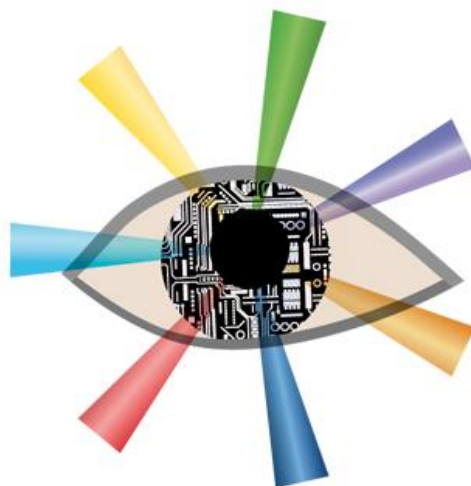Examiners' Report/
Lead Examiner Feedback
Summer 2017

BTEC Level 3 Nationals in IT
Unit 2: Creating Systems to Manage
Information (31761H)

Information Technology

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Unit 2: Creating Systems to Manage Information (31761H)

Grade	Unclassified	Near Pass	Pass	Merit	Distinction
Boundary Mark	0	8	17	27	38

Introduction

Please note there is an example solution and two marked live scripts available for use with this examiner's report. It is advised that teachers use this report alongside these resources in order for candidates to gain the full benefit of the outcomes of this first live examination and to help prepare them for their own assessment. The resources are available here and will be referred to throughout this report.

Also note that templates for some of the tasks are available from ….. These templates are designed to help candidates include the evidence required. It is advised that centres provide them for candidates to use in the examination. It is worthwhile ensuring the most recent ones are being used by downloading copies just before the start of the examination window as they may be refined or new ones added.

This unit is a mandatory synoptic unit, which requires candidates to complete set tasks to design, create, test and evaluate a relational database system that manages information. This was the first live examination for this unit and it was based around the scenario of concerts for bands and the income made from them.

Though many candidates coped well with the content, requirements and degree of difficulty, it would appear that a number were not ready for assessment either being not fully prepared or without the necessary skills to access the tasks, or prepare the evidence.

In terms of administration it was pleasing to see that most candidates submitted only the evidence requested and ensured they followed the naming conventions specified in the paper. However, at times, candidates submitted their database or multiple image files as evidence, this type of evidence cannot be marked. It would also appear that many had concentrated on designing and creating their database artefact at the expense of preparing and submitting the necessary accompanying paperwork. Most centres printed the required documents and sent them with discs or USB with candidate work. However, if possible, USBs are preferable as not all computers have disc drives which could prove difficult for some examiners. At times centres had attempted to assess the work, with some submitting marks on the storage device. This is not necessary.

It is important to define what is deemed acceptable with regards to help and assistance before, during and after the examination sessions. The teacher should prepare the candidates for the examination by developing the technical skills necessary to create a database at this level and to produce the required paperwork. At no point should the teacher be examining the data files. These, along with the paper itself, should be treated as confidential examination material. Both should be viewed and used only by the candidates and only during the controlled assessment sessions.

Teachers may revise topics between the controlled assessment sessions but they should not be focused on the live assessment, for example, they can revise the generation of primary keys as long as the live data files are not used as an example. At times it would appear that solutions were centre led as opposed to being the candidates' individual work. This is not appropriate. The work should clearly be the candidates' own.

Please note that the data file in any examination contains data that the candidates must accept as it is presented. It is up to the candidates to decide how to cope with any anomalies that may be present. This is true of any 'live' situation in the real world where they would have to make their own decisions about how to proceed. Candidates are not required to create any new fields, they should use all and only the data they have been given.
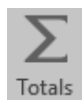
In this particular data file there were anomalies, one of the **_easiest_** and **_quickest_** way to deal with them was to import the exam file into the database, build the tables enforcing referential integrity etc and then use append queries with the **_totals_** selected to append the relevant records into them. This would result in a message saying keys were being violated at which point the candidates could choose to proceed anyway resulting in the anomalies not being appended. Any method of coping with the given anomalies was acceptable.

Task 1 – Entity Relationship Diagram

This task is designed to test the candidates' knowledge and skills in terms of database modelling. They are expected to determine an initial data model from the scenario, normalise the given data set to test the initial data model and produce a final entity relationship diagram detailing all entities, their attributes including primary and foreign keys, relationships and relationship types. ***Evidence of the nomalisation process is not required.***

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Page 3
Script B	Page 3
Example Solution	Page 5

The evidence expected here is **only** the final entity relationship diagram including:

- a box for each entity containing
  - the entity name
  - all of its attributes
  - clear identification of primary and foreign key(s). A legend is a good way to let the examiner know what notation the candidate is using
- a line between entities to show the relevant relationships
- 'crows feet' used to indicate the many end of a relationship.

It was good to see that all candidates attempted this question with many scoring well submitting fully evidenced entity relationship diagrams. However, the main reasons for candidates not gaining marks tended to be because:

- The ERD was a screenprint taken from the database. This is not acceptable. Activity 1 is in preparation of the database.
- Attributes were missing
- Attributes were not in the correct entity.
- Attributes were present in multiple tables
- Primary and/or foreign keys were not clear
- The relationship types were missing
- The relationship types were the wrong way around

Task 2 – Data Dictionary

This task is designed to test the candidates' ability to design database tables based on the entity relationship diagram they produced in task 1.

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 4-9
Script B	Pages 4-8
Example Solution	Pages 6-8

The evidence expected here is a completed data dictionary, using the template provided, for each table the candidate is planning to use in the database. The dictionaries should include:

- clear table names using the standard naming convention of **tbl** followed by the **table name**.
- a consistent approach to the naming of fields eg no spaces, spaces, camel case etc
- data types for each field. Particular care should be applied to Date/Time and Number fields. It is expected the examiners will be able to discern the format of the date: short/medium/long. Monetary amounts should be currency with the number of decimal places specified. Integer Numbers do not need decimal places specified. The data types for foreign keys should match their primary key eg Autonumber -> number, short text->short text, number->number.
- validation including
  - length checks (field sizes), these should be appropriate and only applied to text fields..
  - format checks (input masks or validation rules), these should be appropriate. For example in this paper the email address and telephone number fields.
  - presence checks – primary key fields are required by default so should not be specified
  - range checks – In this paper there were three that could have been applied. Only those 16 or over could attend concerts and the income and price should have been positive currency values
  - value lookups. In this paper there were two that could have been applied, the gender and income type
  - table Lookups. These should be used on foreign keys with the limit to list set to yes

- clear indication of the primary and foreign keys.

There was some excellent evidence seen throughout this window. However, the main reasons for candidates not gaining marks tended to be because:

- standard naming conventions were not used
- field names were inconsistent, spaces, no spaces etc
- data types were incorrect, decimal places were not specified, date formats not specified, lookup wizard specified as a data type etc
- field sizes were not sensible.
- validation was vague eg
    - 'presence check' as opposed to *is not null*
    - Table lookup as opposed to *table lookup to tblBand limit to list = yes*
- validation was not sensible eg value lookups used on foreign keys, presence checks on primary keys
- input masks/format checks were incorrect
- primary and/or foreign keys had not been specified or were incorrect.

Task 3 – Design Specification

This task is designed to test the candidates' ability to design the forms, queries and report required in order to meet the specification requirements. **_Please note that candidates do not need to show the design of any append queries that they will be using to append the records to the table(s) if they are choosing to use that method. The design required is of the forms, queries and reports specified in the paper._**

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 10-8
Script B	Pages 9-14
Example Solution	Pages 9-14

The evidence expected here is a completed design specification using the exam board template, for each form, query and report the candidate is planning to use in the database. It is not expected that candidates draw the forms and report. It should be clear to see the name of each object and its purpose. It is worth bearing in mind that a database programmer should be able to take this design specification and build the database.

Form design should include:

- information about data input aids eg asterisks
- instructions on how to use the form and what they would be
- bound fields– fields that are coming directly from a table
- unbound fields– fields that are not coming directly from a table
- disabled fields, for example, primary keys that can be generated, fields that the user should not be able to change, calculated fields etc
- any formula required
- actions. These should be specific enough for a programmer to know what should happen. For example, "when the save button is clicked code will run to make sure all the fields with asterisks have something in them and that the age is valid (16 or over). If they are fine, then the CustomerID will be generated by using the first three letters of the last name and the first two letters of the firstname. The record will then be saved into the customer table and a save message displayed". Automated routines are part of the specification and we are expecting them to be present on the menu and forms. This is only one example. The programmer should have a clear idea of whether code will be used, append queries and code/macros etc.

Query design should include:

- existing fields and the tables that they come from
- fields that need to be generated should be specified and the formula that they will use. This needs to be specific eg AverageAge=Avg([Customer Age]).
- Specific eg Band name = [Enter the band name], Total Income = ((sum income)*0.25)+(sum price)*0.25)).
- Indication that a query will be used as the basis of a report if applicable.

Report design should include:

- The query it is based on (if applicable)
- Details of any grouping, title, calculations over and above what has been specified in the query design

There was some very good evidence seen for this task overall. At times though, candidates included design of their tables again, which is not required. The main reasons for candidates not gaining marks tended to be because:

- Objects were missing eg no menu
- Unbound fields were not specified or were incorrect
- Data input aids were missing or were a repeat of table validation. Candidates do not have to specify table validation again here. These aids are over and above that
- Disabled fields were not given. Any generated fields identified should be disabled
- Generated fields and formula were missing or incorrect
- Automated routines were vague or missing eg save on the input forms, opening forms, queries etc from main menu, generation of primary keys.

Task 4 – Test Plan

This task is designed to test the candidates' ability to plan tests to ensure the database is robust and meets requirements. ***Please note we do not expect to see any form of table testing at all. Candidates are expected to test the functionality of their database against the scenario – menu, forms, queries and reports.***

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 19-21
Script B	Pages 15-19
Example Solution	Pages 15-16 (combines Task 4 and Task 5 Testing)

The evidence expected here is a completed, detailed test plan. This means the ***first six columns*** of the test plan only.

In terms of the plan for menu testing only normal testing is expected. There should be:

- a test planned for each button
- test data - a click
- specific expected results eg the exact name of the form to be opened, whether it will move to a new record, generate a key etc, the exact name of the query or report to open.

In terms of input form testing, plans for the testing of the transaction and customer form should have been detailed covering normal, erroneous and extreme tests:

- presence checks – specific data that will be used, exactly what will be missing, exactly what should happen
- format checks – specific data that will be used exactly what should happen
- range checks – below range, exactly on boundary . The data should be specific as should exactly what should happen
- value lookups – trying to add a value not in the list. The data should be specific as should exactly what should happen
- table lookups – trying to add an ID that does not exist in the table. The data should be specific as should exactly what should happen
- generated fields/calculations – exactly what data will be used and what the generated or calculate value will be
- full valid record with specific data and what should happen

In terms of the plan for query and report testing there should be:

- a test planned for each query. Normal testing of queries and reports only is expected
- specific data.

The evidence for this activity was mixed. Candidates tended to complete a very detailed or very vague test plan. The main reasons for candidates not gaining marks tended to be because:

- the tests given were too few to confirm a working solution
- it was not clear whether erroneous and/or extreme testing was taking place
- test data was not suitable
- expected results were not accurate based on the test data given

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Task 5 – Testing

This test is designed to test the candidates' ability to document the results of their tests and how they responded to errors.

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 22 -26
Script B	Pages 20-28
Example Solution	Pages 15-16 (combines Task 4 and Task 5 Testing)

The evidence expected here is the test plan fully completed ie ***the remaining two columns*** completed, screenshot evidence of the result and the evidence found in the evaluation documenting changes made during the development and testing process.

In many instances the credit awarded for the section of the evaluation documenting changes made helped move candidates from one mark band to another. Teachers should encourage candidates to build this section of the evaluation as they go so that there is a full account of the problems encountered, why they were encountered and how they were overcome. It is beneficial in terms of this task and also Task 6, the evaluation. However, the main reasons for candidates not gaining marks tended to be because:

1. there was no screenshot evidence of the results
2. there was no evidence of an iterative process

3. there were few, if any comments, in terms of the errors

Task 5 – Database

This test is designed to test the candidates' ability to build a relational database that meets the scenario requirements. ***Please note it is not expected that candidates will spend time annotating screen prints unless they want to explain a particular aspect. If the evidence clear and presented as discussed here then examiners will not require annotations.***

There was no template for this task in this examination series. Please note there will be one for the next examination.

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 27-37
Script B	Pages 29-44
Example Solution	Pages 17-30

The example solution shows the evidence in the way it should be ordered and presented. This is:

1. screenprint of relationships
2. screenprints of each table showing field names and data types
3. import evidence – screenprints of each table showing the first five records and the full record count
4. screenprint of object names (screenprint of the object panel is ideal for this)
5. screenrpints of validation including:
   - presence checks. It is fine for candidates to show full evidence of one presence check and then say which fields and in which table also have presence checks.
   - length checks. It is fine for candidates to show one or two field sizes and then say they have applied sensible field sizes on all short text fields.
   - format checks. Rather than trying to incorporate format check after format check, candidates should be encouraged to apply only to those that are sensible. In this scenario that was the email address and telephone number. Evidence is expected of all formats applied
   - value lookups. Again, candidates should be encouraged to only include sensible value lookups. In this scenario that was gender and income type. Evidence is expected of all lookups applied and these should be in design view as opposed to datasheet view
   - table lookups. Candidates should be encouraged to include table

lookups on all foreign keys. Evidence is expected of all table lookups applied including limit to list set to yes,

- o range checks. Candidates should be encouraged to only include sensible ranges, In this scenario the ranges were open ended ie age >=16 and income and price positive currency values. Evidence is expected of all range checks

6. screenprint of each form in form and design view ensuring all calculations/formulae, generation of keys etc shown. If candidates want credit for something they have done it has to be evidenced. The save process for each form also needs to be included eg code, append and/or select queries, macros etc

7. screenprints of queries in **_design view only_** clearly showing name and full details – no truncation. Please advise candidates not to duplicate evidence – datasheet view of the queries is expected in testing not here.

8. screenprint of report in design view. Needs to clearly show calculations etc. A pdf version of the report itself is also required

9. screenprints of menu in form and design view along with all code/macros etc

As previously mentioned a template will be available for use in the next examination window. Candidates should use this to document their evidence as described. It will help ensure all of the required evidence is present and examiners can find it and award marks with ease.

It was really nice to see the number of candidates who achieved mark band 4 for this task with some excellent solutions and evidence put forward including very good accounts of the methods used to generate keys and save the records into the relevant tables. However, the main reasons for candidates not gaining marks tended to be because:

General	Screenprints were not clear eg truncated queries, object names cropped off, fields not wide enough to show formulae etc
Trait 1	Relationships were not fully enforced, data types were not correct, field sizes were inappropriate, primary and/or foreign keys were not specified or were incorrect or the validation text for error messages was missing or inappropriate.
Trait 2	Object names could not be seen or they were inappropriate
Trait 3	The interface was unclear, particularly in terms of the save process, generated fields and calculations.
Trait 4	Validation was missing, inappropriate or not evidenced.
Trait 5	It could not be determined that the database was functional due to omissions/errors in the other traits

Task 6 – Evaluation

This task is designed to test the candidates' ability to evaluate their database in terms of the changes made during the development and testing process, the relational database structure selected and the quality, performance and usability of the database. Traits 1, 3 and 4 can be determined from this. ***It is worthwhile noting that the evaluation included in the SAM material is not a fully completed evaluation, indeed it evaluates only a very small aspect of the solution and should not be relied upon as a template on which to base evaluations. The same applies to the evaluation given in the example solution. The evaluations must be relevant to the live assessment and to the candidates' own solution.***

Teachers are advised to download Script A, Script B and the example solution. In terms of this task these pages are of relevance:

Script A	Pages 38-39
Script B	Pages 45-46
Example Solution	Pages 31-33

There was a wide range of evidence presented for this task with some being very evaluative and relevant. At times though, it would appear the responses were centre led or based heavily upon the SAMs example. Where this was the case the candidates tended to use inappropriate technical language, fail to relate comments to the scenario or discuss changes they had not actually made. They tended not be evaluative but a running commentary of what they had done throughout (even if they had not done this).

As previously mentioned it can be a good idea for students to add to the evaluation as they go particularly in terms of the changes made during the development and testing process. This will help to ensure all changes made are documented and that the evaluations are totally relevant to the candidates' own solution. It will also strengthen the evidence for Task 5 Testing. It became clear that Task 5 became more of a summative test at which point all problems have been resolved and there was very little, if anything, for candidates to discuss. This would lead to candidates not being rewarded for changes made as they will not have discussed/documented them. It is perfectly acceptable for examiners to look for evidence of the iterative process and comments in the evaluation itself.