of the simulation, as you will be working with it for the remainder of this Project.

# Step 3: Create

## Subsystem 1: Sequential programming

### Research

On the platform, navigate to the [Research](https://app.createbase.co.nz/project/magnebot/create/Sequential%20programming/research) step for the first subsystem. If you get stuck or confused, ask your classmates or a teacher.

You have two programming options available to you for completing this Project. You can either code using a visual programming language called **Flow**, or a text programming language called **JavaScript** (JS). Your teacher will let you know what language they want you to use. Otherwise, feel free to choose. You can always switch between the two at any time.

If you are going to create your solution using **Flow**, then watch the Flow tutorial video and read the Introduction to Flow blocks document on the platform. You will then be able to answer the following questions:

1. **Describe what is meant by a coordinate system. Why might we use an X, Y, Z in this context?**

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1. **Describe what an action block is in your own words.**

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If you are going to create your solution using **JavaScript**, then read the Introduction to JavaScript variables document on the platform. You will then be able to answer the following questions:

1. **Describe what is meant by a coordinate system. Why might we use an X, Y, Z in this context?**

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1. **Describe what a function is in your own words.**

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1. **If we wanted to move the arm to the coordinates 4, 5, 3, what would line of code would we write?**

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When you have answered EITHER the Flow or JavaScript questions, check out the [mini-game](https://www.recycleright.co.nz/) in the green Explore more card while you wait for your classmates to catch up.

When your teacher says you can move on, proceed to the Plan step for this subsystem.

### Plan

Your robot will need to perform a series of actions to solve the problem. At the end of the Imagine step, your teacher may have given you an opportunity to try to manually control the robotic arm using the “Give it a go” button. If you haven’t done this yet, here is a link to try it out for yourself: <http://app.createbase.co.nz/project/magnebot/manual>

When manually controlling the robot, you should be thinking about three things at all times: what decisions am I making, what information am I using to make these decisions, and what actions am I performing based on my decisions.

In this Project, you will be automating the action part of this process. You will construct a program that will tell MagneBot what actions to perform in what order. MagneBot will not think for itself; it will always do exactly what you tell it. You, therefore, need to think about any problems that the robot might encounter in advance and account for them in your code.

To help you write your code, start out by typing your answers to the following brief questions in the boxes below. You may want to use the manual controls to help answer these questions:

1. Do the rubbish bags always have to be in the centre of the magnetic sphere to pick them up? What would happen if they were on the edge of the sphere (half inside)?

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1. What actions could result in our arm breaking?

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1. Did you try to pick up and drop multiple bags into the bin at once? If you did, describe what happened below, explain why you think it is happening, and describe how we could avoid this problem.

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1. If we encounter a situation where we can’t move the magnetic sphere from point a to point b in one straight-line movement (for example, because there is an obstacle in the way), what should we do?

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1. In the Create step, you will have access to two action blocks and their corresponding JavaScript functions: “Move Arm” and “Magnetic Switch”. List the series of actions that we will need to perform to get one of the rubbish bags into a bin, assuming that the arm starts in the default position (you don’t need to provide any coordinates).

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### Code

You can now return to the platform and create your answer as part of the Code step. Make sure that you refer back to the Research and Plan content in your learning journal or the platform whenever you get stuck!

When you have finished with Code, add a screenshot of your final solution below showing the success screen as well as either the Flow or text code. Then, write a brief explanation of how it works, including any problems that you encountered along the way and how you overcame them.

**Important**: *you can save your Flow code using the save icon () in the toolbar in the bottom left corner of the Flow editor. If you save your code before you leave the simulation, you will be able to continue where you left off when you return by pressing the restore icon directly below the save icon.*

*You can save your JavaScript code using the* SAVE *button in the bottom right corner of the text editor. If you save your code before you leave the simulation, you will be able to continue where you left off when you return by pressing the* RESTORE *button.*

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# Step 4: Improve

Add comments and a screenshot of your final Improve solution below. You may also want to provide multiple screenshots throughout your development to highlight how your solution improved over time:

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# Step 5: Review

Congratulations on completing the Project! Please type your answers to the following questions:

1. If you had more time available, how could you potentially improve your solution? If your solution to the Create step didn’t work, try and explain why.

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1. Think about what you achieved during the project. What are you most proud of?

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1. Think about the parts of the project that didn’t go well. List up to **three** of them below. If nothing went bad, think about things that you could have done better.

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1. Choose **one** from question 4. Why do you think it didn’t go well? If you were going to redo this Project, what would you do differently to avoid this negative?

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