



Australian Government

Department of Education, Employment and Workplace Relations

ICAA5139B Design a database

Release: 1

ICAA5139B Design a database

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit defines the competency required to establish client needs and technical requirements and to design a database that meets those requirements. The following units are linked and form an appropriate cluster: • ICAB4170B Build a database • ICAA5153B Model data objects • ICAA5154B Model data processes No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.
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Application of the Unit

Application of the unit	
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine database requirements	1.1. Meet with client and conduct a user needs analysis to determine database functionality 1.2. Analyse results of user needs analysis to identify technical requirements 1.3. Develop a conceptual model of the database 1.4. Submit conceptual model to client for review 1.5. Evaluate client feedback and make changes as required
2. Develop logical data model	2.1. Identify attributes and determine data types 2.2. Undertake normalisation of attributes 2.3. Develop entity relationship diagram to clarify cardinality of relationships 2.4. Document attributes, normalised data and entity relationship diagram 2.5. Forward documentation to client for confirmation
3. Design data structures	3.1. Confirm primary and foreign keys for tables 3.2. Review client business rules 3.3. Identify referential integrity constraints 3.4. Establish relevant database management system constraints and incorporate into database design 3.5. Develop validation rules for data 3.6. Design indexes and develop data dictionary 3.7. Document the database design
4. Design queries, screens and reports	4.1. Design user interface for database , including menus, input screens and outputs 4.2. Design queries based on requirements 4.3. Design output reports based on requirements 4.4. Compare physical design with conceptual model/user needs analysis 4.5. Incorporate changes as required
5. Design access and security systems	5.1. Review business security plan as basis for commencing access and security design 5.2. Design password and access system for database 5.3. Identify multiple-user requirements 5.4. Develop client access profiles using client business model
6. Confirm database	6.1. Identify database back-up and recovery

ELEMENT	PERFORMANCE CRITERIA
design	requirements 6.2. Develop and document the database back-up and recovery procedures 6.3. Submit database and documentation to client for final approval

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- Techniques to elicit information from users, particularly during the design and prototype phases
- Analysis skills to determine data objects required, data structures and business requirements
- Data modelling skills
- Business analysis skills
- SQL programming skills
- Communicating with clients

Required knowledge

- Function and features of databases
- Logical design concepts, particularly in relation to designing data structures, queries screens and reports
- Data modelling in relation to developing the conceptual data model
- Object model design concepts, particularly in relation to designing data structures, queries, screens and reports
- Data analysis, particularly in determining data types and data structures and query and report design
- DBMS fundamentals, particularly during the design phase
- Function and features of data types and data structures
- Data redundancy
- Encryption and authentication as they apply to database security features
- Scalability of databases

Evidence Guide

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

Evidence of the following is essential:

- Assessment must confirm the ability to design a well-structured database that represents the client's business reality and provides the user with a productive business tool.

To demonstrate competency in this unit the learner will require access to:

- Current industry-accepted database software, network or other system for remote or multi-user access
- Business requirements

Context of and specific resources for assessment

The breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination would be characteristic.

Assessment must ensure:

- self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others.
- Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned with planning and evaluation functions. Group or team coordination may also be involved.

Method of assessment

The purpose of this unit is to define the standard of performance to be achieved in the workplace. In

EVIDENCE GUIDE

	undertaking training and assessment activities related to this unit, consideration should be given to the implementation of appropriate diversity and accessibility practices in order to accommodate people who may have special needs. Additional guidance on these and related matters is provided in ICA05 Section 1. - Competency in this unit should to be assessed using summative assessment to ensure consistency of performance in a range of contexts. This unit can be assessed either in the workplace or in a simulated environment. However, simulated activities must closely reflect the workplace to enable full demonstration of competency. - Assessment will usually include observation of real or simulated work processes and procedures and/or performance in a project context as well as questioning on underpinning knowledge and skills. The questioning of team members, supervisors, subordinates, peers and clients where appropriate may provide valuable input to the assessment process. The interdependence of units for assessment purposes may vary with the particular project or scenario.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: - ICAB4170B Build a database - ICAA5153B Model data objects - ICAA5154B Model data processes An individual demonstrating this competency would be able to: - Demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas - Analyse and plan approaches to technical problems or management requirements - Transfer and apply theoretical concepts and/or technical or creative skills to a range of situations

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	• Evaluate information, using it to forecast for planning or research purposes • Take responsibility for own outputs in relation to broad quantity and quality parameters • Take some responsibility for the achievement of group outcomes • Maintain knowledge of industry products and services
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Range Statement**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 but is not limited to:	• internal departments • external organisations • individual people • employees
<i>Database</i> may include but is not limited to:	• relational databases • object-relational databases • proprietary databases • commercial off the shelf (COTS) database packages
<i>Technical requirements</i> may be in reference to:	• business • system • platform • application • database • network • people in the organisation
<i>Documentation</i> may follow:	• ISO/IEC/AS standards • audit trails • naming standards • version control

RANGE STATEMENT	
	• project management templates • report writing principles
Database management system may include:	• distributed or centralised • on-line • partitioned geographically or thematically distributed
Security plan may include:	• privacy • authentication • authorisation and integrity • usually relates directly to the security objectives of the organisation
Requirements may be in reference to:	• business • system • platform • application • database • network • people in the organisation

Unit Sector(s)

Unit sector	Analyse and Design
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Co-requisite units

Co-requisite units		

Competency field

Competency field	
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