In support of

WE DISCOVER, WE GROW
Girlguiding

Google

Google Digital Adventure

Intro

Making products at Google is a lot of fun. It takes clever problem-solving, lots of research, and creative design. In this activity, you'll learn about how we create our exciting new products. Along the way, you'll get to design your very own robot!

This activity takes up to two unit meetings.

You will need

Paper
Eraser
Pencil

Follow the code

What is an algorithm?

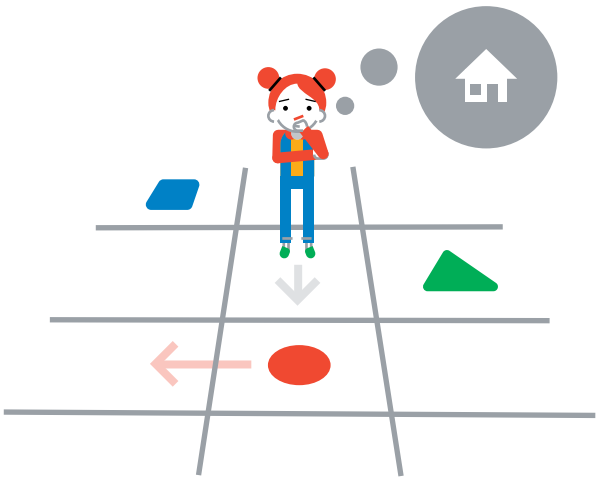
An algorithm is a set of step-by-step instructions that solves a problem or completes a task. Algorithms are all around you. For example, a cake recipe is an algorithm that tells you how to bake a cake. In computing, we use code to write algorithms that tell computers how to perform a task.

Leaders' box

This activity teaches how algorithms work. To help add context to the activity, kinesthetic learners can use a figurine to move around the map.

Let's get started!

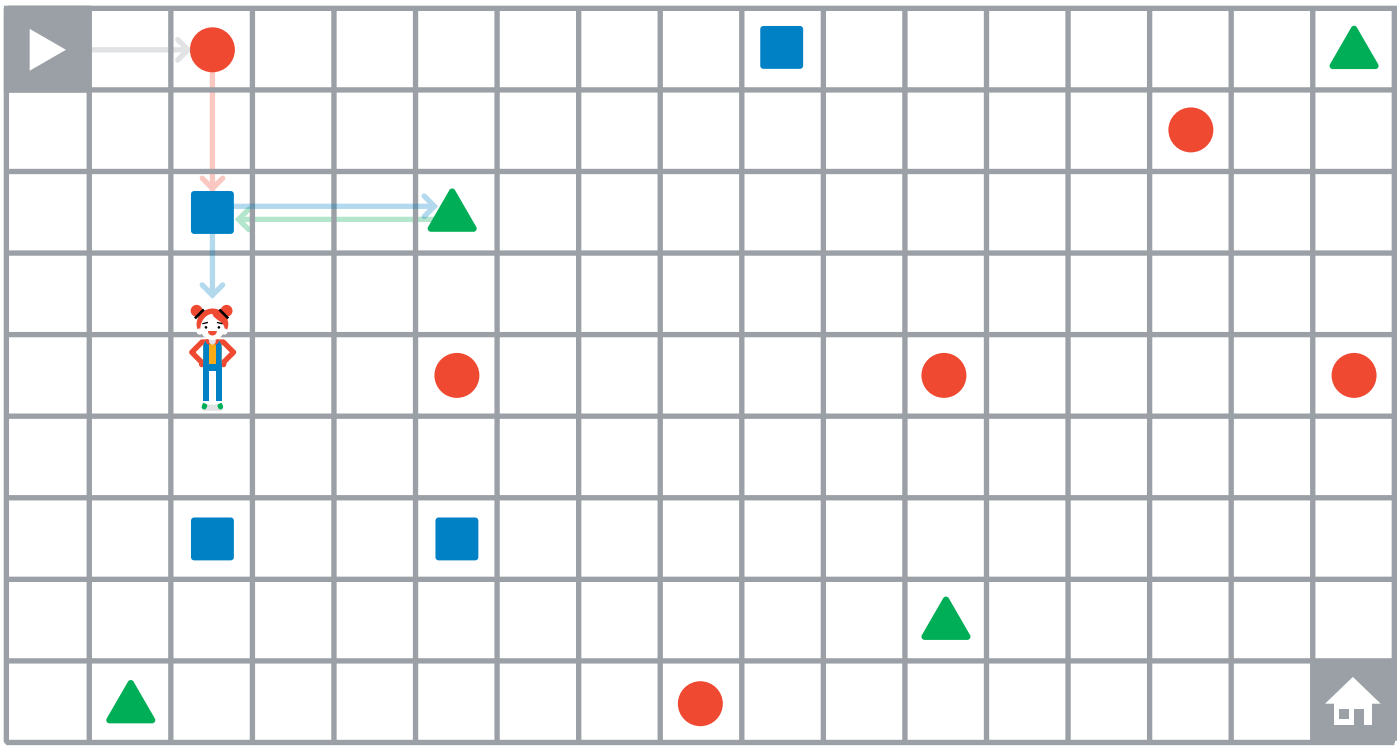
Our Brownie, Emma, is lost and doesn't know how to get home. Can you help Google's Brownie find her way home?



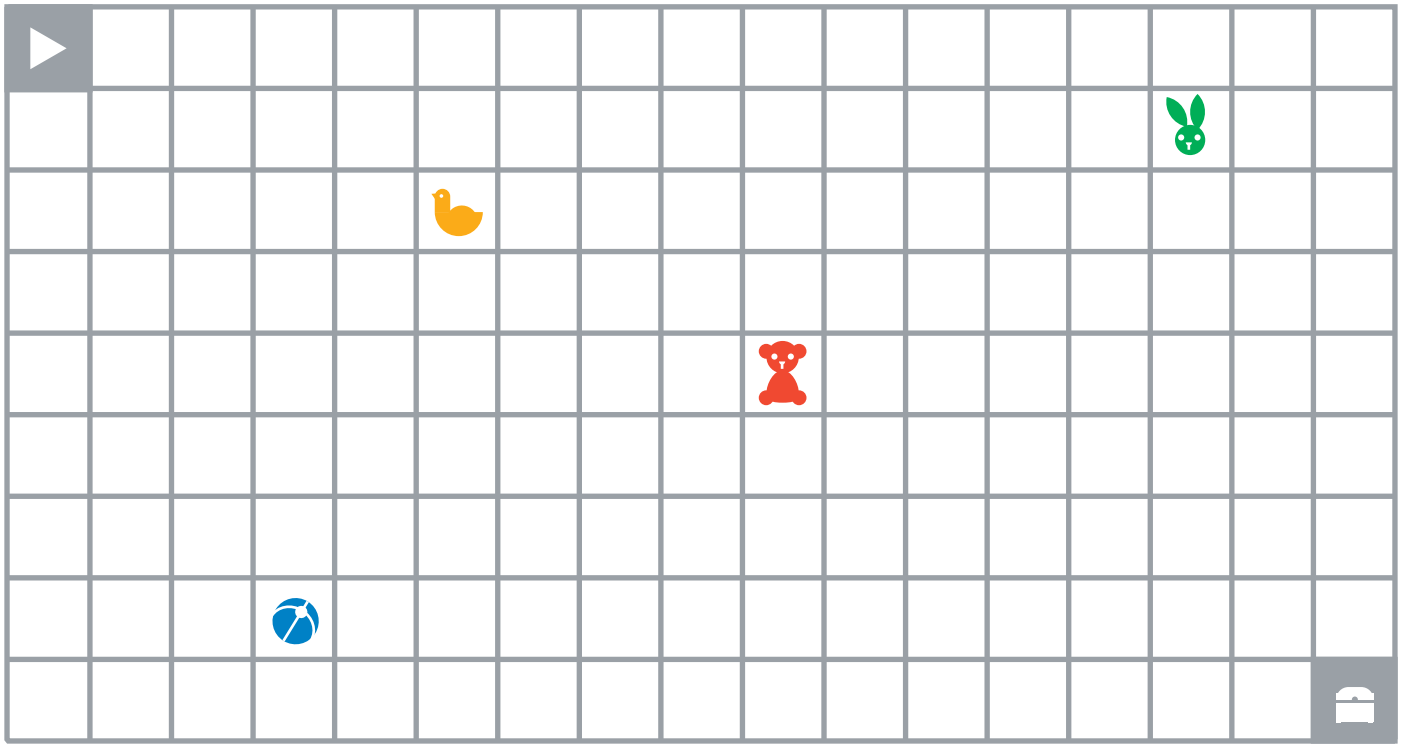
Symbol instructions

Start here | Move forward | Turn right and move forward | Turn left and move forward | Turn around and move forward | Finish

1 Each square Emma stands on has a symbol that tells you where she needs to go next. Use the symbol instructions to find Emma's path home. We've drawn the first few steps, but it's up to you to help Emma get the rest of the way home.



2 Google is building a robot for tidying your room. Can you program the robot to pick up all the toys and reach the toy cupboard? Tell the robot where to go by adding ●, ■ and ▲ symbols to the map.

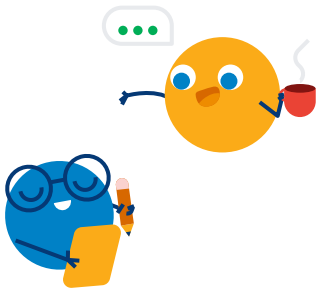


3 A. Can you use the same symbols from before to make the robot complete the task over and over again?
B. Try the task again without using any ■ symbols. Can you still get the robot to complete the task?

Code is everywhere

Now that we understand that an algorithm is a list of instructions to follow in order to solve a problem, let's see how we can apply this to an everyday task.

Instructions



1. Pick a simple task.

   Examples:

   - Make a hot drink
   - Kick a soccer ball
   - Do a cartwheel
   - Clean your room

2. Ask a friend or family member to complete the task. Write down or say each step they take. The more detail the better!

   Example: If the task was to wash your hands, the first few steps might be:

   1. Turn the tap on.
   2. Put your hands under the tap.
   3. Using your hand, grab the soap bar.
   4. Rub your hands together with soap.
   ...and so on

3. When you're done, ask a friend or family member to read your instructions or tell them the steps.

4. Ask them to pretend this is the first time they have done this so they must follow the instructions exactly. (Remember that a computer can only do exactly what you tell it to do, they are not smart like people).

5. Don't worry if they get stuck. Make changes to your instructions and try again until they can finish the task.

Advanced

Draw the key steps of your algorithm in the squares at the end of your packet, like the example below. At Google, we call this **a storyboard**. They may look like comic strips, but we use them to design new products!

Leaders' box

This activity teaches research, analysis and storyboarding.

Hint

Can't think of anything? Think about how to make your favourite food, how to dance to your favourite song, or something you do everyday—like brush your teeth!

Did you know?

If a computer says there is an error, it's often due to problems with the instructions they've been given. We call them "bugs". Fixing the problems is called "debugging".

Tip

Use words to describe your drawings. Descriptions help people understand your storyboard better.

Task:

Steps:

1

2

3

4

5

6

7

8

9

10

Let the robot do it!

How can technology help us complete these tasks?

Instructions

1. Look at your algorithm or your storyboard. Which steps are the most difficult or frustrating?

   > For example: Splashing water on yourself, burning your hands in hot water, or running out of soap

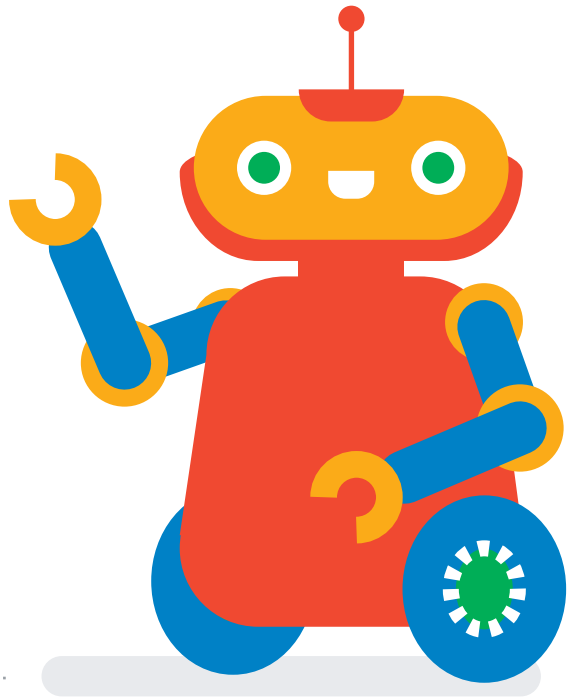
2. Can you design a robot that could help complete your task perfectly every time or for more than one person at a time?

   > For example: How could a robot give you the perfect amount of soap every time you wash your hands?

3. Draw a picture of your robot, and give it a name. Option: If you have craft materials, try building a model of your robot.

Leaders' box

This activity teaches creativity, design & presentation skills.



Describe how your Robot design will help accomplish your task

Draw your Robot here!

Appendix 1

Map Template

Storyboard Template

1	2	3
4	5	6