



Australian Government

Department of Education, Employment and Workplace Relations

ICADBS502A Design a database

Release: 1

ICADBS502A Design a database

Modification History

Release	Comments
Release 1	This Unit first released with <i>ICAI1 Information and Communications Technology Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to establish client needs and technical requirements and to design a database that meets those requirements.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.

Application of the Unit

This unit applies to database administrators and designers who are required to design databases.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

Elements and Performance Criteria

1. Determine database requirements	<p>1.1 Meet with <i>client</i> and conduct a user-needs analysis to determine <i>database</i> functionality</p> <p>1.2 Analyse results of user-needs analysis to identify <i>technical requirements</i></p> <p>1.3 Develop a conceptual model of the database</p> <p>1.4 Submit conceptual model to client for review</p> <p>1.5 Evaluate client feedback and make changes as required</p>
2. Develop logical data model	<p>2.1 Identify attributes and determine data types</p> <p>2.2 Undertake normalisation of attributes</p> <p>2.3 Develop entity relationship diagram to clarify cardinality of relationships</p> <p>2.4 Document attributes, normalised data and entity relationship diagram</p> <p>2.5 Forward <i>documentation</i> to client for confirmation</p>
3. Design data structures	<p>3.1 Confirm primary and foreign keys for tables</p> <p>3.2 Review client business rules</p> <p>3.3 Identify referential integrity constraints</p> <p>3.4 Establish <i>database-management system</i> constraints and incorporate into database design</p> <p>3.5 Develop validation rules for data</p> <p>3.6 Design indexes and develop data dictionary</p> <p>3.7 Document the database design</p>
4. Design queries, screens and reports	<p>4.1 Design user interface for database, including menus, input screens and outputs</p> <p>4.2 Design queries based on <i>requirements</i></p> <p>4.3 Design output reports based on requirements</p> <p>4.4 Compare physical design with conceptual model or user-needs analysis</p> <p>4.5 Incorporate changes as required</p>
5. Design access and security systems	<p>5.1 Review business <i>security plan</i> as basis for commencing access and security design</p> <p>5.2 Design password and access system for database</p> <p>5.3 Identify multiple-user requirements</p>

	5.4 Develop client access profiles using client business model
6. Confirm database design	6.1 Identify database backup and recovery requirements 6.2 Develop and document the database backup and restore procedures 6.3 Submit database and documentation to client for final approval

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- analytical skills to determine data objects required, data structures and business requirements
- communication skills to liaise with clients
- literacy skills to:
 - produce database documentation
 - produce models
- numeracy skills to calculate field lengths, table and database estimated size
- planning and organisational skills to undertake business analysis
- problem-solving skills to solve normalisation problems
- technical skills to undertake data modelling and structured query language (SQL) programming.

Required knowledge

- data analysis, particularly in determining data types and data structures and query and report design
- data modelling related to developing the conceptual data model
- data redundancy
- database management system (DBMS) fundamentals, particularly during the design phase
- encryption and authentication as they apply to database security features
- function and features of data types and data structures
- functions and features of databases
- logical design concepts, particularly related to designing data structures, queries screens and reports
- object model design concepts, particularly related to designing data structures, queries, screens and reports
- scalability of databases.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • design a well-structured database that represents the client's business reality and provides the user with a productive business tool.
Context of and specific resources for assessment	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • current industry-accepted database software, network or other system for remote or multi-user access • business requirements • CASE or diagramming software • appropriate learning and assessment support when required • modified equipment for people with special needs.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • observation of candidate liaising with client • verbal or written questioning to assess candidate's knowledge of: <ul style="list-style-type: none"> • normalisation • indexing • security models • review of the final database and associated support documentation.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate.</p> <p>Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the work being performed.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p> <p>In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.</p>

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<i>Client</i> may include:	<ul style="list-style-type: none"> • employees • external organisations • individuals • internal departments.
<i>Database</i> may include:	<ul style="list-style-type: none"> • commercial off-the-shelf (COTS) database packages • object-relational databases • proprietary databases • relational databases.
<i>Technical requirements</i> may relate to:	<ul style="list-style-type: none"> • application • business • database • network • people in the organisation • platform • system.
<i>Documentation</i> may include:	<ul style="list-style-type: none"> • audit trails • data dictionaries • entity-relationship diagrams • International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and Australian Standards (AS) standards • naming standards • project management templates and report writing principles • version control.
<i>Database management system</i> may include:	<ul style="list-style-type: none"> • distributed or centralised • online • partitioned geographically or thematically distributed.
<i>Requirements</i> may relate to:	<ul style="list-style-type: none"> • application • business • database • network • people in the organisation • platform • system.

<i>Security plan</i> may include:	<ul style="list-style-type: none">• authentication• authorisation and integrity• privacy• security objectives of the organisation.
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Unit Sector(s)

Database