

Activity title

Writing a Flowchart to Control a System

Time required

1 hour

Activity summary

Writing a program to meet a design brief

By the end of this activity, you will be able to:

- Understand that programs can be written as flowcharts
- Write a flowchart program to meet a given design brief

What equipment will you need?

None

How to do it

Programming is an essential skill in the 21st century. From mobile phones and tablet computers, to large ‘fly by wire’ passenger jet aircraft, our everyday lives are shaped by systems that have been programmed. Almost all modern electronic products have been programmed to perform different tasks. These systems keep us safe, get us to work or school and allow us to communicate with our friends and family.

In this activity you are going to write a program for a system using a flowchart.

A flowchart to program a dog to chase a ball...

Flow Chart Symbols:

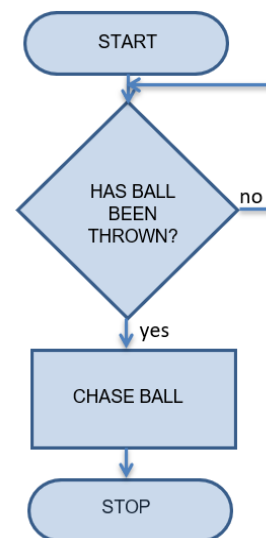
Start or Stop (terminator)



Decision



Process



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Now try this

1. Study the design brief below and answer the following questions in the spaces provided.

Design Brief

Young children are often scared of the dark when going to sleep. This can stop them from sleeping properly and cause worry for their parents. To address this need, a design team has decided to create a programmable night light for use with young children.

The night light must use an LDR (light dependent resistor) to detect when it has gone dark and turn an LED (light emitting diode) on when this happens. The light must stay lit for twenty minutes and then switch off.

You are tasked with writing the program for the system.

What inputs and outputs will need to be controlled by the program?

What are the main things that the program must do?

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2. You are now going to write a flowchart for your proposed program. Use the space below to present your first attempt. Make sure that you label your program so that it is easy for other people to understand.

Some flowchart symbols have been given to help you.

My flowchart program

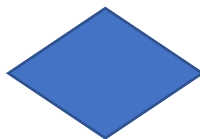
Notes to explain my program

Flow Chart Symbols:

Start or Stop (terminator)



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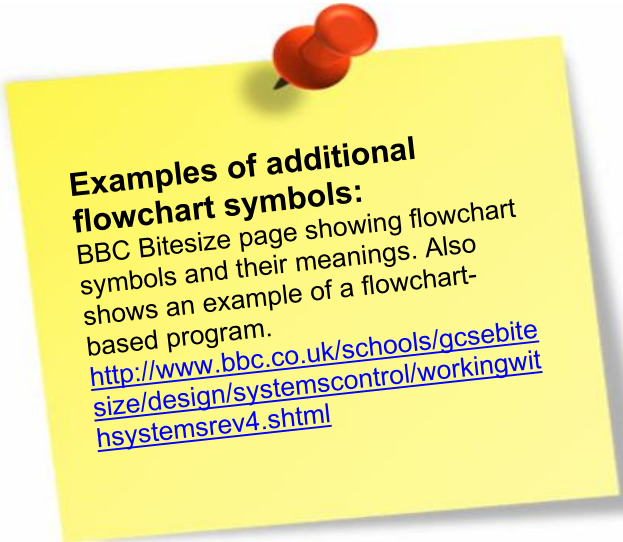
You could also

Write flowcharts that could control other activities. For example:

- Controlling a home heating system that turns on when the temperature is below 16°C, but turns off when it is above 20°C.
- Controlling the water sprinkler system at a garden nursery to be turned on for selected times during the day.
- Controlling a burglar alarm for your house (you can choose the inputs and outputs).
- Controlling the wash cycle on a washing machine that heats up to a selected temperature and washes, rinses and spins in sequence.

Further activities you could carry out

You could also use additional symbols for the flowchart, for example to include sub-systems and input and output devices.



Examples of additional flowchart symbols:

BBC Bitesize page showing flowchart symbols and their meanings. Also shows an example of a flowchart-based program.

<http://www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/workingwithsystemsrev4.shtml>

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What results were expected?

