














Controlling Devices: Flowol: Combining Skills

<p>Aim: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</p> <p>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</p>	<p>Success Criteria: I can decompose a problem into smaller parts. I can use repetition to check multiple inputs. I can detect errors in a flowchart and correct them.</p>	<p>Resources: Lesson Pack PC /laptop with Flowol 4 software</p>
<p>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</p> <p>Children are introduced to a new scenario (robot toy) for which they must design and create their own programming solution. This should involve one or more inputs controlling one or more outputs. Some children will be able to include subroutines for clearer organisation.</p> <p>I can design, write and debug my own flowchart program for a given task.</p>	<p>Key/New Words: Flowol, flowchart, algorithm, control, output, mimic, simulation, insert, symbol, start, stop, delay, process, decision, input loop, subroutine.</p>	<p>Preparation: Robot Activity Sheet - as required</p>

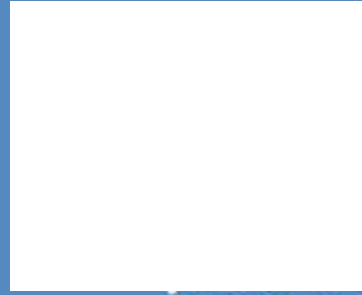
Prior Learning: Children will have created flowcharts using inputs and outputs in previous lessons in this unit.

Learning Sequence

	<p>Putting Skills into Practice: Explain that the aim of the final lesson is to put into practice some of the skills developed during previous lessons in the unit. Encourage a discussion about what the children have learnt to do with flowchart programming. Suggestions should include: turning outputs on/off, sequencing instructions; using decisions to check on inputs; using repeating loops; programming subroutines.</p>	
	<p>Robot Mimic: Introduce the Robot mimic and explore the various inputs and outputs available. Think of a name for the robot!</p>	
	<p>A Robot Toy: Ask the children to imagine the robot was a toy for a younger child. What could you program it to do? Explore the inputs and outputs by clicking on them in the mimic. Tell children to jot down notes first about what they might want the robot to do, based on its features. <i>Can children decompose a problem into smaller parts?</i></p>	
	<p>Programming the Robot: <i>Children combine skills to create a new flowchart.</i> Children independently design their own flowchart to control the robot using the Robot Activity Sheet for guidance. As an additional task or extension, a set of instructions could be written to provide with the toy.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="215 1512 582 1758"> <p> Design a flowchart to control an element of the robot using one of the inputs. This need not include any subroutines but should be a working flowchart, which could be developed further.</p> </div> <div data-bbox="614 1512 981 1758"> <p> Design a flowchart to control several elements of the robot using multiple inputs. This need not include any subroutines but should be a working flowchart, which could be developed further.</p> </div> <div data-bbox="1013 1512 1380 1758"> <p> Design a flowchart, which contains subroutines, to control several elements of the robot using multiple inputs.</p> </div> </div>	
	<p>Robot Demo: In pairs, swap programs to demonstrate to each other the solution for programming the robot. Explain to a partner any element that was not working as expected. Can children debug the program together? Evaluate each other's program by complimenting on what works well and suggesting a next step.</p>	

Taskit

Exploreit: Open up a new flowchart in Flowol and try using any of the other mimics that you have not programmed. Begin by exploring the inputs and outputs to see where they are and what they do. Design your own flowchart to make the simulation work.



Computing

Controlling Devices: Flowol

Combining Skills



Aim

- I can design, write and debug my own flowchart program for a given task.

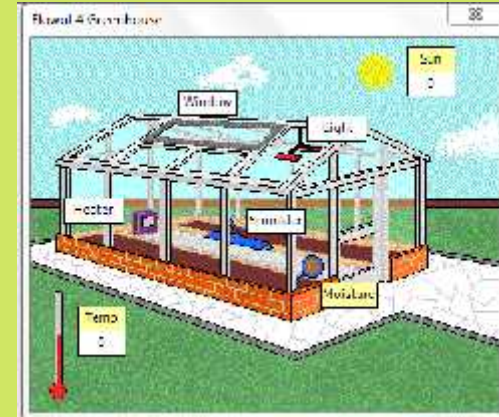
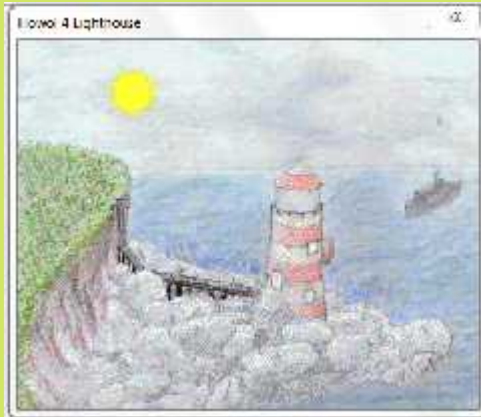
Success Criteria

- I can decompose a problem into smaller parts.
- I can use repetition to check multiple inputs.
- I can detect errors in a flowchart and correct them.

Putting Skills into Practice



The aim of this final lesson is to put into practice some of the skills you've been developing.



What have you learnt to do with flowchart programming so far?

Putting Skills into Practice



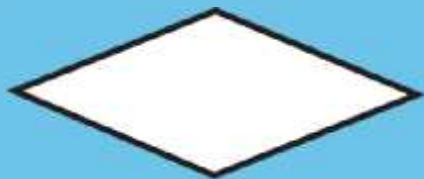
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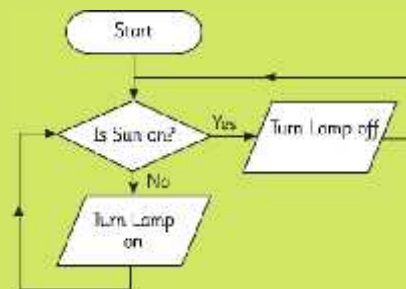
Turning outputs on/off.



Sequencing instructions.



Using decisions to check on inputs.



Using repeating loops.

Sub

Programming subroutines.

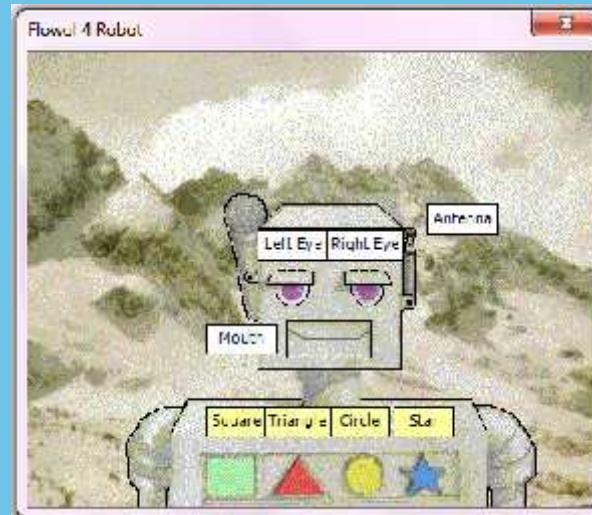
Robot Mimic

The Robot mimic has four inputs and four outputs.

Inputs

Four buttons on his chest:

- Square
- Triangle
- Circle
- Star



Outputs

Facial features:

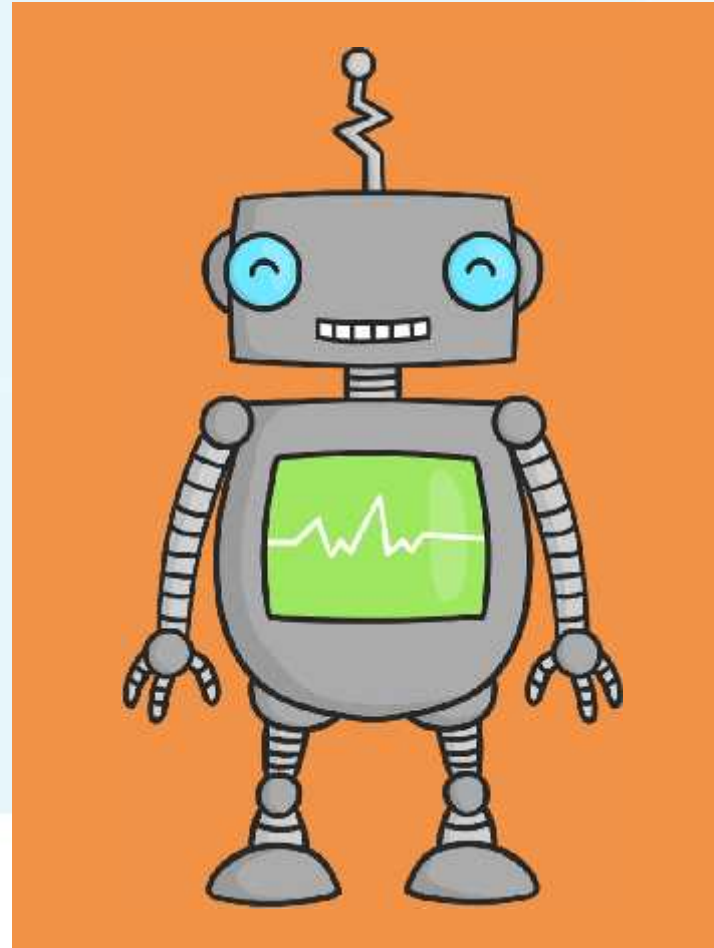
- Antenna
- Left Eye
- Right Eye
- Mouth

A Robot Toy

Imagine this robot was a toy for a younger child. What could you program it to do?

Explore the inputs and outputs by clicking on them in the mimic.

First jot down notes about what you might want the robot to do, based on its features.



Robot Demo

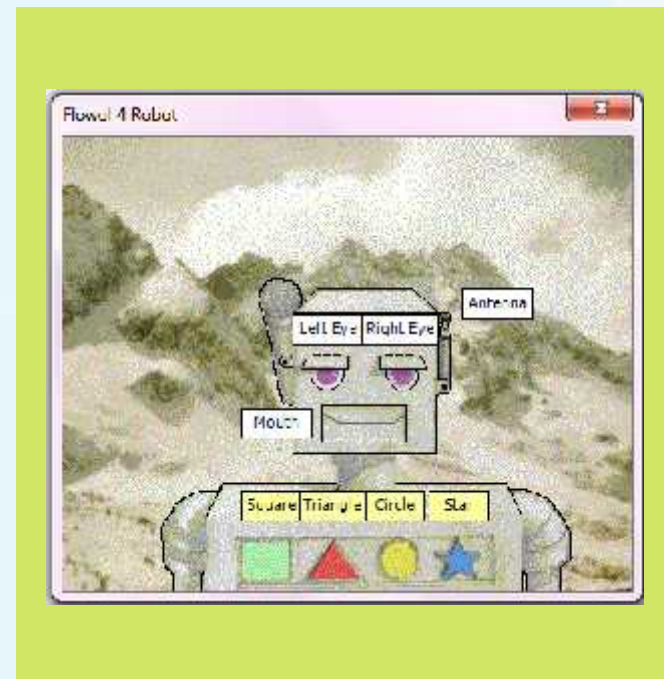


In pairs, swap programs and demonstrate your program.

Explain to your partner any element that was not working as expected.

Can you debug the program together?

Evaluate each other's program by complimenting on what works well and suggesting a next step.



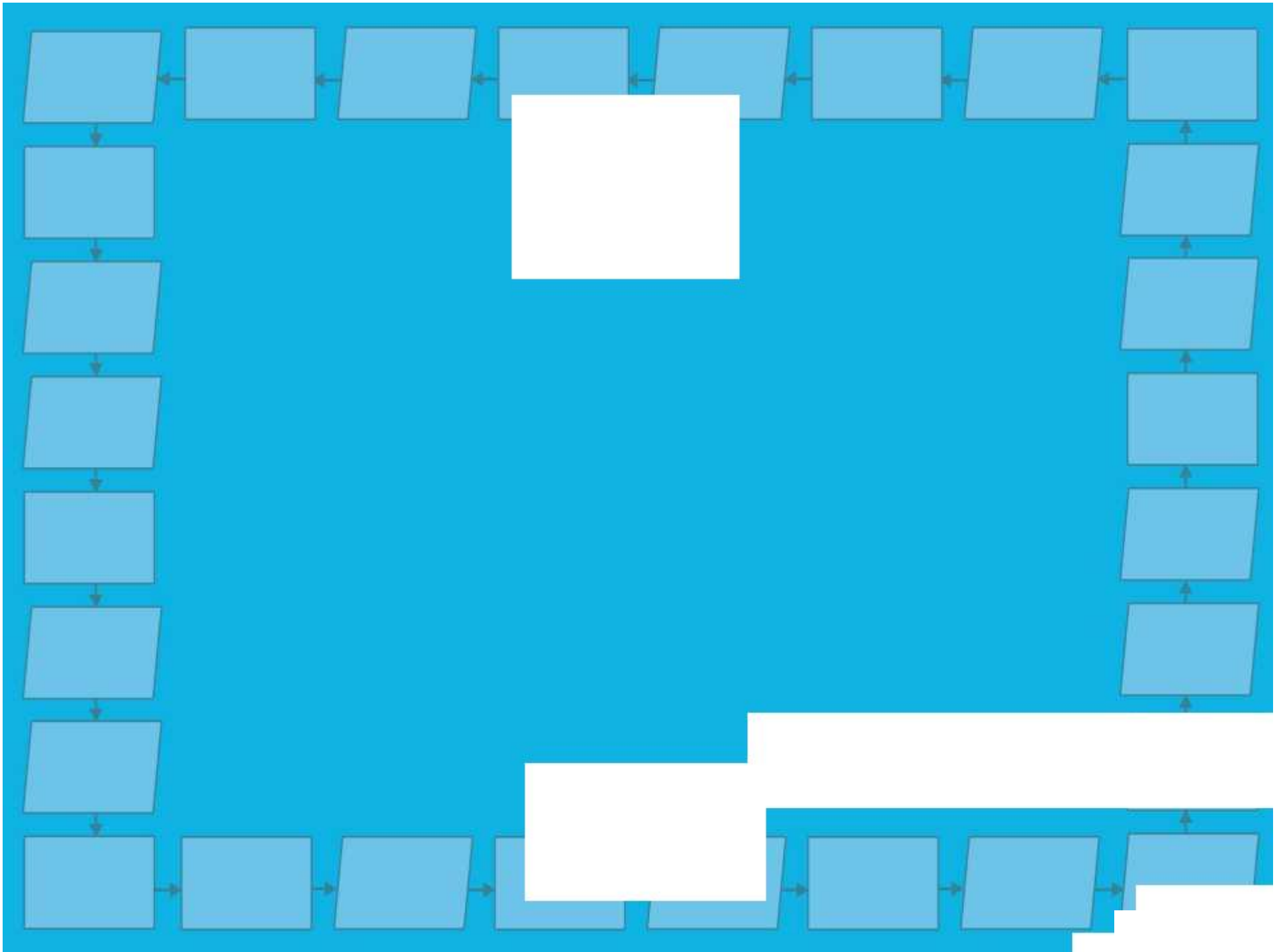
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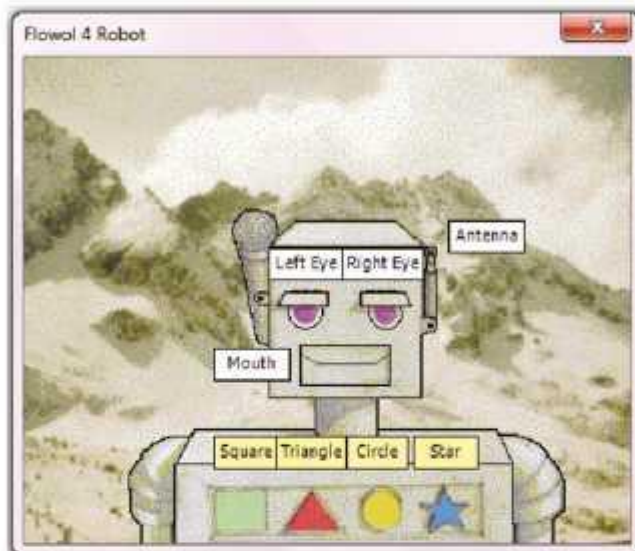
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Flowchart Programming for a Robot

Think of a name for this robot:

The robot has four inputs (the coloured shapes on its chest) to act as buttons.

There are also four outputs. It can move its mouth, left eye, right eye and antenna.



Imagine it is a toy robot for a younger child. What could you program the outputs to do, as each button is pressed?

Design instructions and a flowchart to make the program work.

Challenge 1

Choose one input and one output. Create a flowchart to make the output respond when the input is activated.

Challenge 2

Develop the flowchart to control more than one output, using more than one of the input buttons.

Challenge 3

To make sure your flowchart program is well organised and functioning properly, develop your program to include subroutines for the separate actions.

Remember to keep testing and debugging your flowchart as your work and to save your work regularly.

Robot

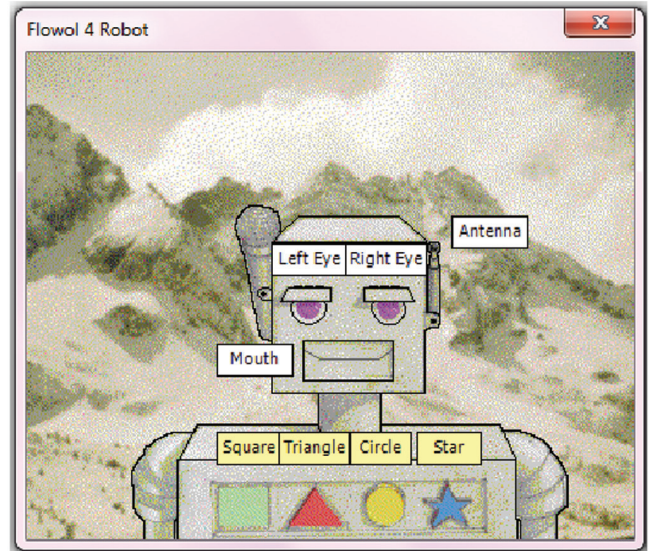


Flowchart Programming for a Robot

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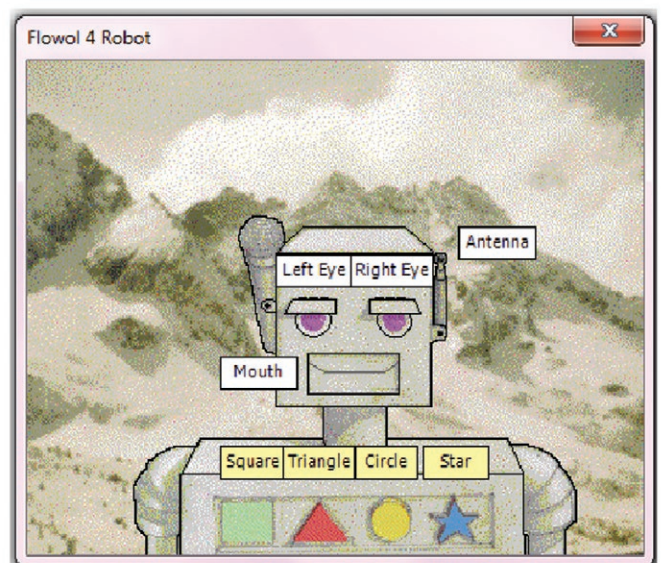
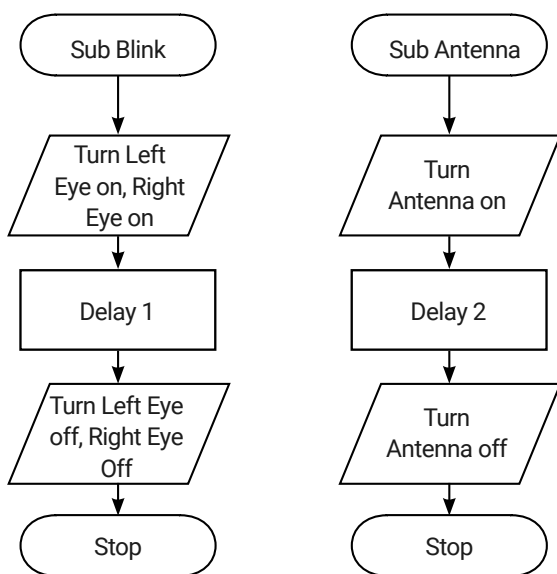
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Adult Guidance

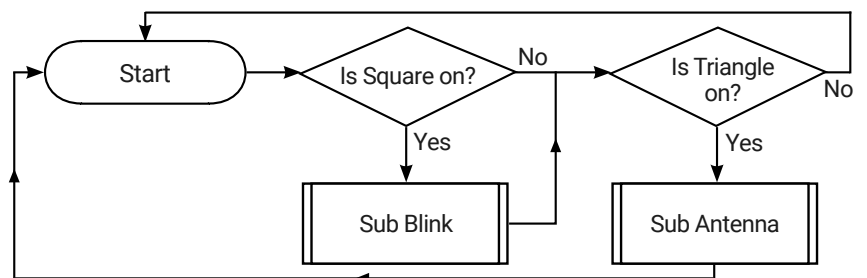
This lesson is designed for use with Flowol software (intended for use with Version 4, but adaptable to earlier versions) and the Lighthouse mimic.

As a final lesson in the unit, some judgment can be made as to whether to return to devote more time to a previous skill using a different mimic; to direct children in developing the Robot mimic; or to allow more free choice with some of the other mimics that are bundled with the Flowol software. As a primary objective, children should be encouraged to put into practice some of the skills they have been developing during the previous lessons in the unit, in a new context.

See below for an example of flowcharts including subroutines for the Robot mimic.



This program is a starting point to control the eyes and antenna outputs, using the two inputs of the square and triangle. Further development could incorporate the mouth as another output or control the eyes separately, whilst also using the remaining two inputs of the circle and star.



The program demonstrates how the main flowchart (at the bottom) constantly repeats and loops to check for the square and triangle inputs, calling a single iteration of the relevant subroutine if so.

Note: The subroutine symbol should be set to repeat the subroutine 1 time. This prevents the programming becoming stuck in the subroutine loop and not returning to check other inputs.

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