

Achievement Standard

Subject Reference	Digital Technologies and Hangarau Matihiko 2.7				
Title	Use advanced programming techniques to develop a computer program				
Level	2	Credits	6	Assessment	Internal
Subfield	Technology				
Domain	Digital Technologies				
Status	Approved	Status date	September 2024		
Planned review date	December 2028	Date version published	December 2024		

This achievement standard involves using advanced programming techniques to develop a computer program.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"><li>Use advanced programming techniques to develop a computer program.</li></ul>	<ul style="list-style-type: none"><li>Use advanced programming techniques to develop an informed computer program.</li></ul>	<ul style="list-style-type: none"><li>Use advanced programming techniques to develop a refined computer program.</li></ul>

Explanatory Notes

- 1

This achievement standard is derived from the Technology Learning Area at Level 7 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the [Papa Whakaako](#) for the relevant learning area.
- 2

*Use advanced programming techniques to develop a computer program* involves:

  - writing code for a program that performs a specified task
  - using advanced techniques in a suitable programming language
  - setting out the program code clearly and documenting the program with comments
  - testing and debugging the program to ensure that it works on a sample of expected cases.

*Use advanced programming techniques to develop an informed computer program* involves:

- documenting the program with appropriate names and comments that describe code function and behaviour
- following common conventions for the chosen programming language
- testing and debugging the program to ensure that it works on a sample of both expected cases and boundary cases.

*Use advanced programming techniques to develop a refined computer program* involves:

- ensuring that the program is a well-structured, logical response to the specified task
- making the program flexible and robust
- comprehensively testing and debugging the program.

- 3 The programming language chosen must support the required data types, control structures, advanced programming techniques and have good commenting facilities.
- 4 An *advanced computer program*:
  - uses variables storing at least two types of data (e.g. numeric, text, Boolean)
  - uses sequence, selection and iteration control structures
  - takes input from a user, sensors, or other external source
  - produces output
  - uses two or more advanced programming techniques.
- 5 Examples of *advanced programming techniques* include:
  - modifying data stored in collections (e.g. lists, arrays, dictionaries)
  - storing multidimensional data in collections
  - creating methods, functions, or procedures that use parameters and/or return values
  - responding to events generated by a graphical user interface (GUI)
  - using non-trivial string manipulation
  - using additional non-core libraries.
- 6 Examples of ways of making a *program flexible and robust* include:
  - using actions, conditions, control structures and methods, functions, or procedures effectively
  - checking input data for validity
  - correctly handling expected, boundary and invalid cases
  - using constants, variables and derived values in place of literals.
- 7 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

---

## Replacement

This Achievement Standard replaced AS91372 and AS91373.

---

**Quality Assurance**

- 1 Schools and institutions must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Schools and institutions with consent to assess must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233

---