Rewarding Learning

General Certificate of Secondary Education
2020

Digital Technology

Unit 5:

Digital Development Practice

MARK SCHEME

Task Guidance

AVAILABLE MARKS

1 Design a solution using appropriate tools

- Use algorithms to design a fully decomposed solution to a given problem. Specify the data requirements for a proposed solution.
- Include suitable input, output and navigation design to enable a user to successfully use the system.
- Use validation and error trapping proposals in the design to improve the potential robustness of the system.

Design a solution using appropriate tools	Marks
The candidate has successfully designed a high quality programming solution, using appropriate design tools, e.g. flowchart, pseudo code, etc. to produce a fully decomposed solution. A comprehensive set of data requirements (inputs, processes, outputs, interface and report design) have been developed for the proposed solution. The data requirements show enough detail to enable a fully functioning programme to be developed. Target audience needs have been clearly identified. Full consideration has been given to appropriate help for the user of the system. Validation and error trapping techniques are designed to ensure that the candidate produces a robust program. The use of user feedback to refine the solution based on the issues identified during the design process is evident.	**[10]–[13]**
The candidate has developed a clear set of data requirements for the proposed solution. The candidate has successfully designed a basic solution, using some design tools e.g. data flow diagrams, pseudo code etc. to produce a working solution. A basic set of data requirements (inputs, processes, outputs, interface and report design) have been developed for the proposed solution. The data requirements show enough detail to enable a basic functioning programme to be developed. Target audience needs have been identified. Some evidence of validation is included in the design to ensure that the candidate produces a robust program. Some evidence of design refinement based on the issues identified during the design process are produced.	**[5]–[9]**
The candidate has designed a limited programming solution. A limited set of data requirements have been developed for the proposed solution. The data requirements show enough detail to enable a partially functioning programme to be developed. Little evidence of validation is included in the design solution. Target audience poorly identified and little or no evidence of design refinement.	**[1]–[4]**
Not worthy of credit.	**[0]**

[13] 13

2 Building a solution

AVAILABLE MARKS

Use the appropriate features of an integrated development environment (IDE) to support the creation of a solution from a structured design:

- Code editor;
- Simple debugging tools;
- Compiler;
- Error diagnostics;
- Runtime environment; and
- Graphical User Interface, where appropriate.

Use the appropriate features of a programming language to build a solution from a structured design:

- Data Types:
  - numeric;
  - character;
  - string;
  - boolean; and
  - date/time.

- Control structures:
  - conditional execution: if;
  - conditional execution with alternative: if else, case; and
  - looping: for, while, repeat.

- Functions:
  - user defined functions;
  - inbuilt functions; and
  - mathematical functions.

- Data structures:
  - arrays; and
  - reading from and writing to text files.

- String handling:
  - using simple string handling functions.

- Basic arithmetic:
  - addition, subtraction, multiplication and division; powers/exponentials; and
  - modulo arithmetic.

- Logical and Relational operators (and complex combinations thereof)
  - equal to/not equal to;
  - <, > , <=, > =; and
  - logical AND, OR and NOT.

Building a solution	Marks
The candidate has produced a high quality solution to the proposed problem. The solution has used appropriate features of the integrated development environment to support the creation of the program. The interface is appropriate for the target audience and matches all data and design requirements. An annotated solution is evident showing the use of appropriate data types, data structures, control structures, string handling, functions, logical and arithmetic operators. Validation and help features are evident throughout solution.	**[21]–[27]**
The candidate has produced a fully working solution to the proposed problem. The solution used some of the features of the integrated development environment to support the creation of the solution. The interface is appropriate for the target audience and matches most of the data and design requirements. An annotated solution is produced, showing the use of data types, data structures, control structures, string handling, functions, logical and arithmetic operators. Basic validation and help features are evident in the solution.	**[14]–[20]**
The candidate has produced a basic working solution to the proposed problem. The solution uses a few of the features of the integrated development environment to support the creation of the solution. The target audience has been considered when designing the interface and matches most of the data and design requirements. Some evidence of a working solution was produced, showing some of the following: data types, data structures, control structures, string handling, logical and arithmetic operators and functions. Little evidence of validation and/or help features in the solution.	**[7]–[13]**
The candidate has produced a partially working solution to the proposed problem. Some evidence of the integrated development environment was used in the creation of the solution. Some evidence of a solution is produced, showing the use of the features required to develop a solution.	**[1]–[6]**
Not worthy of credit.	**[0]**

[27]

AVAILABLE MARKS

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3 Testing the solution

AVAILABLE MARKS

Create a test plan which:
- is presented in tabular format;
- incorporates black box and white box testing;
- utilises appropriate test data;
- shows expected output;
- identifies runtime and logic errors;
- reflects the general robustness of the system for use in evaluation; and
- measures the extent to which the user requirements have been met.

Test the solution using the test plan created and document the observed outcomes from each test.

Testing the solution	Marks
The candidate has demonstrated an excellent application of the knowledge and skills required to fully test the solution. Detailed evidence of a successfully designed test plan derived from user requirements was produced. The test plan is well structured, in tabular format (showing tests, expected outcome, actual outcome and a range of fixes). Incorporates a range of tests (black and white box testing) and includes valid, invalid and extreme test data. Errors are clearly identified and a working solution developed. Testing reflects the general robustness of the system.	**[8]–[10]**
The candidate has demonstrated a good application of the knowledge and skills required to test the solution. Evidence of a successfully designed test plan derived from user requirements is produced. The test plan is structured in tabular format (showing tests, expected outcome, actual outcome and some fixes) and incorporates a range of tests (black and white box testing). Test data includes valid, invalid and extreme data. Errors are identified and solution is offered.	**[4]–[7]**
The candidate has successfully designed a partial test plan. The test plan has some tabular format structure. Testing data includes valid and invalid data.	**[1]–[3]**
Not worthy of credit.	**[0]**

[10] 10

4 Evaluate the solution

AVAILABLE MARKS

Evaluate the solution in terms of:
- user requirements;
- performance during testing;
- refinements required following testing; and
- robustness of the system.

All documentation should be saved as one PDF.

Evaluating the solution	Marks
The candidate has produced a well-structured evaluation of the solution with clear reflection on the extent to which the user requirements have been met. The test data is fully analysed. Refinements are clearly identified. The performance and robustness of the system is analysed fully.	**[8]–[10]**
The candidate has produced a good evaluation of the solution with some reflection on the extent to which the user requirements have been met. Performance of the test data is analysed. Some evidence that refinements are identified. The performance and robustness issues are included in the evaluation.	**[4]–[7]**
The candidate has produced an evaluation of the solution with limited reflection on the extent to which user requirements have been met. Limited/ no performance or robustness issues have been included. No refinements are identified.	**[1]–[3]**
Not worthy of credit.	**[0]**

[10] 10

Total **60**