

Achievement Standard

Subject Reference Digital Technologies 1.44

Title Demonstrate understanding of basic concepts from computer science

Level 1 **Credits** 3 **Assessment** External

Subfield Technology

Domain Digital Technologies

Status Registered **Status date** 20 January 2011

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This achievement standard requires demonstrating understanding of basic concepts from computer science.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Demonstrate understanding of basic concepts from computer science. 	<ul style="list-style-type: none"> Demonstrate in-depth understanding of basic concepts from computer science. 	<ul style="list-style-type: none"> Demonstrate comprehensive understanding of basic concepts from computer science.

Explanatory Notes

- 1 This achievement standard is derived from the Level 6 achievement objectives from the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>.

Further information can be found at <http://www.techlink.org.nz>.

- 2 *Demonstrate understanding of basic concepts from computer science* involves:
- describing the key characteristics and roles of algorithms, programs and informal instructions
 - describing an algorithm for a task, showing understanding of the kinds of steps that can be in an algorithm, and determining the cost of an algorithm for a problem of a particular size

- describing the role and characteristics of programming languages, including the different roles and characteristics of high level languages and low level (or machine) languages, and the function of a compiler
- describing the role of a user interface and factors that contribute to its usability.

Demonstrate in-depth understanding of basic concepts from computer science involves:

- explaining how algorithms are distinct from related concepts such as programs and informal instructions
- showing understanding of the way steps in an algorithm for a task can be combined in sequential, conditional, and iterative structures and determining the cost of an iterative algorithm for a problem of size n
- explaining how the characteristics of programming languages, including the different characteristics of high level and low level (or machine) languages, are important for their roles
- explaining the need for programs to translate between high and low level languages
- explaining how different factors of a user interface contribute to its usability.

Demonstrate comprehensive understanding of basic computer science concepts from computer science involves:

- comparing and contrasting the concepts of algorithms, programs, and informal instructions
- determining and comparing the costs of two different iterative algorithms for the same problem of size n
- comparing and contrasting high level and low level (or machine) languages, and explaining different ways in which programs in a high level programming language are translated into a machine language
- discussing how different factors of a user interface contribute to its usability by comparing and contrasting related interfaces.

- 3 The *basic concepts from computer science* are: the concept of an algorithm; the concept of a programming language; and the concept of a user interface and its usability.
- 4 An algorithm is a precise unambiguous specification of how to accomplish some computational task in a finite number of well-defined steps. An algorithm is distinct from a computer program. An algorithm has a cost (the number of steps it will perform) for a task. Different algorithms for the same task may have different costs.
- 5 A programming language is a precise, formal language for writing programs that can be run on a computer; it is distinct from pseudocode and natural language. There are different levels of programming languages; programs can be translated from high level to low level (or machine) languages.
- 6 A user interface is the part of a computer or electronic system that a human user interacts with to control the system. The usability of an interface is the key characteristic for evaluating an interface.
- 7 Assessment Specifications for this achievement standard can be accessed through the Technology Resources page found at <http://www.nzqa.govt.nz/ncea/resources>.

Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference

0233