















Controlling Devices: Flowol: Programming Outputs

<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 insert symbols in sequence to create a working flowchart. I can insert new symbols to modify a flowchart. I can edit symbols to modify the effect. I can delete symbols.</p>	<p>Resources: Lesson Pack PC /laptop with Flowol 4 software</p>
<p>Children use the control software (Flowol) to create a simple flowchart for a zebra crossing, then learn how to edit, delete and insert new symbols.</p> <p>I can create and edit a flowchart to control a simulated device.</p>	<p>Key/New Words: Flowol, flowchart, algorithm, control, output, mimic, simulation, insert, symbol, start, stop, delay, process, decision.</p>	<p>Preparation: Zebra Crossing Activity Sheets - per child Crossing Patrol Activity Sheet - as required</p>

Prior Learning: Children will have gained an understanding of flowcharts in lesson 1.

Learning Sequence

	<p>Using Flowol: Explain that Flowol is an example of software that can be used to create flowcharts as algorithms to control devices. These devices can be actual physical devices or 2D simulations of outputs. Open the software and choose the mimic: 'Zebra Crossing'. Establish that this is a computer simulation of a real life automatic system.</p>	
	<p>Outputs: What are the outputs? What do they need to be programmed to do? <i>(The outputs in this case are the yellow flashing lights. They should flash on and off with a pause in between).</i></p>	
	<p>Inserting Symbols: Explain what the symbols are for and how to insert them into the 'workspace'. Children create the same sequence to make the light flash on and off. What happens? Is it what you expected? How does the algorithm need to be changed to improve it?</p>	
	<p>Editing & Deleting Symbols: Show that a new symbol can be inserted by dropping it between existing symbols in the flowchart. To delete a symbol, select it and press the delete button. How can we make the sequence continue? Children edit and run the new algorithm.</p>	
	<p>Creating Your Flowcharts: Children create and edit their own flowcharts for the crossing mimics.</p> <div style="display: flex; justify-content: space-around;"> <div>  <p>Children control the Zebra Crossing mimic using the Zebra Crossing Activity Sheets as a guide.</p> </div> <div>  <p>Children control the Zebra Crossing mimic using the Zebra Crossing Activity Sheets as a guide. They then move to the Crossing Patrol mimic and use the Crossing Patrol Activity Sheet.</p> </div> </div>	
	<p>Three Things: Ensure that the children's flowcharts are saved with appropriate filenames. Ask children to tell their partner 3 things they have learnt today, what they have done well and something that they would like to know how to do next.</p>	

Taskit

Describeit: Can you use your Maths knowledge to describe the names and properties of the flowchart symbols?



Computing

Controlling Devices: Flowol

Programming Outputs



Aim

- I can create and edit a flowchart to control a simulated device.

Success Criteria

- I can insert symbols in sequence to create a working flowchart.
- I can insert new symbols to modify a flowchart.
- I can edit symbols to modify the effect.
- I can delete symbols.

Using Flowol

Flowol is an example of software that can be used to create flowcharts as algorithms to control devices.

A selection of 'mimics' are included which are computer simulations of real life devices.

Open the software and choose the mimic: 'Zebra Crossing'.



Outputs



Look at the scene in the picture. An automatic computer system is being used to control devices.

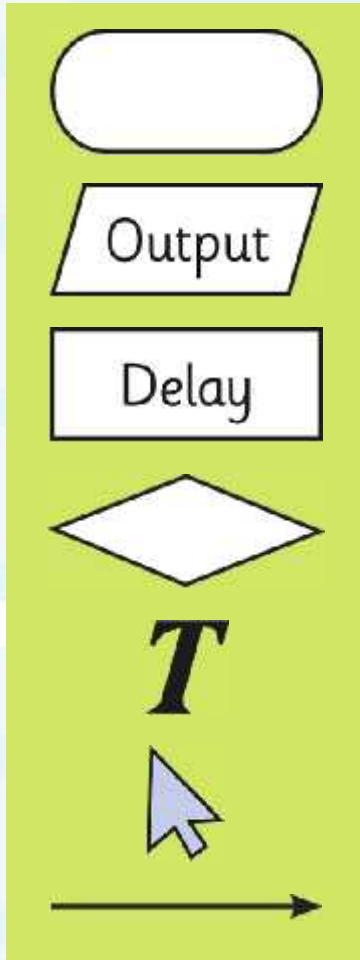
What do you think the outputs are in this simulation?

What do they need to be programmed to do?



The outputs in this case are the yellow flashing lights. They should flash on and off with a pause in between.

Inserting Symbols



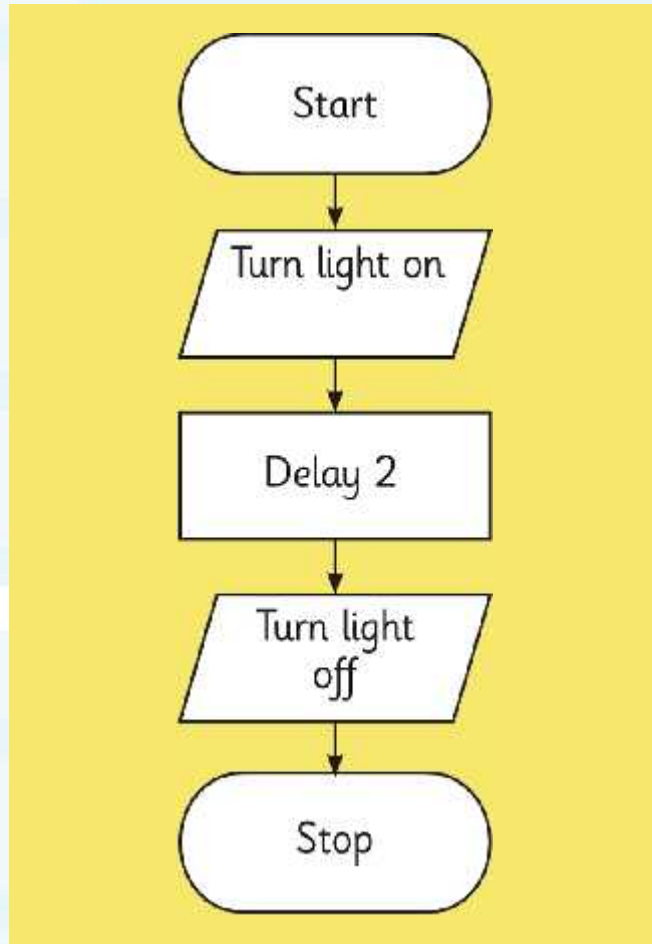
The start/stop symbol. Use this to begin and end your sequence of instructions.

Name of an output, e.g. a light.

Use this to insert a time delay with a number of seconds.

Use the arrow to connect each symbol in sequence.

Inserting Symbols



Try creating this flowchart of instructions in the workspace area.

Now, use the **Run** button at the bottom to play the sequence.

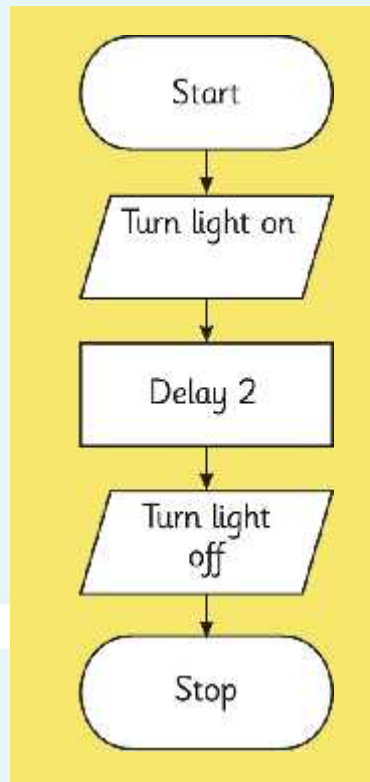
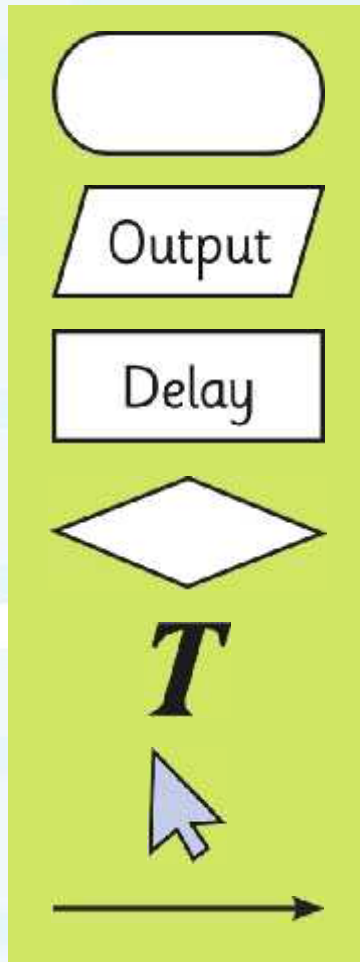


What happens?

Is it what you expected?

How does the algorithm need to be changed to improve it?

Editing and Deleting Symbols



A new symbol can be inserted by dropping it between existing symbols in the flowchart.

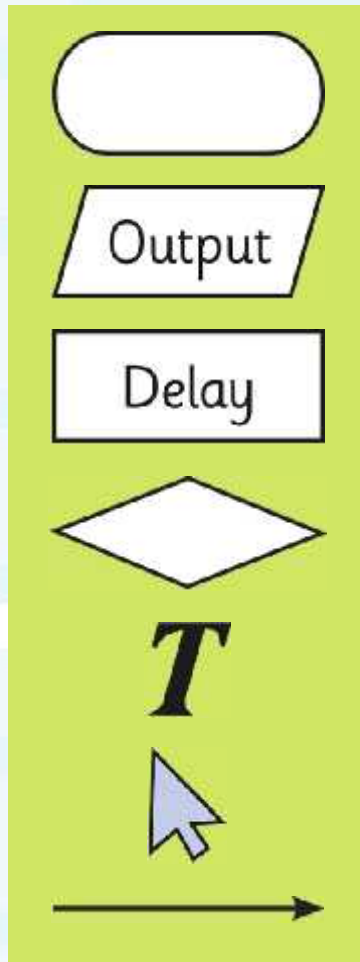
To delete a symbol, select it and press the delete button (on the toolbar at the top).

How can we make the sequence continue?

Edit and run the new algorithm.


Click here when you want to select a symbol to edit or delete it.

Editing and Deleting Symbols



When you click on a symbol in Select Mode, the Edit dialogue box will appear.

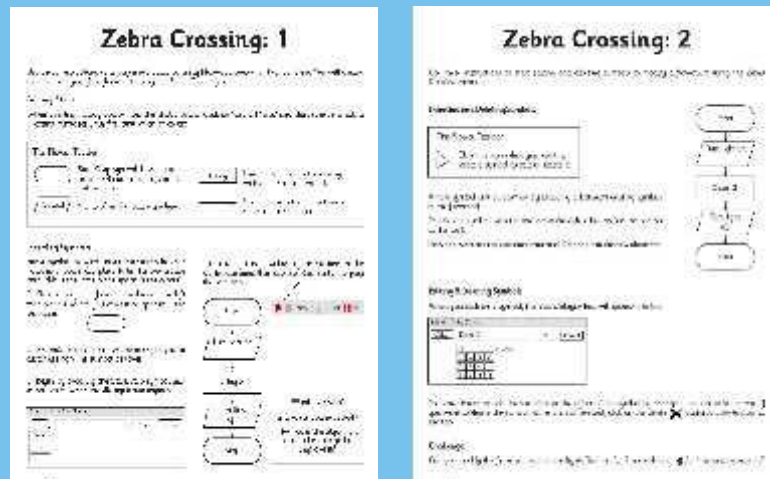
You can choose to edit the variables or the effect of the symbol by changing the values in the box.

If you want to delete the symbol, while it is selected, click on the delete button  on the toolbar at the top.

Creating Your Flowcharts



Can you create and edit your own flowcharts for the crossing mimics?



Use the activity sheets as a guide.

Challenge: Open the Crossing Patrol Mimic and use the activity sheets to program this type of crossing.

Three Things



Ensure your flowcharts are saved in the right place with appropriate filenames. Then, tell your partner:



Three things
that you have
learnt today.

Three things
that you have
done well.

Three things
that you want
to know how to
do next.

Be ready to feedback your three things to the class too!

Aim



- I can create and edit a flowchart to control a simulated device.

Success Criteria

- I can insert symbols in sequence to create a working flowchart.
- I can insert new symbols to modify a flowchart.
- I can edit symbols to modify the effect.
- I can delete symbols.

Crossing Patrol



Start a new flowchart file and use the Crossing Patrol mimic. This simulation has two lights (shown as Top Light and Bottom Light).

Can you make both lights flash on and off alternately? When the top light is on, the bottom light should be off and vice-versa.

Tip: More than one output (light) can be controlled using the same output symbol.

Challenge: How can you adapt your flowchart to make the lights behave in a different way?



1. Can you think of a crossing near your home or school that is similar to the Zebra Crossing or the Crossing Patrol mimic?

2. What is the purpose of the yellow/amber flashing lights?

3. How does the automatic computer control system help in this real life situation?

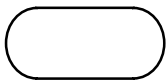
Zebra Crossing: 1

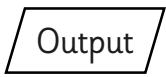
Use these instructions as a beginner's guide to using Flowol software for the first time. You will create, edit and test your first flowchart, using the Zebra Crossing mimic.


Getting Started

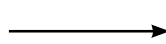
When opening Flowol, you will see the choice below. Click on 'Use a Mimic' and then select the Zebra Crossing mimic for your first simulation to control.

The Flowol Toolbar

 Start/Stop symbol. Use this to begin and end your sequence if instructions.

 Name of an Output, e.g a light.

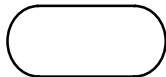
 Use this to insert a time delay with a number of seconds.

 Use the arrow to connect each symbol in a sequence.

Inserting Symbols

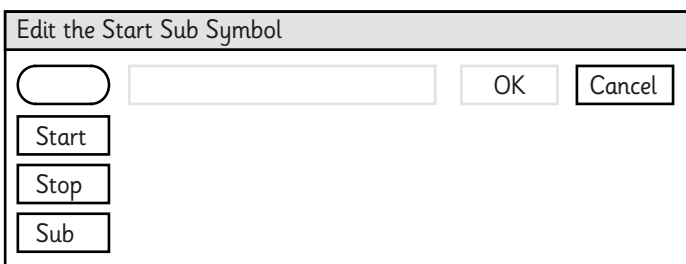
For a symbol to work as an instruction in your flowchart, you must place it in the workspace area (this is the large blank space in the centre).

1. Click on a symbol from the toolbar on the left then place it where you want it to appear in the workspace.

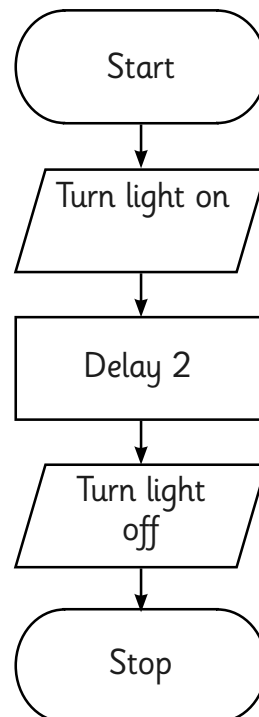


2. An 'Edit' dialogue box will appear for you to customise how the symbol behaves.

3. Begin by choosing the Start/Stop symbol and select 'Start' when the dialogue box appears.



Try creating this flowchart of instructions in the workspace area, then use the 'Run' button to play the sequence.



What happens?

Is it what you expected?

How does the algorithm need to be changed to improve it?

Zebra Crossing: 2

Use these instructions to start editing and deleting symbols to modify a flowchart, using the Zebra Crossing mimic.

Inserting and Deleting Symbols

The Flowol Toolbar



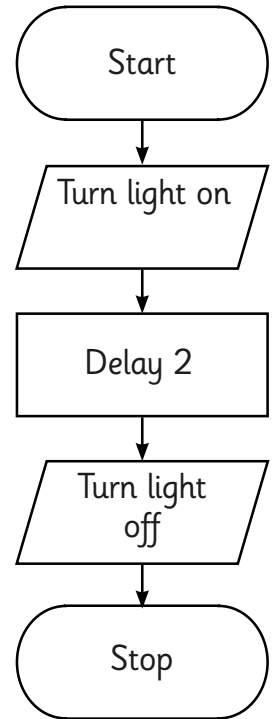
Click this icon when you want to select a symbol to edit or delete it.

A new symbol can be inserted by dropping it between existing symbols in the flowchart.

To delete a symbol, select it and press the delete button (on the toolbar at the top).

How can we make the sequence continue?


Edit and run the new algorithm.



Editing & Deleting Symbols

When you click on a symbol, the Edit dialogue box will appear, like this:

Edit the Delay Symbol				
Delay	Delay 2	OK	Cancel	
2		seconds		
7	8	9	C	
4	5	6	.	
1	2	3	0	

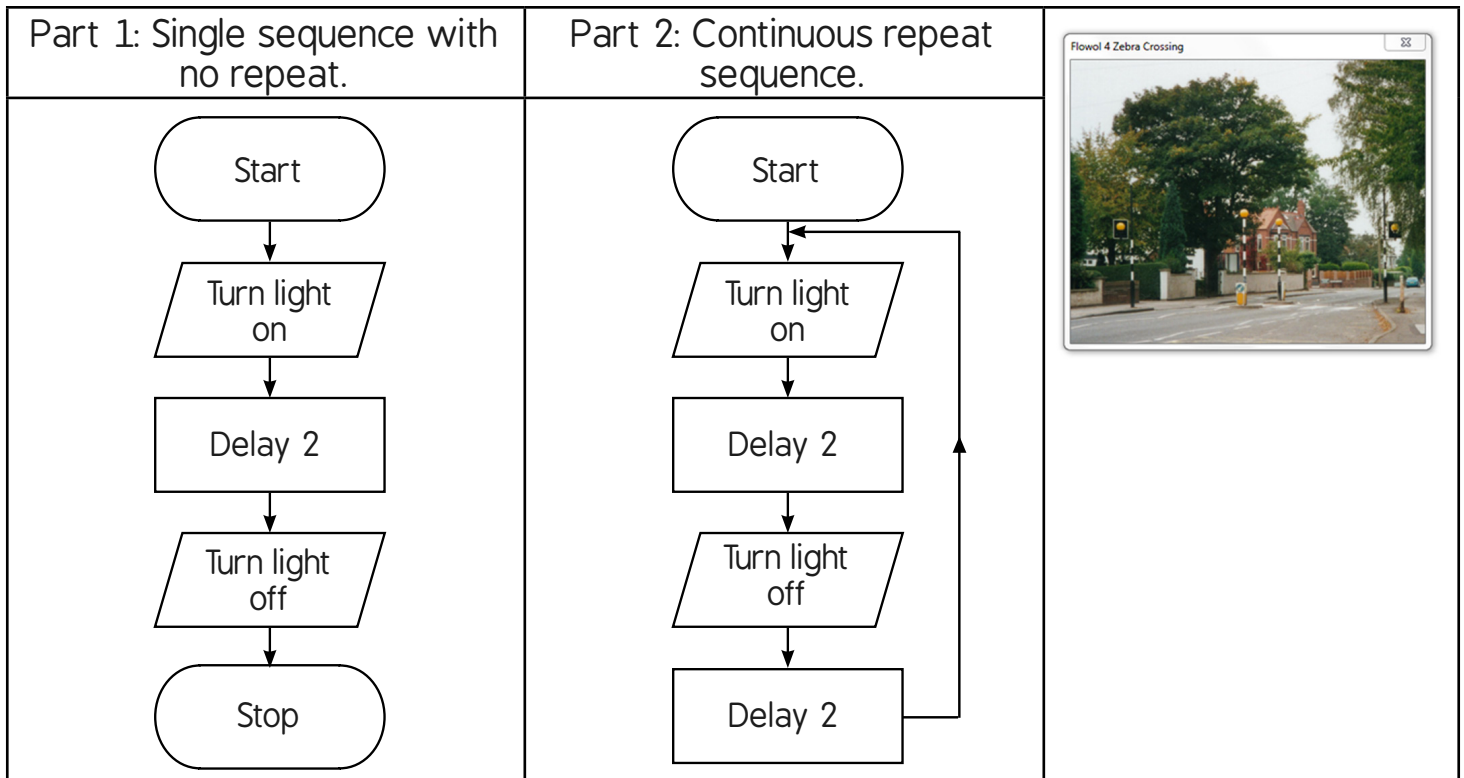
You can choose to edit the variables or the effect of the symbol by changing the values in the box. If you want to delete the symbol, while it is still selected, click on the delete  button on the toolbar at the top.

Challenge:

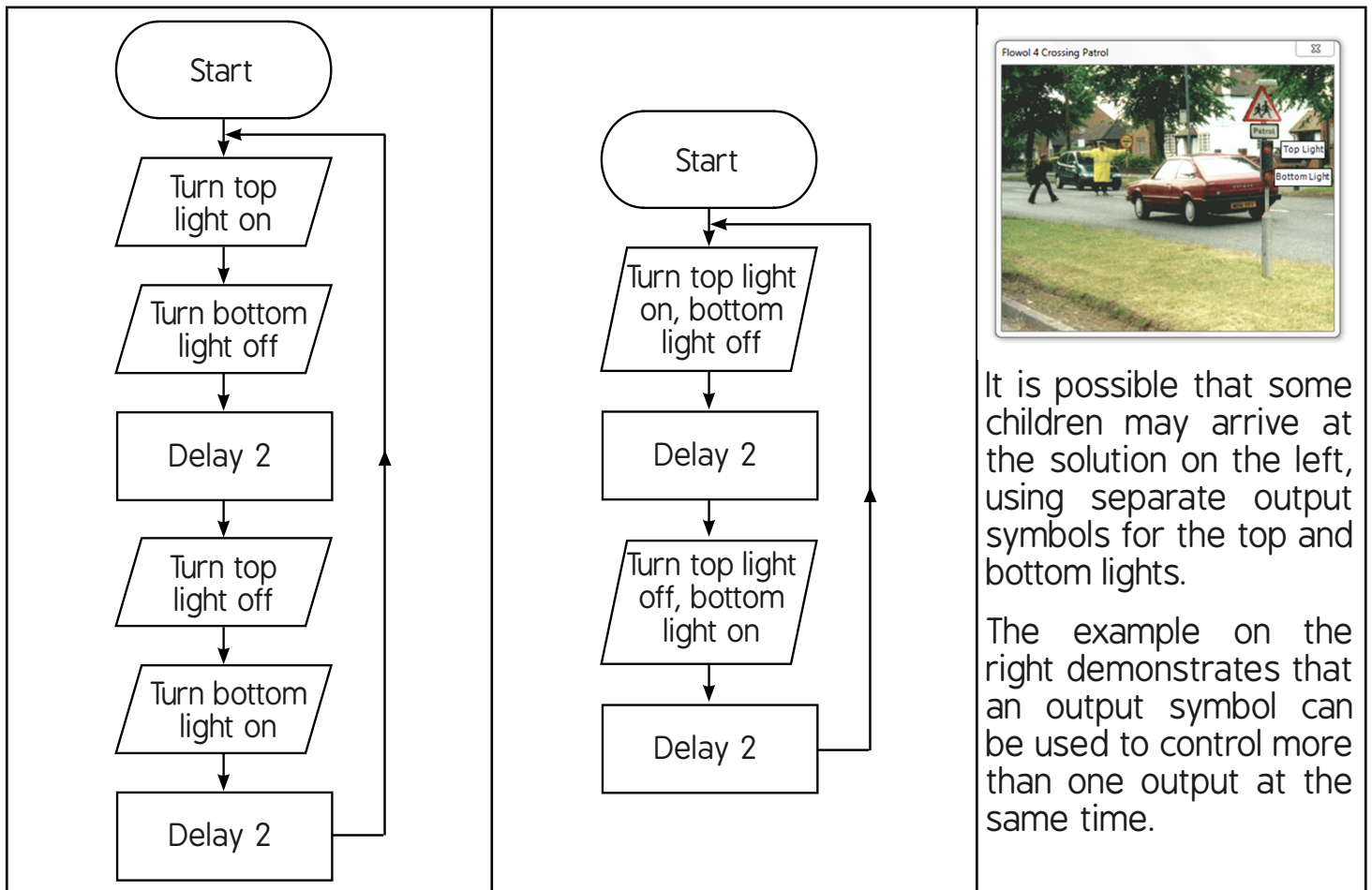
Can you modify the flowchart so that the lights flash on for 2 seconds and off for 1 second repeatedly?

Adult Guidance

Solution to Zebra Crossing Mimic



Solution to Crossing Patrol Mimic



Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		

Controlling Devices: Flowol | Programming Outputs

I can create and edit a flowchart to control a simulated device.		
I can insert symbols in sequence to create a working flowchart.		
I can insert new symbols to modify a flowchart.		
I can edit symbols to modify the effect.		
I can delete symbols.		