

# Algorithms and debugging

|                         |                                                               |
|-------------------------|---------------------------------------------------------------|
| Abstraction             | To pick out the important information.                        |
| Algorithm               | A clear set of instructions to carry out a task.              |
| Artificial intelligence | Computers that can perform the tasks that humans normally do. |
| Bug                     | An error or mistake in computer code.                         |
| Correct                 | Free from mistakes.                                           |
| Data                    | Information used for a specific purpose or investigation.     |
| Debug                   | To fix the error in code.                                     |
| Decompose               | To break something down into smaller chunks.                  |
| Error                   | A mistake.                                                    |
| Key features            | Important parts of something.                                 |
| Loop                    | A repeated sequence of instructions.                          |
| Predict                 | To make a guess.                                              |
| Unnecessary             | Not needed.                                                   |

## Abstraction: Key information

Remember to take spare clothes, including t-shirts, trousers, a coat, underwear and a hat. There will be a lot of wet weather in the rainforest, so wrap up to stay dry.

You might hear lots of animals, such as monkeys and parrots. Keep close to the adults and be careful where you step.

Do not forget to take a drink and a snack.

## Decomposition: Smaller chunks

List for the rainforest:

- Take spare clothes
- Wet weather
- Keep close to the adults
- Take a drink and a snack



# Key facts

Zooming into an Australian rainforest on Planet Earth.



Algorithm for making a hot chocolate:

1. Fill the kettle with water
2. Boil the water
3. Fill a mug with the boiled water
4. Add a teaspoon of cocoa powder
5. Add a drop of milk
6. Stir well



# What is a computer?

|             |                                                                                                                        |
|-------------|------------------------------------------------------------------------------------------------------------------------|
| Battery     | A cell or connected group of cells that store electrical energy to power wireless devices.                             |
| Buttons     | Switches that you can press to control a device.                                                                       |
| Computer    | Electronic machine that accepts and processes information to produce an output, and then stores the results.           |
| Desktop     | A tower computer that needs a mouse, keyboard and monitor, that stays in one place.                                    |
| Device      | Equipment created for a certain purpose or job.                                                                        |
| Electricity | A type of energy, that is usually invisible, that can be made or stored and used to make devices work.                 |
| Input       | A way of telling the computer what you want it to do.                                                                  |
| Invention   | A new device or process which solves a problem.                                                                        |
| Keyboard    | An input device made up of buttons that create letters, numbers, and symbols, as well as perform other functions.      |
| Laptop      | A compact computer that is easy to carry and move around.                                                              |
| Monitor     | An output device, which shows what is happening on the computer for example videos, images and text.                   |
| Mouse       | A handheld device that is used to move things around on the computer screen.                                           |
| Output      | Information or data that is sent by the computer to an output device such as a printer or speakers.                    |
| Technology  | Using scientific knowledge to help us to create new devices or tools.                                                  |
| Wire        | A long, thin and flexible piece of metal protected by a plastic coating. Electrical wire is used to carry electricity. |

## Key facts

Some computers have a keyboard, screen and mouse, others have buttons to make them do things.



All computers need electricity - they can get this through wires into the wall or batteries!

These items all use technology.



## International Space Station

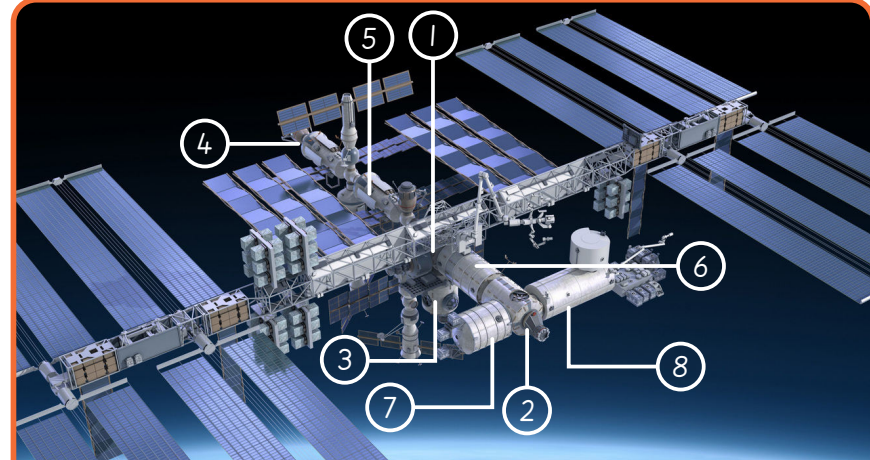
|                                     |                                                                                                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------|
| Approximate                         | Being close but not exactly the same as something.                                              |
| Astronaut                           | Someone who is trained to control a spacecraft.                                                 |
| Data                                | Information used for a specific purpose or investigation.                                       |
| Digital content                     | Information and media such as videos and pictures stored on a computer.                         |
| Experiment                          | To trial and test new ideas.                                                                    |
| Interactive map                     | A digital map which can be searched, zoomed in or out of and provide information about a place. |
| International Space Station (I.S.S) | A laboratory in space that orbits the Earth.                                                    |
| Interpret                           | Explain the meaning of something to someone else or to yourself.                                |
| Laboratory                          | A place where scientists carry out research and experiments to discover more about something.   |
| Monitor (verb)                      | To check the status of something.                                                               |
| Satellite                           | A computer that orbits the Earth to provide information or communication services.              |
| Sensor                              | A tool or device that is designed to monitor, detect and respond to changes.                    |
| Space                               | A vast area around and beyond planet Earth, which is not inhabited.                             |
| Survival                            | To stay alive in bad conditions.                                                                |
| Thermometer                         | A device that measures and displays the temperature of something using a scale (°C or °F).      |

## Growing plants in space



The Vegetable Production System, known as 'Veggie' is a device used to understand and support plants to grow in space on the I.S.S. It helps produce fresh food for the astronauts.

## Key Facts



|   |                  |                                                       |
|---|------------------|-------------------------------------------------------|
| 1 | Node 1 (Unity)   | Connects U.S. and Russian modules of the I.S.S.       |
| 2 | Node 2           | Connects the American, European and Japanese modules. |
| 3 | Node 3           | Sleeping and resting area.                            |
| 4 | Zvezda (Star)    | Central hub for Russian astronauts.                   |
| 5 | Zarya (Sunshine) | Russian research module.                              |
| 6 | Destiny          | American research module.                             |
| 7 | Columbus         | European research module.                             |
| 8 | Kibo (Hope)      | Japanese research module.                             |

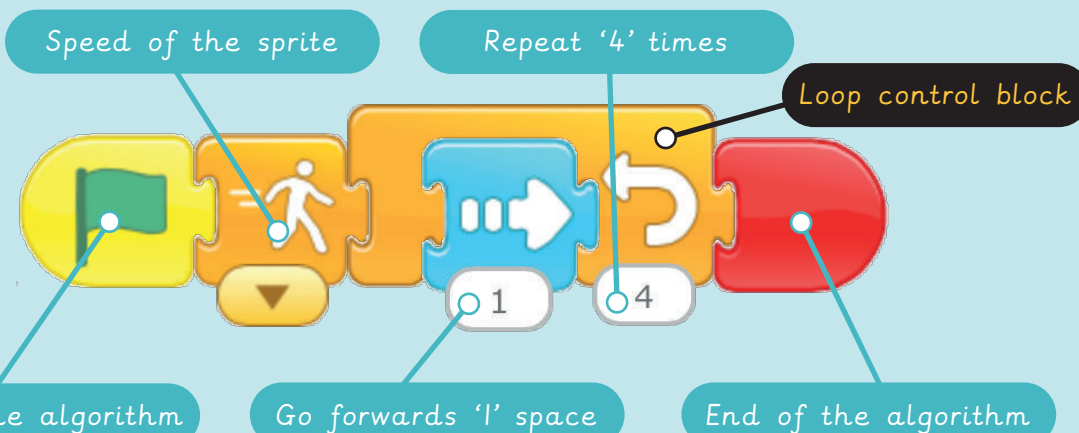
## Survival items



# Programming - Scratch JR

|                 |                                                                                       |
|-----------------|---------------------------------------------------------------------------------------|
| Algorithm       | A clear set of instructions to carry out a task.                                      |
| Animation       | Pictures or photographs in a sequence to give the illusion of movement.               |
| Bug             | An error or mistake in computer code.                                                 |
| Code (computer) | A set of instructions written in programming language, to tell a computer what to do. |
| Code (verb)     | To write in programming language (code).                                              |
| Debug           | To fix the error in code.                                                             |
| Icon            | A small image which represents something or someone.                                  |
| Imitate         | To copy.                                                                              |
| Instructions    | A list of commands and directions on how to do something.                             |
| Loop            | A repeated sequence of instructions.                                                  |
| Repeat          | To do the same again.                                                                 |
| Scratch JR      | A simple, block-based coding application, in which you can instruct Scratch the cat.  |
| Sequence        | A set order or pattern for something to follow.                                       |

A Scratch JR algorithm with a loop:



## Key facts

Scratch JR is an application for tablets.

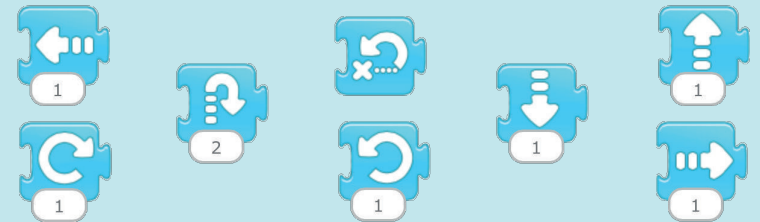


Code blocks let you build algorithms:

Triggering blocks:



Motion blocks:



Looks blocks:



Sound blocks:

End blocks:



Control blocks:



## Stop motion

|              |                                                                                   |
|--------------|-----------------------------------------------------------------------------------|
| Animation    | Pictures or photographs in a sequence to give the illusion of movement.           |
| Animator     | Someone who specialises in the creation of animations.                            |
| Contraption  | An old-fashioned device.                                                          |
| Decompose    | To break something down into smaller chunks.                                      |
| Design       | To make, draw or write plans for something.                                       |
| Device       | Equipment created for a certain purpose or job.                                   |
| Download     | Saving files from the internet, intranet or another device.                       |
| Film review  | Writing your opinion about a film.                                                |
| Filming      | Using a video recorder to capture moving images.                                  |
| Import image | To place a picture into a document or into other software.                        |
| Plan         | An idea about how to do something in future.                                      |
| Sketch       | A rough drawing to help you plan.                                                 |
| Software     | A series of instructions written for a computer to follow.                        |
| Stop motion  | A sequence of photographs used to create an animation.                            |
| Storyboard   | A sequence of sketches that show what you plan to make for an animation or video. |
| Upload       | To send files from one device to another device.                                  |

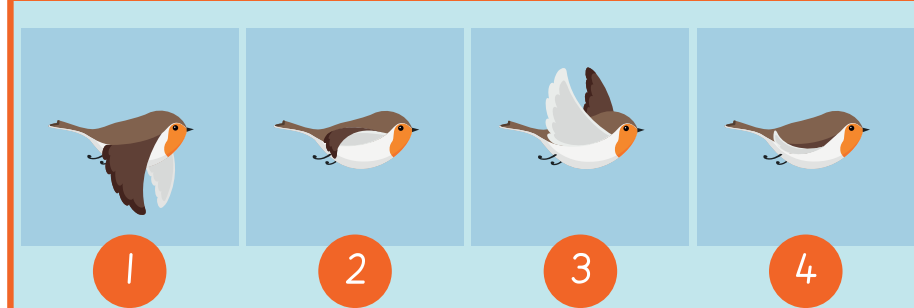
## Did you know?

Animators normally sketch a storyboard to plan their ideas and the sequence for an animation.



## Key facts

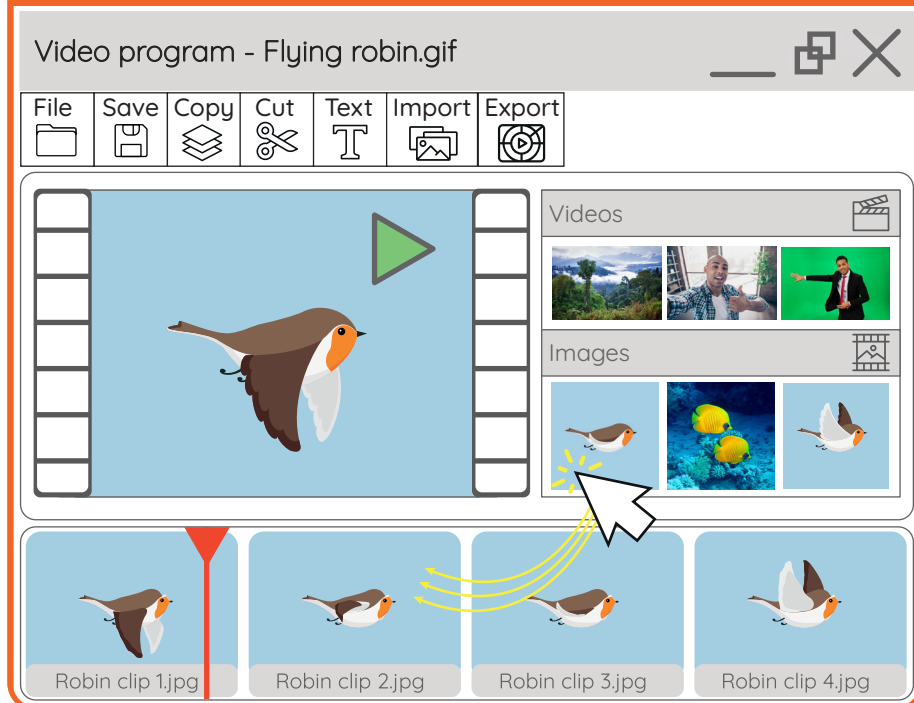
Animations are made up of a sequence of still images, the sequence below makes the robin look like it is flying.



To see the finished animation, ask an adult to scan the QR code:



## Video editing software:



## Word processing

|                    |                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------|
| Backspace          | A key to move the cursor backwards.                                                                               |
| Copyright          | The law that protects other people's work from being copied or used without permission.                           |
| Delete (text)      | A button on the keyboard which deletes text.                                                                      |
| Image              | A picture.                                                                                                        |
| Import             | To place another file into a document, such as an image.                                                          |
| Keyboard           | An input device made up of buttons that create letters, numbers, and symbols, as well as perform other functions. |
| Keyboard character | Any letter, symbol, space, number or punctuation mark that can be input with a keyboard.                          |
| Paste (text)       | To insert copied or cut text.                                                                                     |
| Redo               | To step forwards to the next edit.                                                                                |
| Space bar          | A button on a keyboard to insert room between letters.                                                            |
| Touch typing       | Using a keyboard with all your fingers, without looking at the letters on the keys.                               |
| Undo               | To step backwards to the previous edit.                                                                           |
| Word processing    | A program used for creating text documents on a computer.                                                         |

## Keyboard buttons:

Important buttons to learn when typing on a computer.



## Key facts

Word processing software:

Writing program - Sid the dog.txt

File Save Print Copy Cut Text Clipart Font  
Balsamiq sans

Regular aA

Sid, the silly sausage dog, swam in the sparkling sea.

Bold B

Sid, the silly sausage dog, swam in the sparkling sea.

Italics I

Sid, the silly sausage dog, swam in the sparkling sea.

Underline U

Sid, the silly sausage dog, swam in the sparkling sea.

Highlight

Sid, the silly sausage dog, swam in the sparkling sea.

E-books and e-documents can be read on electronic devices

