

GCE



Chief Examiner's and
Principal Moderator's Report
Digital Technology

Summer Series 2018



Foreword

This booklet outlines the performance of candidates in all aspects of CCEA's General Certificate of Education (GCE) in Digital Technology for this series.

CCEA hopes that the Chief Examiner's and/or Principal Moderator's report(s) will be viewed as a helpful and constructive medium to further support teachers and the learning process.

This booklet forms part of the suite of support materials for the specification. Further materials are available from the specification's microsite on our website at www.ccea.org.uk.

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GCE Digital Technology

Chief Examiner's Report

Introduction

It is important to stress again that the GCE Digital Technology Specification is more demanding than the specification it replaces, the GCE in Information and Communication Technology. This is reflected in the major shift in assessment objectives, with a reduced weighting of Assessment Objective 1 and an increased weighting of Assessment Objective 2. Furthermore, a new assessment objective has been introduced - Assessment Objective 3 - which brings additional demands to the assessments. The GCE Digital Technology specification is more demanding in another important respect - the content has been comprehensively revised and includes learning outcomes and content of a more technical nature.

While there was evidence that more centres had properly prepared their candidates for the new specification, and had taken on board the feedback in the previous Chief Examiner Report and in the Exemplification of Standards materials, in particular with regard to the assessment of Assessment Objective 3, the majority of candidates still responded in the examination papers as if the GCE ICT Specification was still in place. The result was that the overall level of response again fell short of the required standard.

The performance of candidates on individual questions on the three examination papers is described below but, as was stated in the last Chief Examiner Report, centres are urged to read previous Chief Examiner Reports for GCE ICT which highlighted two ongoing issues which are even more relevant for GCE Digital Technology. Firstly, candidates must address the exact question being asked. Secondly, candidates must make appropriate use of Digital Technology terminology in their responses.

Assessment Unit AS 1 Approaches to Systems Development

Q1 The majority of candidates obtained at least three out of the available six marks in Part (a), with the role of the programmer being better understood than that of the systems analyst. Some candidates confused the systems analyst with the project manager, while others wasted valuable time describing the different methods of fact-finding in great detail. A significant number of candidates could not distinguish between 'user requirements' and 'system specification' and inappropriate phrases such as 'user needs', 'user specification' and 'system requirements' were common. The majority of candidates identified that the programmer 'wrote' or 'created' something, but frequently careless phrases such as 'the software' or 'the system' were used instead of the required 'the code'. A worrying number of candidates referred to 'fake data', 'false data' or 'made up data' with reference to testing - this is completely inappropriate at this level. The overall level of response to Part (b) was weak. Many candidates confused the two types of requirement or identified the incorrect example from the table. The overall understanding of the process of DFD refinement was very weak in Part (c), as was the standard of the DFDs produced. Almost 75% of the candidates were awarded no marks, while only a single candidate achieved maximum marks. This is one part of the specification which lends itself to practical activities, and this weakness must be addressed.

The mean mark for Part (d) was approximately one - candidates were still not adequately prepared for Assessment Objective 3 assessment. Many candidates ignored the context of the question and produced rote answers from a previous mark scheme referring to a different scenario.

- Q2** Part (a) was intended to be a straightforward question testing candidates' understanding of a common design tool. It proved to be more challenging than intended, but it did differentiate between the candidates. The overall level of response to Part (b) was very weak. Most candidates ignored the wording of the question which referred to the use of a prototype specifically in the design the data model. Many detailed, often rambling, descriptions of generic prototyping were given, to no avail. Most candidates were unfamiliar with the term 'test case' in Part (c). However, a very small number of candidates were appropriately familiar with the term and obtained maximum marks. Part (d) provided the intended differentiation across the candidature. A common weakness was an inability to state the purpose of the test data using appropriate language as illustrated in the example candidates were given. The mean mark for Part (d) was just over one - this again demonstrated that candidates were still not adequately prepared for Assessment Objective 3 assessment. Candidates were required to compare the purpose of the two types of testing, most candidates ignored this and simply provided descriptions of how each type of testing was implemented.
- Q3** The overall level of response to Part (a) was very high, although user documentation was better understood than technical documentation, and some candidates confused the two types. Most candidates struggled to get more than half marks in Part (b) as they found it difficult to provide clear advantages and disadvantages of the pilot changeover method. A common mistake was that the method involved software being given to a group of users. While most candidates could explain the need for data conversion and some excellent responses were noted, it was apparent that a significant number of candidates were not familiar in any way with data conversion. The overall level of response to Part (d) was poor. Many candidates simply described both types of maintenance, sometimes incorrectly and without detail, and ignored the claim made in the stem of the question.
- Q4** The overall level of response to Part (a) was very high and many complete responses were noted. The opposite was the case with Part (b) with only a small number of candidates able to identify three items as required. Most candidates struggled to explain the term 'critical path' in Part (c) and this weakness continued in Part (d) which required candidates to be familiar with critical path analysis as well as project management. The majority of candidates explained the need for a disaster recovery plan in Part (e) as required.
- Q5** Most candidates were not familiar with the programming concepts referred to in this question and the overall level of response was very poor. In general, candidates struggled to explain the three terms in Part (a). This was also the case in Part (b) although many candidates gained appropriate marks by identifying where within the algorithm the program structure would be used. A small number of candidates demonstrated familiarity with inheritance in Part (c), but most of these candidates failed to address the issue of improved productivity as was required. It was also apparent that a significant number of candidates were not at all familiar with inheritance.

Assessment Unit AS 2 Fundamentals of Digital Technology

General

It was pleasing to note that the overall performance in this paper has improved this year. Candidates who demonstrated their technical knowledge and focussed on the requirements of the questions are gaining access to the higher marks particularly in the questions that have 'banded' responses.

Question 1 was well answered with the majority of candidates achieving more than 50% of the marks allocated. In Part (a) candidates clearly understood that positive numbers begin with a zero and negative numbers begin with a one. Too often candidates lacked technical terms such as a reference to 'Most Significant Bit (MSB)' and 'inverting bits and adding one'. Part (b), (c) and (d) were well answered. In Part (e) most candidates referred to a parity bit as the eighth bit but could not suggest an appropriate use such as error checking. Part (f) was well answered with the majority of candidates scoring two marks. In Part (g) candidates knew that Unicode characters consisted of 16 bits and therefore a greater range of characters could be represented.

In Question 2 Parts (a) and (b) were well answered with the majority of candidates scoring at least four marks. Whilst candidates were able to explain data and information, the answers for knowledge lacked appropriate detail such as "...applying of rules...." without any reference to making decisions. In Part (c), the majority of Candidates did make reference to the question stem in their answers but instead explained the general concept of double entry. The answer in this case required candidates to refer to "..keying data in twice.." and not just entering data twice. In Part (d), (e) and (f) Candidates were able to demonstrate their knowledge of how a weighted check digit is calculated. In Part (g) answers were often poor with little or no reference to detecting errors at the data entry stage or the understanding of transposition errors.

Question 3 (a) a poorly answered. Candidates need to be able to clearly define components of a computer system. Some candidates were able to refer to main memory as being RAM but were not able to state that it is immediate access memory. Many candidates confused the memory address register with the address bus in the second component. Although candidates knew that a port is used to connect a peripheral device they were unable to explain why this was necessary such as for the purpose of transferring data between a peripheral device and the processor. Parts (b) and (c) were well answered but there was a lack of technical detail in Part (d). Most candidates were able to refer to a laser when describing how data is written to a DVD but lacked understanding of 'pits' and 'lands'. Part (e) was well answered.

In Question 4 (a) the majority of candidates were able to state that an operating system manages resources but failed to elaborate in detail. Candidates were expected to refer to actual resources such as memory management, managing peripherals and managing the user interface. In Part (b) many candidates confused multiprocessing with multitasking. Candidates need to be discouraged from rewording the question such as multitasking is an operating system that manages "...many tasks at a time". More able candidates demonstrated a detailed knowledge of both operating systems. It was pleasing to note that the majority of candidates demonstrated a good knowledge of archive software. Part (d) was well answered but in some cases the examples provided for special purpose software were vague, such as utility software. Part (e) was intended to be an evaluation question and the majority of candidates found this question difficult to answer. There was evidence of a brief description of open source software lacking detail. Proprietary software was not well known.

In Question 5(a) candidates too often produced vague definitions, with some only expanding the acronyms, which did not explain the web technology term. At this level candidates will not be awarded credit for expanding the term. In Part (b) the majority of Candidates understood that the ITU is responsible for communication standards and it is a United Nations agency. Answers in Part (c) were disappointing with candidates showing a lack of understanding of the syntax used in HTML tags. Part (d) was an evaluation question that required candidates to describe the benefits of using CSS in designing websites. The majority of candidates only described the features of CSS leading to a lower band response.

Assessment Unit A2 1 Information Systems

Q1 Most candidates were familiar with a WAN in Part (b) but they were less familiar with a MAN. The overall level of response in Part (b) was disappointing with candidates displaying a general inability to use appropriate Digital Technology terminology. The question referred to the use of the devices in a network but many vague responses were noted, particularly for the switched hub and the repeater. Part (c) was intended to be a discriminating question and it proved to be even more discriminating than intended. From their responses it was clear that some candidates were not familiar with IP and MAC addresses nor the key differences between them. On the other hand, there were many complete or nearly complete responses which did distinguish between the use of each on a network and which used the appropriate Digital Technology terminology. The overall level of response to Part (d), which also assessed quality of written communication, was good. However, some significant weaknesses were apparent in the majority of responses. This type of question, with its banded response mark scheme, requires a concise, focused response which addresses the specific requirements of the question. The question concerned the impact of cable failure on each of the two network topologies. Some candidates described how additional nodes could be added to each topology. Others offered the general advantages and disadvantages of each topology. To achieve the highest band candidates were required to describe each topology clearly and concisely, and to discuss the impact of a cable failure on each using appropriate terminology with a high standard of presentation, spelling, punctuation and grammar. These are demanding criteria but there was some evidence that centres and candidates had taken on board the feedback given to them about similar types of question last year on the first AS1 and AS2 examination papers for this specification.

Q2 Most candidates were familiar with the general need for communication protocols in Part (a)(i) but only a few could give a reason or a specific example of what would be defined in the protocols. The overall level of response to Part (a)(ii) was high. Candidates had obviously studied the OSI model in appropriate detail and were generally aware of the interaction between the Application and Data Link layers and the other layers. Part (b) was expected to be discriminating but it proved to be more discriminating than intended. Many candidates answered the question as if they had been asked to describe the main features of each of the two technologies. The question was about the use of each to transfer data to a mobile device. Complete responses which included the appropriate Digital Technology terminology were rare. The overall level of response to Part (c) was good. The question also assessed quality of written communication. However, the general weaknesses in this type of response which have been identified previously were apparent in the majority of responses. The question required the evaluation of the two cable types with respect to security. Some candidates described irrelevant features of each type of cable. Others focused on data loss. To achieve the highest band candidates were required to describe the relevant features of each type of cable clearly and concisely, and to discuss the issue

of data security for each using appropriate terminology, with a high standard of presentation, spelling, punctuation and grammar.

- Q3** The overall level of response to Part (a) was very disappointing. Only a small number of candidates could explain each of the two data models. On the other hand, the overall level of response to Part (b) was very good with many candidates providing the required Digital Technology terminology. Similarly, the overall level of response to Part (c) was very good. The only common weakness was a failure to use an appropriate example from the table. As would be expected given candidates' performance in the previous specification in questions requiring data normalisation, the overall level of response to Part (d) was very good, although some candidates failed to provide a name for each entity or to clearly identify the primary key. The overall level of response to Part (e) was very good but candidates need to be reminded that they must use the ER model notation identified in the specification. The overall level of response to Part (f) was disappointing. Most candidates struggled to describe the concept or purpose of ER modelling and normalisation, as opposed to the process which had been assessed in the two previous question parts. The question also assessed quality of written communication. To achieve the highest band, candidates were required to describe both methods clearly and concisely, and to explicitly identify similarities or differences, using appropriate terminology with a high standard of presentation, spelling, punctuation and grammar.
- Q4** In Part (a)(i), most candidates struggled to provide concise and accurate explanations of the two terms. Similarly, in Part (a)(ii). In each of these questions, candidates were expected to produce the explanations or descriptions to be found in the specification's reference materials. The overall level of response to Part (a)(iii) was very disappointing. Most candidates simply described the use of the attribute in the re-ordering process and not the use of the default value as was required. Parts (b)(i) and (ii) split the candidature into two roughly equal parts – those who were properly familiar with SQL, and those who were not. The overall level of response to Part (b)(iii) was disappointing. Most candidates could not provide an accurate description of QBE or SQL. The question also assessed quality of written communication. To achieve the highest band candidates were required to describe both QBE and SQL clearly and concisely, and to evaluate their use in the company, using appropriate terminology with a high standard of presentation, spelling, punctuation and grammar.
- Q5** In Part (a), candidates could describe the Turing test to a much higher standard than Artificial Intelligence. The overall level of response to Part (b) was good. This was particularly positive as it concerned a new topic and many candidates provided the required Digital Technology terminology. The same was true of Part (c) which concerned fuzzy logic. The overall level of response to Part (d) was mixed. Candidates were more familiar with the knowledge engineer than the expert systems shell. This is not a new topic. Hence, it was disappointing that many candidates could not describe the role of the life insurance consultants. To many candidates these were the users who also tested the system. The overall level of response to Part (e) was disappointing due to the fact the majority of candidates confused the word 'robotics' with 'robots' and many general descriptions of the use of robots in car assembly ensued. The question also assessed quality of written communication. To achieve the highest band candidates were required to describe the meaning of 'robotics' clearly and concisely, and to evaluate the effectiveness of the use of robotics in a car assembly line in a specific circumstance - the production of a new version of a car - using appropriate terminology with a high standard of presentation, spelling, punctuation and grammar.

Q6 Part (a) highlighted the key difference between this new specification and the previous ICT specification it replaced. Here candidates were required to know the three offences as stated in the CMA, and to correctly state the penalties. The paraphrasing which would have been acceptable in the ICT specification for a question with this wording is not acceptable in this more rigorous specification. Consequently, the overall level of response was disappointing. The overall level of response to Part (b) was also disappointing due to many candidates failing to provide accurate explanations. A common weakness was a failure to refer to 'personal data' in the context of the DPA. Many candidates failed to provide the appropriate context for the Information Commissioner and the Data controller. Not surprisingly as they referred to new content in the specification, the overall level of response to Parts (c) and (d) was poor, although data mining was better understood than the ethical consideration in automated decision making or online censorship. The overall level of response to Part (e) was disappointing. The majority of candidates failed to focus on the data security issues of cloud computing and general descriptions of cloud computing, many lacking any Digital Technology terminology, ensued. The question also assessed quality of written communication. To achieve the highest band, candidates were required to describe the cloud computing clearly and concisely and why it is used for data storage, and to evaluate its use with respect to data security using appropriate terminology with a high standard of presentation, spelling, punctuation and grammar.

Principal Moderator's Report

Assessment Unit A2 2 Application Development

Overview

This was the first year where candidates carried out a problem solving task based on a pre-release case study. It has worked well with the majority of Centres applying the assessment criteria in an accurate and consistent manner, within the agreed standards set by the moderation team. Although some centres are within the agreed standards there is evidence of slightly lenient marking in some sections which has been noted on individual TAC6 centre reports. Centres need to address any of the concerns raised by the moderation team on the TAC6 in preparing the 2019 cohort. The moderation team has also made individual centre based comments on TAC6 reports with a view to guiding centres for 2019.

Centres should be encouraged to follow the guidance given in the specification which clearly states that this task is a 60-hour assignment and carries a 20% weighting of the A level award. By doing this centres should be able to divide the time spent on both A2 modules in a more proportionate manner. Centres should also encourage different approaches to creating a solution as there is scope for more than one solution. The scope of the analysis should be guided by the ability of the candidate.

Most Centres were able to follow the procedures for administering and submitting coursework samples as requested by the moderation team. Candidate solutions should be clearly labelled in electronic folders referenced by candidate number and each folder should contain two files – one file should be the documentation whilst the other file should be the solution.

Centres that are not marking to the agreed standards should attend forthcoming Agreement Trials and submit sample work to the Portfolio Clinic in March 2019. This can greatly assist centres in ensuring that the moderation process runs smoothly in the summer series.

Teachers should also be encouraged to add comments in the textboxes provided justifying the mark awarded to each assessment criteria. This acts as an important means of communication between the centre and the Moderator, justifying why a certain mark was awarded. Assessment descriptors taken directly from the specification and 'pasted' onto Electronic Candidate record sheets should be discouraged.

Analysis

Candidates who investigated similar applications to City Catalogue were able to produce a more detailed list of user requirements, giving consideration to inputs required and outputs expected. Candidates who carried out a limited investigation into the case study found it more difficult producing a full and detailed set of user requirements which impacted greatly on the design stage of their solution. It is important for candidates to clearly articulate their user requirements as this will assist in the planning for the design stage. There is no requirement for candidates to include evidence of fact finding in the Analysis. Candidates need to use a Gantt chart to illustrate how the solution will be managed over the 60-hour time limit and this will then help to prioritise the user requirements into the essential and non-essential categories. The inclusion and appropriate use of data flow diagrams (DFD) at Level 0 and Level 1 is clearly demonstrated by the better candidates. The main purpose of the DFD's in the case study is to assist candidates in modelling user requirements.

Design

It was pleasing to note that many candidates began this section by including detailed storyboard designs and/or other structured diagram techniques. The majority of candidates incorporated a relational database approach to their solution. It was pleasing to see candidates demonstrating their knowledge and understanding of database modelling, including relevant ER models and database normalisation to 3NF, clearly documenting each stage of normalisation in their solution. The majority of candidates were able to include a number of appropriate data tables including good use of data validation techniques, design of data capture forms, reports and user interface. Candidates need to show more evidence of appropriate query design including the use of criteria, inbuilt functions and formula design. To achieve marks in the highest band candidates, need to include well-structured algorithms to illustrate some of the processes that will be designed. Candidates also need to ensure that the query design is linked to the outputs expected as documented in the analysis phase. Candidates should be encouraged to include a detailed test plan linked to user requirements. If the user requirements are vague the testing plan tends to lack structure.

Application Development

The majority of candidates were able to produce an effective database solution using MS Access, with a focus on implementing the user requirements identified in the Analysis stage. Some Candidates used coding to assist in the solution which is to be encouraged. Candidates should be discouraged from creating queries and reports at this stage that were not identified at the requirements stage. The majority of centres were able to produce results of tests planned and annotated these accordingly. In the Implementation Strategy candidates should be encouraged to reference a range of changeover methods, user training required and the conversion of legacy data to the new system in their documentation.

Documentation and Evaluation

The standard of electronic user documentation was excellent across many centres. Candidates included well presented user guides with appropriate detail including a troubleshooting/FAQ's section. In the evaluation section, it was pleasing to see detailed descriptions of what the solution achieved with cross referencing to user requirements.

Candidates should be encouraged to discuss not only the benefits of their solution but also the limitations and be aware of possible extensions. The better candidates were able to refer to the non-essential requirements as identified in the Analysis section and how these could be phased in over time.

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