Achievement Standard

Subject Reference   Digital Technologies 1.45

Title   Construct a plan for a basic computer program for a specified task

Level   1   **Credits**   3   **Assessment**   Internal

Subfield   Technology

Domain   Digital Technologies

Status   Registered   **Status date**   17 November 2011

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This achievement standard requires constructing a plan for a basic computer program for a specified task.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Construct a plan for a basic computer program for a specified task.	• Skilfully construct a plan for a basic computer program for a specified task.	• Efficiently construct a plan for a basic computer program for a specified task.

Explanatory Notes

1   This achievement standard is derived from Level 6 of 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 at http://seniorsecondary.tki.org.nz.

Further information can be found at http://www.technology.tki.org.nz/.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools,* Ministry of Education at http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education, and the Health and Safety in Employment Act 1992.

2   *Construct a plan for a basic computer program for a specified task* involves:
   • specifying variables and their data types
   • specifying a procedural structure that combines actions, conditions and control structures
   • specifying a set of test cases with expected inputs for testing the program.

Skilfully construct a plan for a basic computer program for a specified task involves:
- independently constructing the plan
- specifying a procedural structure with well-chosen actions, conditions and control structures
- specifying a set of test cases with expected and boundary inputs for testing the program.

Efficiently construct a plan for a basic computer program for a specified task involves:
- constructing a flexible and robust plan
- specifying an effective procedural structure that constitutes a well-structured logical solution to the task
- specifying a comprehensive set of test cases with expected, boundary and invalid input for testing the program.

3   A *plan* refers to a coherent document that communicates the structure and function of a computer program. The plan must be developed in the context of a target programming language. The plan may be communicated using a range of tools. These may include but are not limited to: natural language (as long as it is unambiguous and precise), diagrams (including screen layouts), and pseudocode. The plan itself should not be expressed in program code.

4   A *basic computer program* is a program written in a programming language, that uses:
- variables involving at least two types of information (eg numeric, characters, text) and assignment
- sequence, selection and iteration control structures
- predefined actions (eg predefined methods, functions, or procedures)
- input from a user, sensors, or other external source.

5   *A specified task* refers to a set task which requires the development of a basic computer program to resolve. The task must be of sufficient rigour to allow the student to meet the standard and needs to be agreed prior to the plan being constructed. It may be teacher-given or developed in negotiation with the student.

6   Actions are the atomic steps of the plan. Conditions are logical expressions within conditional and iterative structures that control the choice or repetitions.

7   Well-chosen actions, conditions and control structures are those where the resulting sequence of actions correctly performs the task and has no unintended behaviour or consequences.

8   Ways of making a plan more flexible and robust may include but are not limited to: checking input data for validity; correctly handling expected, boundary and invalid inputs; using constants and variables of appropriate data types; and using constants, variables and derived values in place of literals.

9   An effective procedural structure is one where each individual control structure has a clear and well defined purpose within the structure of the plan, and which has no unnecessary duplication or repetition.

10   Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards.

Quality Assurance

1   Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2   Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

     Consent and Moderation Requirements (CMR) reference   0233