Counting Machine

Program Aim Can the users create and adapt a counting machine that displays the numbers counted and then removes one to test the users numeracy skills.

Computer Science Concepts

-Repeat x times loops

-Variables in a loop
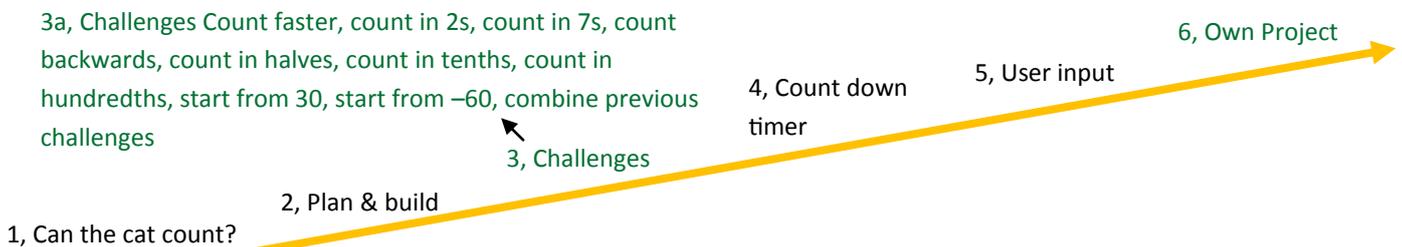
-Input to a list

-Using a variable within a say command

Maths Concepts

-Counting in multiples, counting backwards, counting in halves, counting in tenths, counting in hundredths, counting from a different starting number

Differentiation and Assessment for Learning

In this module a lot of the extension tasks can be given orally. At the beginning of each session the *learning intention sheet* is shared and the learning journey expanded through success criteria. Pupils feed their progress back to the teacher through annotating this sheet with smiley faces at the end of the lesson. Teachers can also annotate the sheet to indicate those who need more or less help in future lessons. These extra resources can be found on the code-it.co.uk website.
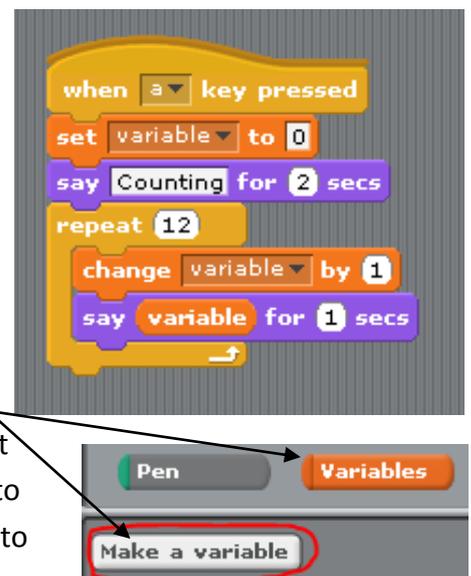
Extension

3a, Challenges Count faster, count in 2s, count in 7s, count backwards, count in halves, count in tenths, count in hundredths, start from 30, start from –60, combine previous challenges

6, Own Project

5, User input

4, Count down timer

3, Challenges

2, Plan & build

1, Can the cat count?

Learning Path

1, Can the cat count?

Ask pupils if they can work out a way to make the cat count. They will often come up with lots of say commands strung together. Welcome their efforts and ask them what the draw backs are for this method? (very time consuming) if they don't come up with this ask them if they would be happy to make the cat count to 1000 using their method?

2, Plan and build

Explain that we have a much easier way. Show them how to make a variable called variable. Then hand out the Counting Machine Flowchart Introduction printed in colour one to each pair. Explain that they need to match the blocks to the flow chart drawing lines and then use this plan to build the counting machine.

when [a ▼] key pressed
set [variable ▼] to [0]
say [Counting] for [2] secs
repeat [12]
  change [variable ▼] by [1]
  say [variable] for [1] secs

Pen   **Variables**

Make a variable

Counting Machine P2

3a, Challenges As pupils finish building and testing their machine and have filled in the question on the bottom of the counting machine flow chart challenge encourage them to come up and get challenges from you.

Give the challenges in this order

Challenges Count faster, count in 2s, count in 7s, count backwards, count in halves, count in tenths, count in hundredths, start from 30, start from –60,

combine previous challenges

Start counting from 30 change set variable to 30, start counting from –60 set variable to –60

As they come up get them to point out on your challenge check sheet what they have changed. Give them the next challenge.

Count in 2s change variable to 2, count in 7s change variable to 7, count backwards change variable to negative number, count in halves change variable to 0.5, count in tenths change variable to 0.1, count in hundredths change variable to 0.01,

Count faster change seconds to decimal fraction such as 0.5

4, Countdown timer

Explain that you would like a 30 seconds count down timer that would be obvious when it finishes. Can they adapt their counting machine to do this?

This is one possibility but there are many variations on this.

Ask how people will know when it finishes? Sound or colour change

Counting Machine P3

4, User Input

Explain that you would like to be able to set the timer so that you could determine how many seconds it runs for.

Ask if they can remember a way of inputting user typing into a programme. If you covered the quiz someone should remember the ask command.

Drag out an ask command and an ask where the user input goes. Draw out that it goes into the answer block.

Can we use this to set the timer?

Some pupils may need to see the power of using an answer block user input into other forms of programming before they make the link to use this in their own timer.

Demonstrate using just the first four blocks. Ask them how the sprite knows to move x steps? Where is the sprite getting its information from? Then add the degree example if pupils need it.

6, Own Project

Can pupils use this information to create their own counting projects?