SQA Advanced Unit Specification

General information for centres

Unit title: Database Design Fundamentals

Unit code: HP2G 47

Unit purpose: This Unit is designed to provide the candidate with the skills required to create, maintain and interrogate a relational database management system using commercially available database software. The resultant skills will help prepare the candidate to enter commercially operated database environments and to administer the system to the requirements of the industry. The Unit is primarily aimed as an introduction to relational database management systems and will incorporate the skills to design a suitable structure to maintain and update real world systems. The Unit is written in generic terms enabling it to be completed using a commercially available relational database management system software and may be delivered as part of an SQA Advanced Qualification.

On completion of the Unit the candidate should be able to:

1 Create a normalised relational database structure.
2 Write SQL select statements to maintain and update a database structure.
3 To interrogate the database and manipulate the data.

Credit points and level: 1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the Centre as no prior knowledge is required although experience of using a computer system would be desirable.

Core Skills: There are opportunities to develop the Core Skills of Problem Solving at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: The Knowledge and Skills elements of this Unit are predominantly practical, therefore, it is recommended that the Outcomes be assessed by means of a project, case study or scenario covering all of the requirements of the three Outcomes. Whether this is delivered as a single assessment or a number of assessments matching the progression of the Outcomes is at the discretion of the centre.

All assessments are open book conducted under supervised conditions. Assessors should assure themselves of the authenticity of each candidate's submission.

Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Create a normalised relational database structure

Knowledge and/or skills

- Develop a rational data model to agreed organisational standard

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- successfully normalise data to the required standard
- construct a data model derived from the 3NF relations
- produce a data dictionary for the entities created

It is **not** acceptable for candidates to use modelling software.

Assessment guidelines

This assessment is open book but must be undertaken in supervised conditions. Assessors should assure themselves of the authenticity of each candidate's submission.

The assessment instrument should be constructed to ensure that normalisation of the data will produce, as a minimum, three tables to be incorporated into the RDBMS. Assessors must ensure that the normalised tables contain a cross section of the most commonly encountered data types.

Outcome 2

Write SQL statements to maintain and update a database structure

Knowledge and/or skills

- Populate tables with records
- Update tables according to user requirements
- Create constraints and primary keys within tables

Evidence Requirements

Assessment for this Outcome will be in the form of practical assignments. Candidates will need evidence to demonstrate their skills and/or knowledge by showing that they can:

Use SQL to:

- populate the tables with records conforming to the data dictionary created in Outcome 1
- search, interrogate and modify the tables according to user requirements

Evidence for this Outcome will consist of the production of printouts listing the table structures and the table contents to meet the user requirements.

It will **not** be acceptable to use an automated generator for this assessment.

Assessment guidelines

This assessment is open book but must be undertaken in supervised conditions. Assessors should assure themselves of the authenticity of each candidate's submission.

Outcome 3

To interrogate the database and manipulate the data

Knowledge and/or skills

- Use SQL to create queries to meet user requirements
- Sorting, updating and deleting data records to meet user requirements
- Incorporate calculations within queries
- Create queries that 'join' more than one table in a select statement
- Produce formatted query responses

Evidence Requirements

Evidence for this Outcome will consist of the production of printouts listing the table structures and the table contents to meet the user requirements.

Assessment guidelines

It will **not** be acceptable to use an automated generator for this assessment.

This assessment is open book but must be undertaken in supervised conditions. Assessors should assure themselves of the authenticity of each candidate's submission.

Administrative Information

Unit code: HP2G 47

Unit title: Database Design Fundamentals

Superclass category: CD

Original date of publication: August 2017

Version: 01

History of Changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

Unit specification: support notes

Unit title: Database Design Fundamentals

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended as an introduction to the basic principles and procedures involved in developing robust, reliable and efficient database structures using a propriety RDBMS. Its aim is to acquire competence in the design and development of such structures. The concepts of good practice should be stressed throughout.

It forms part of an SQA Advanced Diploma in Computing: Software Development and should be delivered within the context of the Group Award. It can also be delivered as a stand-alone Unit by candidates wishing to acquire and develop skills in relational databases.

As this is an introductory Unit in RDBMS in an SQA Advanced Qualification, the context and examples used should be both relatively simple and within the context of the candidate's vocational experience, however, this must be delivered at SCQF level 7. This would permit the candidate to concentrate more on the techniques involved, rather than trying to understand the initial problem.

By the end of the Unit, the candidate should have achieved a good foundation in the skills required for developing reliable and efficient RDBMS structures which solve business problems and meet user requirements.

Guidance on the delivery and assessment of this Unit

This Unit is capable of being taught on its own and therefore there is no requirement for it to be taught in conjunction with any other Unit.

This Unit is intended as an introduction to the basic principles and procedures involved in developing robust, reliable and efficient database structures using a propriety RDBMS. Its aim is to acquire competence in the design and development of such structures. The concepts of good practice should be stressed throughout.

It forms part of an SQA Advanced Diploma in Computing: Software Development and should be delivered within the context of the Group Award. It can also be delivered as a stand-alone Unit by candidates wishing to acquire and develop skills in relational databases.

As this is an introductory Unit in RDBMS in an SQA Advanced Qualification, the context and examples used should be both relatively simple and within the context of the candidate’s vocational experience, however, this must be delivered at SCQF level 7. This would permit the candidate to concentrate more on the techniques involved, rather than trying to understand the initial problem.

By the end of the Unit, the candidate should have achieved a good foundation in the skills required for developing reliable and efficient RDBMS structures which solve business problems and meet user requirements.

Opportunities for developing Core Skills

There are opportunities to develop the Core Skills of Problem Solving at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance. A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes. For further information and advice, please see *Assessment and Quality Assurance for Open and Distance Learning* (SQA, February Publication code A1030.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

Unit title: Database Design Fundamentals

In this Unit, you will acquire the knowledge and learn the skills necessary to enable you to create a normalised RDBMS structure from first principles.

To achieve this, you will require access to a workstation and also to a suitable SQL-based Relational Database Management System applications package.

This will involve two major areas of learning.

Firstly, breaking down the problem into identifiable and manageable steps from which you will develop the required database structure.

Secondly, you will learn the syntax, functions and structures of SQL scripts, with which you will implement the solutions.

Your understanding and grasp of these skills and techniques will be reinforced throughout with practical exercises.

Using a bank of test data, you will test your scripts to ensure their correct working to meet the user's needs. You will be required to amend any errors in your solutions in order to achieve robust, reliable and efficient scripts.

On completion of this Unit, you should be able to:

1 Create a data storage structure from normalised data.
2 Create and populate tables.
3 Interrogate the RDBMS to user requirements.