

## Let's explore Edisons outputs

What do computers do? Computers **process** information. This means that computers take information from somewhere and do something with that information. For example, you can give a computer two numbers and tell it to add them together.

The computer can then add those numbers and show you the result.

This cycle of information coming in, the computer doing something with the information and then creating some result is called the **input-process-output cycle**.



### Jargon buster

**Inputs** are the information and instructions that you give a computer.

A **process** is what the computer does with a computer program full of information and instructions. This is sometimes called 'running' the program.

Outputs are the results you get from a computer. What the computer displays, or how the robot behaves, are the outputs you get based on the information and instructions you gave the computer.

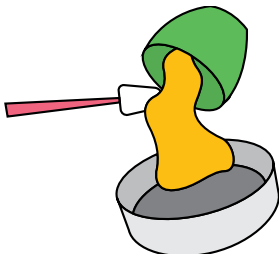
We call this process of **inputs** going into a computer, that computer **processing** the information, and then generating some type of **output** the **input-process-output cycle**.

The input-process-output cycle isn't only used in computers.

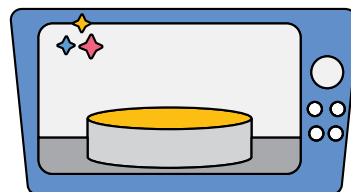
You can see this cycle in action in your daily life too.

Baking a cake is a good example. You input ingredients into a pan and put that pan into the oven. The process of baking then happens in the oven. After a while, the output of a cake is ready!

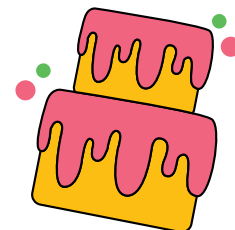
Input



Process



Output



### Inputs, outputs and Edison

When you write a program for your Edison robot, you are telling the robot what you want it to do by giving it inputs. Edison's microchip then processes the information to tell the robot what to output.

Your Edison robot has three main types of outputs: outputs using the motors, outputs using the LEDs and outputs using sounds. In EdScratch, the blocks related to Edison's main outputs are organised into three different categories: **Drive**, **LEDs** and **Sound**.

Look at the blocks in the **Drive**, **LEDs** and **Sound** categories in EdScratch.

Which category contains the code blocks you would need to input into a program to get Edison to generate each output? **Match** each output **with** the **correct** category (**Drive** or **LEDs** or **Sound**).

#### Output

Turn Edison's lights off

Play a musical note

Spin Edison right

#### Category

## Flash and beep

Edison has two red LED lights. When you turn Edison on, you can see these two LEDs begin to flash.

Edison also has a special bit of tech which you can see just to the left side of the round button on the top of the robot. This is a buzzer and a sound sensor all in one. It can detect noise, but it can also make noise!

For this task, you need to write a program which will have Edison use both the LED and buzzer outputs.

Write a program in EdScratch using eight blocks which tells Edison to do the following things in sequence:

1. Turn on the left LED light
2. Beep
3. Turn off the left LED light
4. Beep
5. Turn on the right LED light
6. Beep
7. Turn off the right LED light
8. Beep

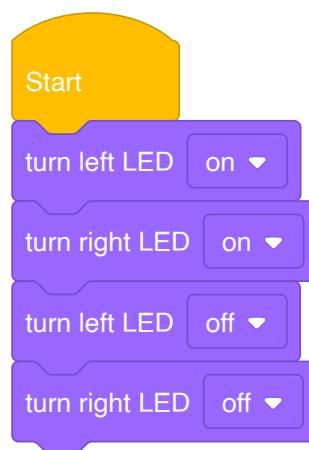
Download and test the program with your Edison robot.

Did the program work the way you expected? Could you observe the robot perform each step of the program?

## Make Edison blink

Some of Edison's outputs, like turning a LED on or off, happen very quickly. In fact, this can happen so fast, it can be really hard to see.

Try writing the following program in EdScratch:



Download it and run it with your robot. Can you see Edison blink?

Because the robot flashes its LEDs when it is in standby mode, it will be really hard to see this program in action.



### Why is that?

Edison moves through each EdScratch block one at a time, but the robot is able to process each block very quickly. Computers can process information very fast – that's one of the things that makes them so useful!

If you want Edison to pause after it completes one block before going onto the next block, you have to tell it that.

One of the EdScratch block categories is the **Control** category. The blocks in the **Control** category allow you to control the flow of your program.

One of the blocks in this category is the **wait** block:



This block tells Edison to wait the amount of time you specify before moving on to the next block. Let's try using this block in a program.

Modify the 'blink' program from before but use this new control block to make the program work better. You want a program where it's very easy to see Edison 'blink'. Experiment using at least one wait block. Test using wait blocks in different places in your program to see what works best.

What does your program look like? Which blocks does it use, in which order? Write your program below. Be sure to include the input parameters you used.

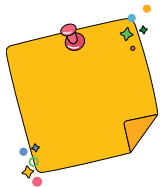
### Mini challenge!

When a person blinks, what happens? Their eyes start open and then...

Look at your blink program. Can you adjust your program to make it more like a blink?

### Challenge up: Drive the maze safely

You can write programs for Edison which tell your robot to use multiple types of outputs.



#### Don't forget

Your Edison robot has three main types of outputs: outputs using the motors, outputs using the LEDs and outputs using sounds. In EdScratch, the blocks related to Edison's main outputs are organised into three different categories: Drive, LEDs and Sound.

For this activity, you will need to write a program telling Edison to drive the maze on page 56. This time, however, Edison needs to be a very safe driver. On the road, drivers use their indicator lights and horn to alert other drivers. Edison can do these things too!

Drive the maze starting at the outline and driving forwards to the finish line. Your program should end after Edison crosses the finish line.

Your program needs to tell Edison to pause and use the LED lights to 'indicate' before making each turn in the maze. Make sure other drivers would be able to see the LEDs indicate!



#### Hint

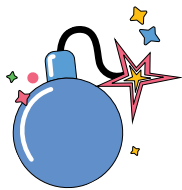
If you are going to turn left, which LED should you use to indicate? What about when you turn right?

Pretend the 'beep' block is like a horn in a car. Where in your program might it make sense for Edison to beep?

Your program should also use the 'beep' block at least one time somewhere in the program.

## Let's explore input parameters

Every block in EdScratch contains inputs which tell Edison what you want the robot to do. You have probably noticed that lots of the blocks also have **input parameters**.



### Jargon buster

**Input parameters** are the things you can change inside a block, like the numbers and choices in the drop-down lists. You can think of input parameters as specific pieces of information needed in an input.

For example, if you want Edison to drive forward, you need to give the robot specific information about that command, such as how far to drive and at what speed.

There are three styles of input parameters in EdScratch:

- **numbers** you type into the block using your keypad,
- **drop-down menus** where you choose an option, and
- **round or diamond-shaped holes** you fill with special blocks.

Each input parameter in a block gives a different piece of information that Edison will need to be able to run that command. You can think of input parameters as the answers to questions the robot has about what you are asking it to do. For example, if you want Edison to drive backwards, there are three questions you need to answer:

**Question:** How far do you want the robot to go?

**Answer:** distance input parameter

**Question:** What units are you using to measure distance?

**Answer:** distance units input parameter

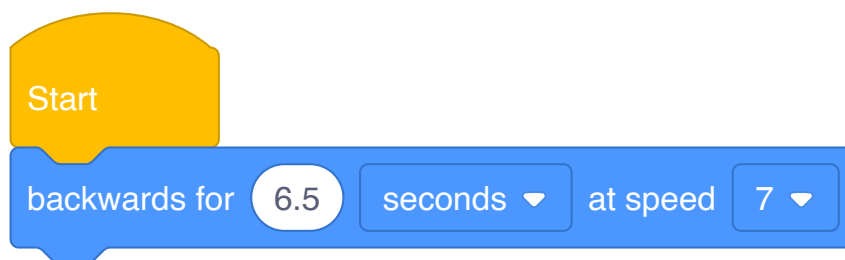
**Question:** How fast do you want the robot to go?

**Answer:** speed input parameter

You always need to fill in all the input parameters in a block to give the robot all the information it needs.

### Try it out!

The input parameters in a program give you lots of information about what that program is asking the Edison robot to do. Try reading the following programs and answer the questions.

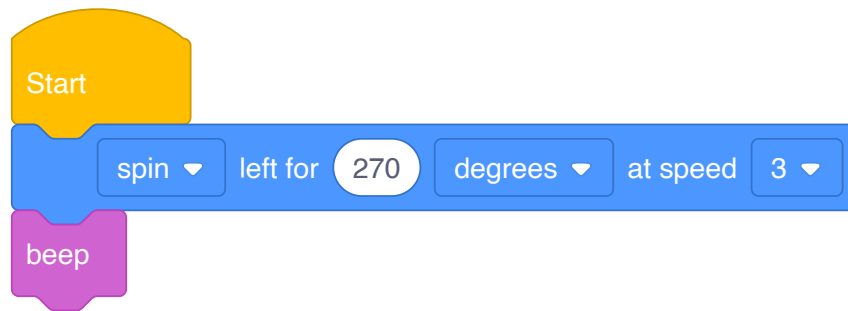


In this program, what is the input parameter for **distance units**?

In this program, what is the input parameter for **speed**?

What is the full program telling Edison to do?

Look at this program:



How many input parameters are there in this program?

Remember that input parameters are answers to questions the robot needs to know. What question is the **spin** input parameter answering? **Hint:** you might want to look at the other options for this input parameter in EdScratch to help you think about your answer.

