Lesson 6: Let's explore Edison's 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!
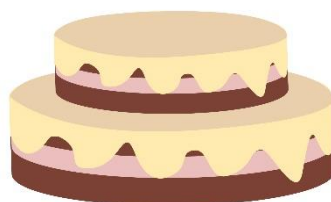
Inputs, outputs and Edison

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.

1. 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 to the category where you can find the blocks you would need.

Output   **Category**

| Turn Edison's lights off | ☐ |

| Play a musical note | ☐ |

| Spin Edison right | ☐ |

● Drive

● LEDs

● Sound

Task 1: 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:

> ☐ turn on the left LED light
> ☐ beep
> ☐ turn off the left LED light
> ☐ beep
> ☐ Turn on the right LED light
> ☐ beep
> ☐ Turn off the right LED light
> ☐ beep

Download and test your program with your Edison robot.

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

_____

_____

Task 2: 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:

```
Start
turn left LED    on ▼
turn right LED   on ▼
turn left LED    off ▼
turn right LED   off ▼
```
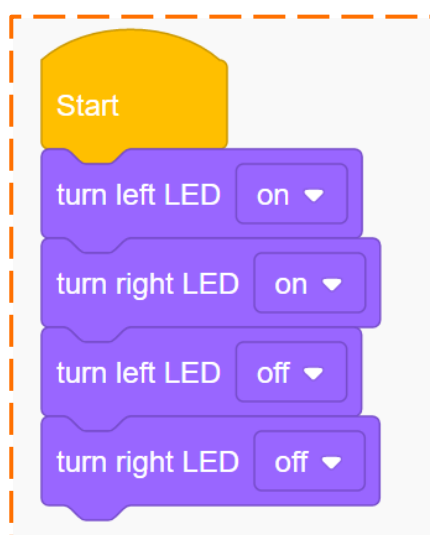
Download it and run it with your robot. Can you see Edison blink?

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:

```
wait   1   sec
```
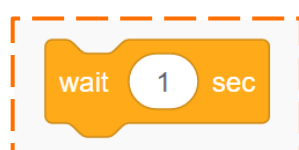
This block tells Edison to wait the amount of time you specify before moving on to the next block. Let's try using this block in a program.

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.

3. 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?

BONUS Challenge: 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 student sheet 6. 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?

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

Hint!

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

Activity sheet: Mini maze