# Stage 2 Digital Technologies

# Assessment Type 3: Individual Digital Solution

Purpose

Create an innovative web application, game or electronic product to meet a genuine need in industry, education, or entertainment.

Description of Assessment

Identify and deconstruct a genuine need in industry, education, or entertainment and create a digital solution in the form of an innovative, original web application or game to meet this need. Your solution can be a prototype, but must transform data into information using a digital system. There should be enough programming present to clearly explain how the solution will produce an output.

Examples of digital solutions include (but are not limited to):

* an interactive multimedia learning application (e.g. interactive junior science lesson)
* a multimedia game (e.g. adventure game)
* a business application (e.g. an electronic ordering system for a small cafe)
* an electronic product (e.g. micro-processor, robotics, wearable technology).

Your digital solution should demonstrate:

* computational thinking skills in the design of your digital solution’s features
* effective time management in the project’s development
* understanding and application of programming skills
* creative and innovative thinking in the development of the concept and digital solution.

In creating your digital solution:

1. deconstruct the need you have identified, breaking it down logically into component parts or features
2. pitch your idea, describing what you are proposing to develop (this must be approved by your teacher)
3. explore the main features of your application by investigating and analysing existing applications and/or games
4. produce a manageable time plan for the features to be developed for your solution
5. create the algorithmic design for each feature using decomposition, abstraction, documented flowcharts, pseudocode, and annotated sketches
6. use your plan to develop, test, and modify each feature to achieve effective and efficient functionality of your digital solution
7. incorporate appropriate user testing and implement any required modifications to improve your solution
8. produce a 3-5-minute walk-through demonstration video to accompany your final solution
9. present your explanation and evaluation of the digital solution as a 5-minute video. This should include an explanation of what makes the digital solution innovative and an evaluation of the effectiveness of the solution.

Assessment Conditions

Produce an individual digital solution that is original and meets an identified need in industry, education, or entertainment. Your digital solution should be no more than 1GB in size and should include:

* key original source code and/or adapted code/pseudocode, accompanied by comments to demonstrate your understanding
* algorithmic design
* graphical user interface and/or instructions for use
* walk-through demonstration video (3-5 minutes).

Your digital solution should be supported by a video of no more than 3 minutes that includes:

* an explanation of what makes the digital solution innovative
* an evaluation of the effectiveness of the digital solution.

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| *Learning Requirements* | *Assessment Design Criteria* |
| 1. apply computational thinking skills, including abstraction, to approach, identify, deconstruct, and solve problems of interest 2. analyse data sets related to problems of interest, to identify patterns and/or trends, draw conclusions, and make predictions 3. apply iterative project - development techniques to manage and evaluate proposed digital solutions to problems of interest 4. apply design and programming skills to create and document digital solutions 5. research and discuss ethical considerations in digital technologies 6. work individually and collaboratively to create and explain digital solutions. | Computational Thinking  The specific features are as follows:  CT1 Application of computational thinking concepts and techniques, to identify and deconstruct problems of interest  CT2 Use of abstraction to identify core concepts and ideas  CT3 Analysis of relationships in datasets to draw conclusions and make predictions  CT4 Application of skills and processes to develop solutions to problems of interest  Development and Evaluation  The specific features are as follows:  DE1 Initiative in the design and creation of digital solutions or a prototype  DE2 Application of iterative development, testing, modification, and documentation of a digital solution or prototype  DE3 Evaluation of the effectiveness of a digital solution or prototype  DE4 Explanation, with supporting evidence, of own role in and contribution to projects  Research and Ethics  The specific features are as follows:  RE1 Research into and discussion of the ethical considerations in digital technologies. |

| - | Computational Thinking | Development and Evaluation | Research and Ethics |
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| A | Astute and creative application of computational thinking concepts and techniques to clearly identify and deconstruct problems of interest.  Insightful use of abstraction to identify core concepts and ideas.  In-depth analysis of relationships in data sets to draw insightful conclusions and make well-justified predictions.  Highly purposeful application of skills and processes to develop highly efficient and logical solutions to complex problems of interest. | Clear and consistent use of initiative in the design and creation of digital solution or prototype that includes innovative features.  Highly purposeful and strategic application of iterative development, testing, modification, and documentation of an innovative digital solution or prototype.  Insightful evaluation of the effectiveness of a digital solution or prototype.  Insightful explanation, supported by clear and highly convincing evidence of own role in and contribution to projects. | In-depth research and discussion of the ethical considerations in digital technologies. |
| B | Well-considered application of computational thinking concepts and techniques to identify and deconstruct problems of interest.  Some insights in the use of abstraction to identify core concepts and ideas.  Some depth in analysis of relationships in data sets to draw informed conclusions and make justified predictions.  Purposeful application of skills and processes to develop efficient and mostly logical solutions to some complex problems of interest. | Mostly consistent use of initiative in the design and creation of digital solution or prototype that includes one or more innovative features.  Mostly purposeful application of iterative development, testing, modification, and documentation of a digital solution or prototype, with some innovation.  Well-considered evaluation of the effectiveness of a digital solution or prototype.  Some depth in explanation, supported by clear and mostly convincing evidence of own role in and contribution to projects. | Some depth in research and discussion of the ethical considerations in digital technologies. |
| C | Application of computational thinking concepts and techniques to identify and deconstruct problems of interest.  Some use of abstraction to identify core concepts and ideas.  Description, with some analysis, of relationships in data sets to draw generally informed conclusions and make predictions, with some justification.  Application of skills and processes to develop generally efficient and logical solutions to problems of interest. | Some use of initiative in the design and creation of digital solution or prototype, which may include one or more innovative features.  Competent application of iterative development, testing, modification, and documentation of a digital solution or prototype, with one or more innovative features.  Description of the effectiveness of a digital solution or prototype, with evaluation of some features.  Explanation, supported by generally clear evidence, of own role in and contribution to projects. | Considered research and discussion of the ethical considerations in digital technologies. |
| D | Partial application of basic computational thinking concepts and techniques to identify and describe problems of interest.  Identification and description of some basic core concepts and/or ideas.  Identification and use of one or more simple relationships in data sets to draw a partial conclusion and/or make a prediction based on limited evidence.  Partial application of skills and processes to develop solutions to simple problems of interest. | Partial design and creation of digital solution or prototype.  Basic application of some iterative development, testing, modification, and/or documentation of a digital solution or prototype.  Partial description of the effectiveness of a digital solution or prototype.  Basic explanation of own role in and/or contribution to projects, with limited supporting evidence. | Basic research and discussion of one or more ethical considerations in digital technologies. |
| E | Attempted application of a limited number of basic computational thinking concepts or techniques to describe a problem of interest.  Attempted identification and description of a core concept or idea.  Attempted use of limited, simple data sets to draw a conclusion or make a prediction.  Attempted application of skills and processes to develop partial solutions to some simple problems of interest. | Attempted design and creation of digital solution or prototype.  Attempted application of simple iterative development, testing, modification, or documentation of a digital solution or prototype.  Limited description of a digital solution or prototype.  Limited description of own participation in projects. | Attempted research and discussion of ethical considerations in digital technologies. |