Loops

Introduction

You will aim to learn the following objectives and keywords during this lesson.

Learning Objective	- To identify how to use a loop in a set of instructions - To demonstrate how loops can be used in a robotic system
Keywords	- Repetition - Loops

Setting the Scene

Concept	How it is used
A part of the program that can continuously run the code inside until it is stopped, or the condition of the loop is met.	When code is written you may have sections of the code that are repeated, this is where loops come in. Loops can save time as you do not need to type the same code every time it is required.

Can you think of any types of loop you know about?

Activity 1

Scenario 1	Scenario 2
You need to brush your teeth and given the following instructions: - Brush up and down - You have a **_loop_** given here that states – repeat for 2 minutes.	You are competing in a track event on sports day. - You need to run the circuit - You have a loop with a set amount of times to run.

Where else have you used 'loops' in your life?

Repetition – is the use of loops as you are repeating the code within it.

There are different types of loops:

- **Forever loop** – the code is run continuously until they are stopped
- **Repeat [set amount of times] loop** – the code within is run the amount of times set on the loop.
- **Repeat while** – the code is run '*while*' a condition is being met
- **Repeat 'until'** – the code is run '*until*' a condition is met

Small Group Activity

In pairs, follow the instructions on the left to draw a shape.

<u>Instructions</u>	<u>Shape</u>
Draw a 5cm straight line *Turn 90 degrees to the right* *Draw a 5cm straight line* *Turn 90 degrees to the right* *Draw a 5cm straight line* *Turn 90 degrees to the right* *Draw a 5cm straight line* *Turn 90 degrees to the right*	

How could these instructions be simplified using a loop?

Most computer programs have a form of **_repetition_** (use of **_loops_**) within them, this allows the code to be efficient. In computer programming the least amount of code to solve the problem is more efficient and is what programmers strive to achieve.

Extension

Look at the pattern below, can you fill in the rest of the blocks with the correct colours?

Could you complete the remaining squares by saying repeat the pattern a set amount of times? This is a repeat [set amount of times] loop.

Activity 2

For this activity you will be on your computer using MiRoCODE. Remember to save your work for further review!

There are many blocks available for 'loops' within the MiRo Simulator.

In this lesson we are going to focus on the use of the 'repeat 10 times' block. The number can be edited within this block.

How do we work out how many times the loop should run?

How can we get MiRo to move blink it's eyes and then nod it's head?
We are going to create a program that will control the movement of MiRo.

Can you write some instructions out for the algorithm to do this below?

Nod: ....   Blink: ....

....

....

....

....

Using this algorithm as your plan, create and run the program in the MiRoSIM.

Summary Self-Assessment

Question	Got it	Got it with help	Unsure
Can you identify how to use a loop to a set of instructions?	☐	☐	☐
Can you describe how loops can be used?	☐	☐	☐
Can you create a program using loops to control MiRo in MiRoSIM?	☐	☐	☐