

# Communicating well when programming (Computational Thinking for Digital Technologies PO5)

## Facilitators Notes

### Purpose

These notes are intended to support teachers and leaders facilitate the pīkau *Communicating well when programming (CTDT PO5)* to a group of teachers, for example, in a staff meeting.

### Pre-requisites

#### Essential:

As a minimum participants should have completed the pīkau

- *First steps in programming (CT PO 1) (EMP05)*
- *Programming with Sequence and Output (CT PO 2) (EMP06)*
- *What is Programming (EMP07)*
- *Making the Computer do the Work: Programming with Loops (CT PO3) (EMP08)*
- *Getting Programs Right: the End-user and Fast Algorithms (CTDT PO4) (EMP09)*

It is best if participants have also completed the pīkau *What is Computational Thinking* and *Computational Thinking: the international perspective* before this pīkau.

### Preparation

Complete the pīkau yourself.

Ask participants to bring their laptops. If they don't already have a Kia Takatū account they should set one up via <https://kiatakatu.ac.nz/> so they can access the pīkau directly to participate in the activities.

Activity 1: Can you escape the loop? Participants will work through the two questions within the pīkau either individually or in pairs. They will need access to the Kia Takatū website.

Activity 2: Build your own looping program here! Participants have a go at rebuilding the Scratch program to count down to a chosen event. They will need access to the Kia Takatū website.

Activity 3: Participants will work through the quiz within the pūkai either individually or in pairs.

**Related pūkai:**

*First steps in programming: CT PO 1 (EMP05) and Programming with Sequence and Output: CT PO2 (EMP06), What is Programming (EMP07) and Making the Computer do the Work: Programming with Loops (CT PO3) (EMP08), Getting Programs Right: the End-user and Fast Algorithms (CTDT PO4).*

## Facilitation notes

Access to a data projector or shared screen and speakers to present the pūkai is recommended.

These are arranged in the order that the content appears in the pūkai.

Estimated time: 70-75 minutes (without activities), 85 - 90 minutes with activities (recommended). This is a longer pūkai. You may want to split presenting this over two sessions.

The times given are as a suggestion only. Following the suggested times will ensure the pūkai is completed in the overall suggested time.

Section	Facilitation notes
Introduction and What you'll learn 2 minutes	The key points of this section are that you will learn how to: <ul style="list-style-type: none"> <li>• Summarise comparative and logical operators</li> <li>• Describe different data types</li> <li>• Describe types of control structures</li> <li>• Recognise similarities between block based and text based languages</li> <li>• Describe methods of program documentation</li> </ul>
Why this matters... 2 minutes	The key points of this section are: <ul style="list-style-type: none"> <li>• We write programs for people, not computers</li> </ul>
Links to existing knowledge 2 minutes	The key point of this section is: <ul style="list-style-type: none"> <li>• The content of this pūkai builds on directly from what has been learnt in previous pūkai.</li> </ul>
Variables for different types of data 12 minutes	The key points of this section are: <ul style="list-style-type: none"> <li>• If you use spreadsheets you may already be familiar with some of this.</li> </ul>

	<ul style="list-style-type: none"> <li>The most common types of variable that beginners will encounter are 'text' (string), 'integer' and 'floating point number' (float).</li> </ul>
Controlled loops 12 minutes	<p>The key point of this section is:</p> <ul style="list-style-type: none"> <li>Controlled loops enable programs to continue until a specific criteria is met.</li> </ul>
Activity 1: Can you escape the loop? 5 minutes	<p>Take the quiz as either individuals or in pairs. Discuss any differences of opinions. (Teachers could implement the programs if you want to confirm what they do!)</p>
Writing for the next programmer 10 minutes	<p>The key points of this section are:</p> <ul style="list-style-type: none"> <li>Other people need to be able to understand how our programs work for a variety of reasons.</li> <li>By using clear variable names and comments it is easy to ensure a program can be understood</li> </ul>
There's more than one way to do it (Using loops in Scratch) 6 minutes	<p>The key points of this section are:</p> <ul style="list-style-type: none"> <li>There can be as many different programs for the same problem as there are programmers</li> <li>Some programs are more flexible and robust than others.</li> </ul>
Activity 2: Build your own looping program here! 5 minutes	<p>Participants have a go at rebuilding the Scratch program to count down to a chosen event. They will need access to the Kia Takatū and Scratch websites.</p>
Using loops in Python 7 minutes	<p>The key point of this section is:</p> <ul style="list-style-type: none"> <li>Loops are expressed similarly in both block based and text based languages.</li> </ul>
Logical and comparative operators 10 minutes with just first video 15 minutes watching both videos	<p>The key points of this section are:</p> <ul style="list-style-type: none"> <li>Comparator operators include &lt;, &gt;, =</li> <li>The basic Logical operators are 'and', 'or', and 'not'</li> <li>By combining comparator and logical operators programs are able to make all sorts of decisions to select what a program will do.</li> </ul>
Logical and comparative operators quiz 5 mins	<p>Take the quiz as either individuals or in pairs. Discuss any differences of opinions.</p>
Links to programme design 2 mins	<p>The key point of this section is:</p> <ul style="list-style-type: none"> <li>Comparative and logical operators can be applied in other curriculum areas.</li> </ul>

Wrapping up and where to next?  
6 mins

The key point of this section is:

- This pīkau has built on what has been taught in previous pīkau.
- This pīkau covers most of what is in Computational thinking for computational thinking progress outcome 5, which the last progress outcome before NCEA.
- This pīkau does not cover heuristics for HCI or binary numbers, which will be covered in separate pīkau.