

Introduction to Coding

Scratch

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Topics list

- What is Scratch?
- Flow of Control in a Program
- SomethingFishy Examples:
 - Example1: Sequence
 - Example2: Sequence, Selection and Iteration.
 - Example3: Sequence, Selection and Iteration.

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Scratch

- Scratch is a graphical coding language.
- Developed to help students understand coding.
- You code in the Scratch editor.

Scratch Editor Demo

The image shows the Scratch 2 Offline Editor interface. At the top, the title bar reads "Scratch 2 Offline Editor" with standard window controls. Below the title bar is a menu bar with "Scratch", "File", "Edit", "Tips", and "About". The main workspace is divided into three main sections:

- Stage:** A large white area where the cat sprite is currently positioned. The coordinates "x: 46 y: 154" are displayed at the bottom right of the stage. A small "v447" label is in the top left corner of the stage area.
- Sprites Panel:** Located at the bottom left, it shows a "New sprite:" button with icons for image, drawing, video, and camera. Below this, there is a "Stage 1 backdrop" and a "New backdrop:" section with icons for image, drawing, video, and camera. The "Sprites" list contains one item, "Sprite1", which is the cat sprite.
- Scripts Block Palette:** Located on the right side, it has tabs for "Scripts", "Costumes", and "Sounds". Under the "Scripts" tab, there are two columns of block categories: "Motion" (blue), "Looks" (purple), "Sound" (pink), "Pen" (green), "Data" (orange), "Events" (yellow), "Control" (orange), "Sensing" (blue), "Operators" (green), and "More Blocks" (purple). A list of motion blocks is visible, including "move 10 steps", "turn 15 degrees" (left and right), "point in direction 90", "point towards", "go to x: 0 y: 0", "go to mouse-pointer", "glide 1 secs to x: 0 y: 0", "change x by 10", "set x to 0", "change y by 10", and "set y to 0".

At the bottom right of the Scripts palette, there are search, zoom, and help icons. The cat sprite's current coordinates "x: 0 y: 0" are also visible in the top right corner of the Scripts palette area.

Scratch

- If you have a computer at home, you can:
 - download the Scratch from here:
<https://scratch.mit.edu/scratch2download/>
 - work on the online version:
https://scratch.mit.edu/projects/editor/?tip_bar=fly
- Pre-installed on the Raspberry Pi.

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Flow of Control in a Program

- Each program you write will typically have:

Sequence	Things done in a particular order
Selection	Things done conditionally
Iteration	Things done repetitively

- By using examples, we will explore what each of these mean.

Topics list

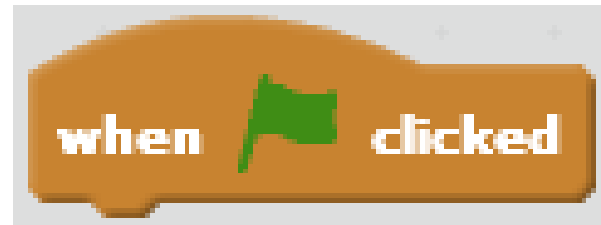
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Example 1

Demonstrating SEQUENCE

Events

Runs the program when the green flag is clicked



Statements

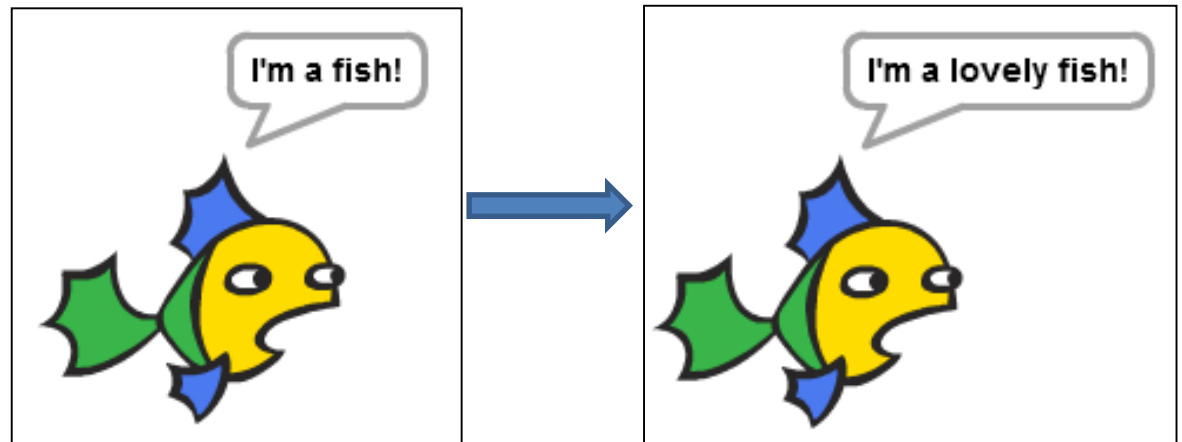
You can type in any text. The words will appear in a speech bubble for the sprite.



You can type in any words to say. The number of seconds tells the speech bubble how long to show. The program waits that long before continuing.



SomethingFishy1

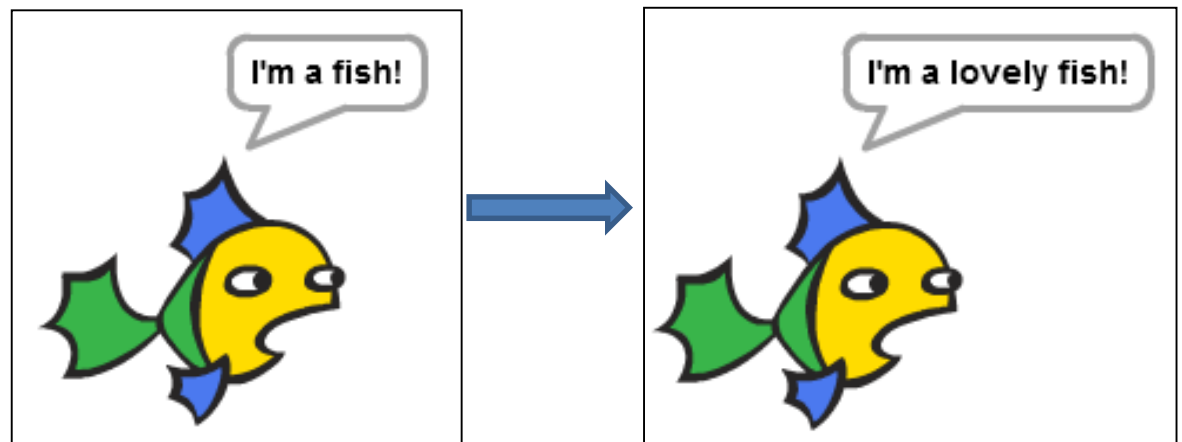


SomethingFishy1



This example demonstrates
SEQUENCE
in a program.



The statements are executed in
sequential order.



Example 2

Demonstrating
SEQUENCE, SELECTION and
ITERATION

Selection / Conditions

<p>If condition is true, runs the statements inside it.</p>	 A yellow Scratch 'if-then' block. It features a small diamond-shaped condition field on the left, followed by a 'then' label and a long horizontal slot for a single statement.
<p>If condition is true, runs the statements inside the if portion; if not, runs the statements inside the else portion.</p>	 A yellow Scratch 'if-then-else' block. It features a small diamond-shaped condition field on the left, followed by 'then' and 'else' labels, and two long horizontal slots for statements.

Example of a condition

Reports true if
specified key is
pressed.



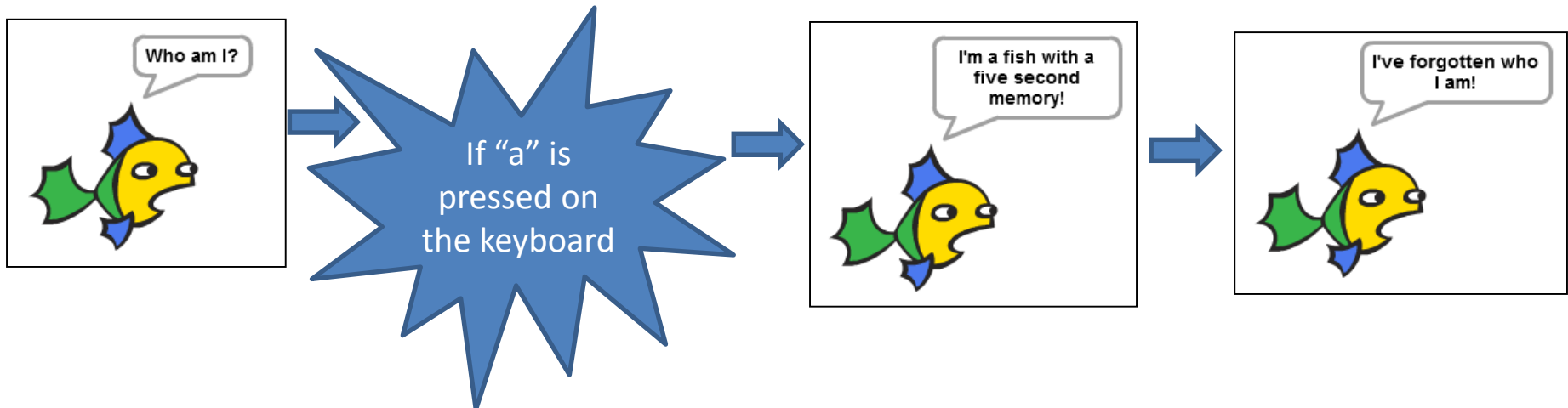
Iteration / Loops

Runs the
statements
inside over and
over again

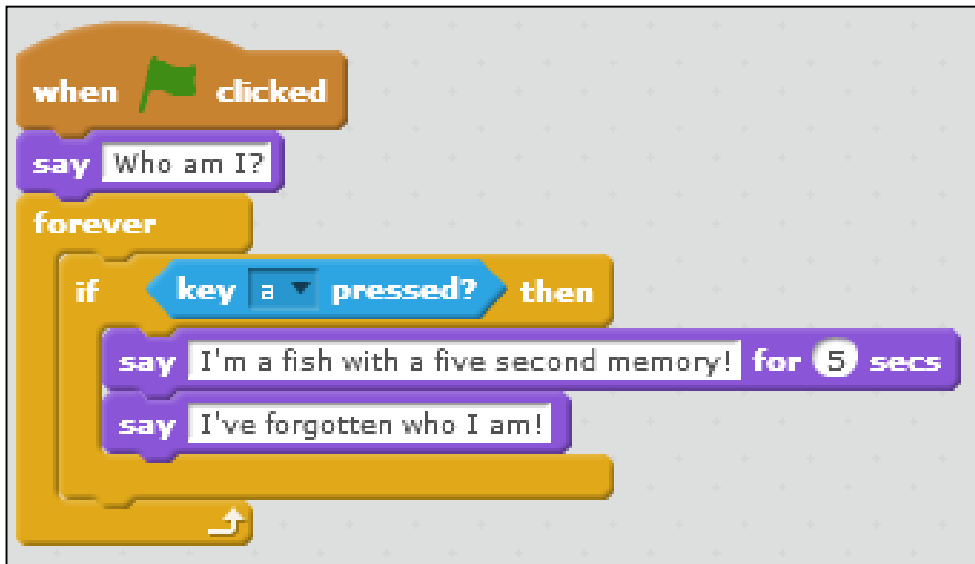


SomethingFishy2

```
when green flag clicked
say Who am I?
forever
  if key a pressed? then
    say I'm a fish with a five second memory! for 5 secs
    say I've forgotten who I am!
```



SomethingFishy2



This example demonstrates:

SEQUENCE (The statements are executed in sequential order)

SELECTION (if “a” is pressed on the keyboard, the messages are printed to the speech bubbles. If “a” is not pressed, nothing happens)

ITERATION (The program is continually listening/waiting for the “a” key to be pressed).

Example 3

More on
SEQUENCE, SELECTION and
ITERATION

More Control / Loops

We saw this one in an earlier slide...it runs the statements inside over and over.



Repeat the statements inside until condition is true.

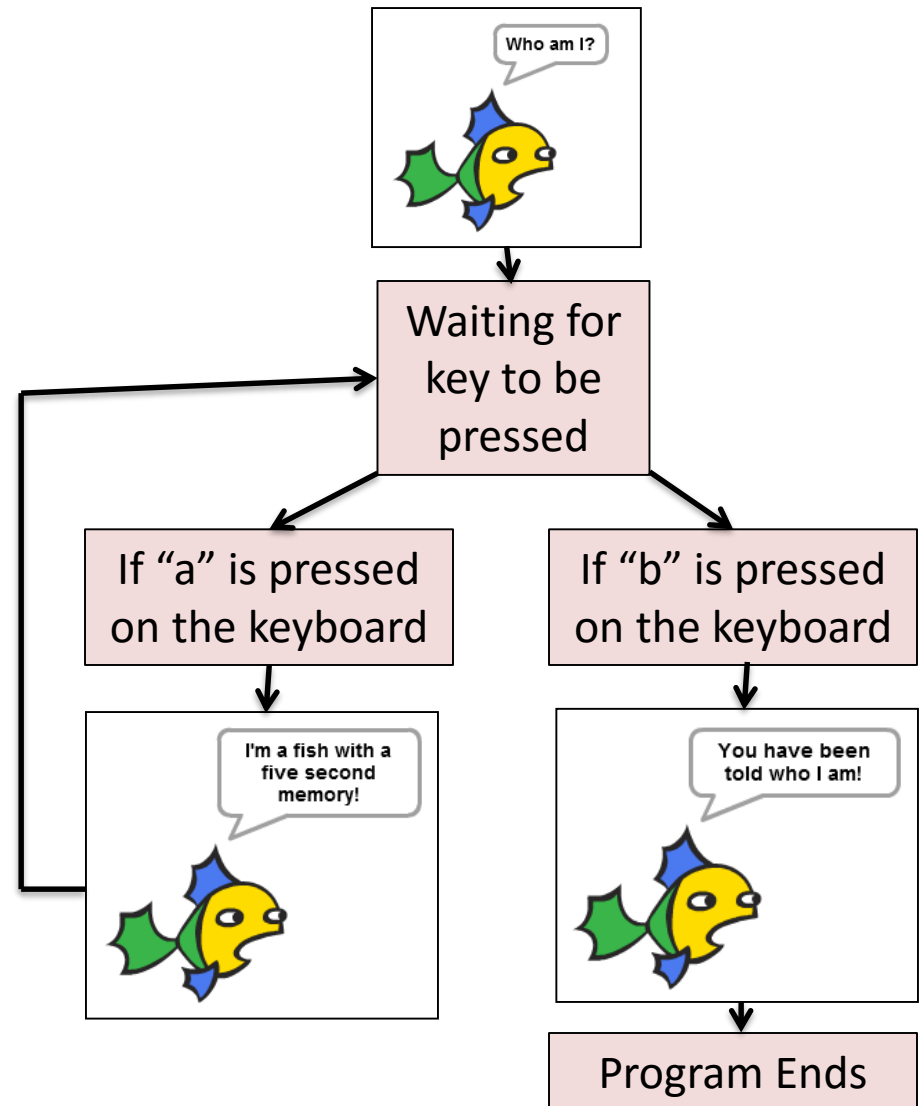
Checks to see if condition is false:

- if so, runs the statements inside and checks condition again.
- If condition is true, goes on to the statements that follow.



SomethingFishy3

```
when clicked
say Who am I?
repeat until key b pressed?
  if key a pressed? then
    say I'm a fish with a five second memory for 5 secs
say You have been told who I am!
```



Questions?

