Stage 2 Digital Technologies

Assessment Type 3: Individual Digital Solution

Purpose

Create an innovative web application to address a problem of interest in your school or local community.

Description of Assessment

Identify and deconstruct a problem or need in your school or local community that interests you and create an innovative web application to address the problem or need. You should produce an individual digital solution or prototype that transforms data into information using a digital system. If you present a model, there should be enough programming present to clearly explain how the solution will produce an output. The problem you choose should be manageable and have sufficient complexity to enable you to achieve at the highest level in creating the digital solution.

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

* an interactive map and listing of native plants found in the local area
* a self-guided walking tour of the school for new students
* a public transport planner for the journey from home to school
* a ticket purchasing system for the school formal
* a tracker for student achievement at a sports carnival.

In creating your digital solution:

1. deconstruct the problem or 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 at the start)
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.

Your digital solution should include:

* a graphical user interface and/or instructions for use
* user-friendly, balanced and consistent interface/menu
* original media elements (e.g. image, audio, animation)
* declaration of variables
* scope of variables (local and global)
* built in functions (e.g. random, round, floor, getDate, concat)
* calculations
* the following constructs:
  + selection (if, then, else, case)
  + iteration – fixed, post-test, pre-test

Your digital solution should do the following:

* extract information from a database, including the use of Single criterion and Multiple criteria, with sorting and displaying in an appropriate web format
* enable input and manipulation of data in a database by adding a new record, updating an existing record, deleting a record
* use Boolean operands
* use data handling methods/events (e.g. eval, passInt, toString, or similar)
* use procedures or modules.

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 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. |