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| Unit title: | Database design concepts |
| Unit number: | 13 |
| Level: | 4 |
| Credit value: | 15 |
| Guided learning hours: | 60 |
| Unit reference number: | R/601/0447 |

## UNIT AIM AND PURPOSE

To provide learners with opportunities to develop an understanding of relational database concepts and to design, document and evaluate a complex database application.

## LEARNING OUTCOMES AND ASSESSMENT CRITERIA

A pass grade is achieved by meeting **all** the requirements in the assessment criteria.

| Learning Outcome (LO)<br><br>The Learner will: | Pass<br><br>The assessment criteria are the pass requirements for this unit.<br><br>The Learner can: |
|---|---|
| LO1  Understand databases and data management systems | 1.1  analyse the key issues and application of databases within organisational environments<br><br>1.2  critically evaluate the features and advantages of database management systems |
| LO2  Understand database design techniques | 2.1  analyse a database developmental methodology<br><br>2.2  discuss entity-relationship modelling and normalisation |
| LO3  Be able to design, create and document databases | 3.1  apply the database developmental cycle to a given data set<br><br>3.2  design a fully functional database (containing at least four inter-relational tables) including user interface<br><br>3.3  evaluate the effectiveness of the database solution and suggest methods of improvement<br><br>3.4  provide supporting user and technical documentation |

## GRADING CRITERIA

A merit grade is achieved by meeting **all** the requirements in the pass criteria **and** the merit descriptors.

A distinction grade is achieved by meeting **all** the requirements in the pass criteria **and** the merit descriptors **and** the distinction descriptors.

| Merit Criteria (M1, M2, M3) | Distinction Criteria (D1, D2, D3) |
|---|---|
| (M1, M2, and M3 are mandatory to achieve a merit grade. Each must be achieved at least once per unit to achieve a merit grade.) | (D1, D2, and D3 are mandatory to achieve a distinction grade. Each must be achieved at least once per unit to achieve a distinction grade.) <br><br> (In order to achieve a distinction grade, all merit criteria must also have been achieved.) |
| MANDATORY TO ACHIEVE A MERIT GRADE | MANDATORY TO ACHIEVE A DISTINCTION GRADE |
| M1 Analyse concepts, theories or principles to formulate own responses to situations. | D1 Evaluate approaches to develop strategies in response to actual or anticipated situations. |
| M2 Analyse own knowledge, understanding and skills to define areas for development. | D2 Evaluate and apply strategies to develop own knowledge, understanding and skills. |
| M3 Exercise autonomy and judgement when implementing established courses of action. | D3 Determine, direct and communicate new courses of action. |

## TEACHING CONTENT

The Teaching Content describes what has to be taught to cover **all** Learning Outcomes.

Learners must be able to apply relevant examples to their work although these do not have to be the same as the examples specified.

| LO1 Understand databases and data management systems | |
| --- | --- |
| Database theory | • Theory of RDBMS (normalisation, columns and tables, simple joins)<br>• Other database models (Hierarchical, Object Oriented)<br>• Physical and logical models<br>• Analysis (to include Purpose & Scope, Data Flow Diagram, ER Model, Constraints and Assumptions, Data Dictionary)<br>• SQL and query languages (use of Query by Example)<br>• Report generators |
| Organisational factors | • DBA role and responsibilities<br>• control of access to database<br>• disaster recovery, failover and data integrity |

| LO2 Understand database design techniques | |
| --- | --- |
| Theory of database design must include | • ER modelling<br>• Normalisation 1NF-3NF<br>• Table design<br>• Producing a detailed analysis |
| Database implementation techniques to cover | • Data Entry Form Design including validation (input masks, validation rules)<br>• Complex Queries in QBE and SQL<br>• Report design<br>• Creating an effective user interface |

| LO3 Be able to design, create and document databases | |
| --- | --- |
| Database developmental cycle for a given data set | e.g.<br>• logical modelling<br>• creating and testing the physical model in comparison with the logical model<br>• compliance with the users requirements and design brief<br>• use of appropriate applications and tools |

Review the database solution and look for strengths and weaknesses in its performance.

Different methods of testing the effectiveness of the database solution have been applied with improvements identified.

Write user and technical documentation for intended audience, using appropriate terminology.

## GUIDANCE

**Delivery guidance**

It will be beneficial to deliver this unit in a way that uses actual events, industry forecasts or sector specific contexts which offer the learner the opportunity to explore, develop and apply the fundamental principles of the sector or subject area. Typical delivery contexts could include a case study of college's database system for storing student data, i.e. what data is stored, legal requirements in terms of DPA and storing personal data. Discuss data input and outputs in terms of queries and reports. Look at who has access to what parts of the database.

Learners will benefit from being encouraged to exercise autonomy and judgement to develop a plan for their own database, adapt their thinking and reach considered conclusions, when they have researched database techniques and looked at the case study in depth.

Learners would benefit from being presented with subject/sector-relevant problems from a variety of perspectives and from being given the opportunity to explore them using a variety of approaches and schools of thought. For example, databases for non-educational purpose, e.g. retail, database of products and sales for a web-based company.

**Assessment evidence guidance**

Evidence must be produced to show how a learner has met each of the Learning Outcomes. This evidence could take the form of assignments, project portfolios, presentations or, where appropriate, reflective accounts.

Where group work/activities contribute to assessment evidence, the individual contribution of each learner must be clearly identified.

All evidence must be available for the visiting moderator to review. Where learners are able to use real situations or observations from work placement, care should be taken to ensure that the record of observation accurately reflects the learner's performance. This should be signed, dated, and included in the evidence. It is best practice to record another individual's perspective of how a practical activity was carried out. Centres may wish to use a witness statement as a record of observation. This should be signed and dated and included in the evidence.

## RESOURCES

**Books**

Connolly, Thomas. and Begg, Carolyn., Database Systems: *A Practical Approach to Design, Implementation and Management* (International Computer Science Series) [Paperback]

Dowling, Nick., *Database Design and Management Using Access* [Paperback]

Blue, Joey., *What is SQL? Database Learning Basics for Business Professionals, Managers, Accountants, Students, Business Analysts, Bloggers and More*... [Kindle Edition]

Couch, Andrew., *Microsoft Access 2010 VBA Programming Inside Out* [Kindle Edition]

**Journals**

http://msdn.microsoft.com/en-us/magazine/cc163286.aspx

**Websites:**

http://office.microsoft.com/en-gb/access-help/database-design-basics-HA001224247.aspx

www.simple-talk.com/sql/database-administration/ten-common-database-design-mistakes/

www.mysql.com/

www.bankofengland.co.uk/boeapps/iadb/