DIGITAL TECHNOLOGIES HUB

Australian Curriculum V9.0
Algorithms

The precise sequences of steps and decisions needed to solve a problem, often involving iterative (repeated) processes
ACARA, 2022

Years 3–4

I can follow and describe the steps that include decisions based on comparing data.

Years 5–6

I can design algorithms with decisions that can lead to multiple outcomes.

Years 3–4

An algorithm can describe a sequence of steps and decisions that include comparing data.

Sequencing refers to placing the steps to be performed in order, one after another.

At certain steps in the sequence we may want an input to make a decision. To get a yes or no answer, branching decisions may result from a **comparison**.
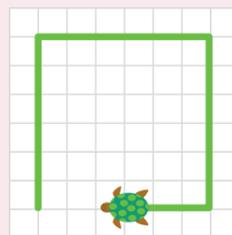
The **operator** may be: < (less than), > (greater than), or = (equal to).

Is the temperature > 25°? — yes → Put on sunscreen, go to beach
no → Play at home with friends
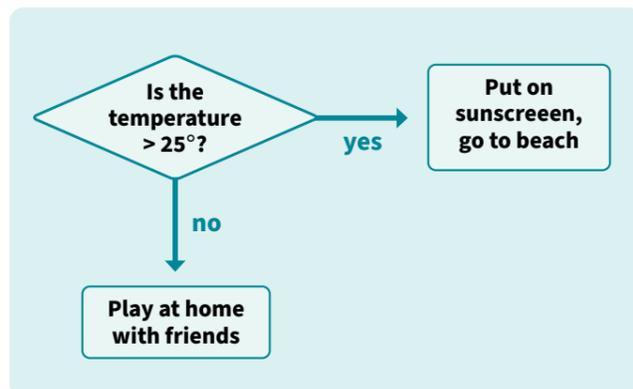
With **iteration**, some steps can happen a set number of times.

To move along a square pathway, repeat these steps 4 times:
Move forward 5 steps, then turn right 90°.

Set instrument to piano.
Play these musical notes, repeat 14 times.
- E for 0.5 beat
- B for 0.5 beat
- G for 0.5 beat
- E for 0.5 beat
- B for 0.5 beat
- C# for 0.5 beat
- G for 0.5 beat

E (40) — C (36) ... C (48)

Achievement standard	Students follow and describe simple algorithms involving branching and iteration.
Content descriptions	Follow and describe algorithms involving sequencing, comparison operators (branching) and iteration	Digital Technologies AC9TDI4P02

Related content

To get 64, start with 2, then repeat this step 5 times: multiply by 2.

2   4   8   16   32   64
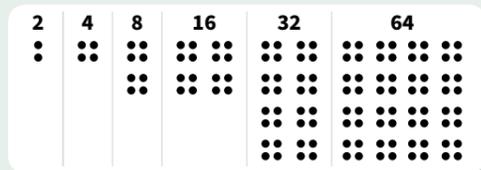
| Mathematics | Follow and create algorithms involving a sequence of steps and decisions that use addition or multiplication to generate sets of numbers; identify and describe any emerging patterns | Mathematics AC9M4N09 |
|---|---|

Years 5–6

An algorithm can describe a sequence of steps and include multiple decisions.

An algorithm can be simple or complex, but it always follows a **sequence** from a starting point.

In algorithms, if/then statements allow for different paths. For example, in a 'choose your own adventure' story, IF the choice is 'cave', THEN the story changes to cave plot. IF the choice is 'river', THEN the story changes to a river plot. Otherwise (ELSE), the story continues with the secret path plot.

If Cave Then Cave plot
If River Then River plot
Else Secret path
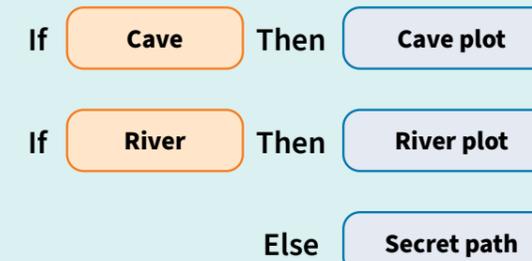
Yes/No questions can be used as a sorting algorithm to identify one object from a group, for example, sorting a group of animals using a series of Yes/No decisions (branching).

With **iteration**, some steps may be repeated only as long as a condition holds.
- Keep heating UNTIL temperature = 22 °C .
- Keep playing a game UNTIL 3 lives are lost, keep count of lives. Subtract one for each unsuccessful attempt.

Lives = 3

Achievement standard	Students design algorithms involving complex branching and iteration.
Content descriptions	Design algorithms involving multiple alternatives (branching) and iteration	Digital Technologies AC9TDI6P02

Related content

Create a flow chart to determine if numbers are divisible by 2.

Enter a number → Does the last digit end in 0, 2, 4, 6 or 8? — yes → Divisible by 2 / no → Not divisible by 2
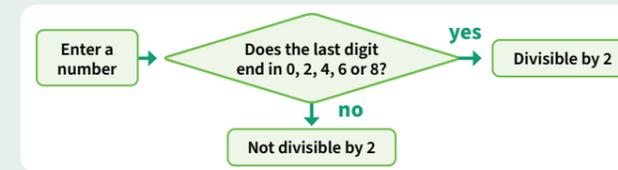
Mathematics	Create and use algorithms involving a sequence of steps and decisions and digital tools to experiment with factors, multiples and divisibility; identify, interpret and describe emerging patterns	Mathematics AC9M5N010