



Australian Government

Department of Education, Employment and Workplace Relations

ICAPRG529A Apply testing techniques for software development

Release: 1

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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 develop test strategies and implement tests to assure the reliability and quality of an application.

Application of the Unit

This unit is relevant to those responsible for test plan preparation, execution and maintenance; reporting of tests; and defect management in an application.

The positions that undertake this role include quality assurance analysts, test analysts, testers, system testers, software testers, test leads and developers.

Licensing/Regulatory Information

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.

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. Plan and design test	1.1 Analyse and review <i>software development specifications</i> 1.2 Determine test context, scope, <i>standard</i> and <i>methodology</i> 1.3 Determine <i>test types</i> and <i>tools</i> 1.4 Determine test input data requirements 1.5 Design test plan and test cases using various <i>test design techniques</i>
2. Prepare test environment	2.1 Analyse and review <i>documents</i> to prepare test environment 2.2 Determine <i>test environment requirements</i> 2.3 Build and <i>set up test environment</i>
3. Implement and execute test	3.1 Build input data for testing 3.2 Create test suite or script from test cases 3.3 Execute test cases 3.4 Create test record to store test result
4. Manage defect and testing process	4.1 Evaluate and report test results 4.2 Track defect and verify fixes 4.3 Maintain and archive <i>testware</i>

Required Skills and Knowledge

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

Required skills

- analytical skills to review and evaluate technical and business requirements
- communication skills to:
 - liaise with programmers on fault debugging matters
 - liaise with project managers or leaders on report and result matters
 - seek requirements and information from business and technical experts
- literacy skills to:
 - develop reports and documentation related to test result report
 - read and interpret software specifications developed by business and technical experts
- problem-solving skills to apply basic debugging techniques in the context of software or application development
- research skills to:
 - locate and interrogate complex and varied sources of information
 - source information from available sources
- technical skills to:
 - operate software applications and navigate the internet
 - develop a small scale application
 - execute an application.

Required knowledge

- characteristics of programming language
- detailed knowledge of input and output requirements
- software development life cycle (SDLC) methodologies
- system layers, such as data network, hardware, operating system, database management systems, web servers, application servers and client deployment
- processes and techniques related to small-size application development.

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"> • develop test-plan document and test cases to verify the completeness, reliability and performance of an application according to requirement specifications • analyse and prepare test environment, and execute test cases by using automated test tools • document and manage test result by performing application debugging process and re-testing application.
Context of and specific resources for assessment	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • test environment that closely resembles production environment • business, functional, system and user requirements • system or application suitable for testing • 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"> • review of test-plan document that follows a certain standard, such as AS/NZS15026:1999 • evaluation of candidate's ability to: <ul style="list-style-type: none"> • select and use features of automated testing tool to perform certain type of test (e.g. stress testing) • analyse and document test results • debug application.
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>

	In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.
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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>Software development specifications</i> may include:	<ul style="list-style-type: none"> • budget requirements • customer requirements • functional design • internal design specifications • schedule requirements • user stories.
<i>Standard</i> may include:	<ul style="list-style-type: none"> • ASNZS15026:1999 • IEEE 829.
<i>Methodology</i> may include:	<ul style="list-style-type: none"> • agile • extreme • rapid application development (RAD) • spiral • traditional plan driven development (TPDD) • waterfall.
<i>Test types</i> may include:	<ul style="list-style-type: none"> • accessibility testing • load testing • performance testing • smoke testing • stress testing • usability testing • volume testing.
<i>Tools</i> may include:	<ul style="list-style-type: none"> • automated test • configuration management • defect management • dynamic analysis • modelling • monitoring • requirement management • review • static analysis • test-data preparation • test-design • test-execution • test-management.

<i>Test design techniques</i> may include:	<ul style="list-style-type: none"> • black-box • experience-based • specification-based • structure-based • white-box.
<i>Documents</i> may include:	<ul style="list-style-type: none"> • configuration guides • installation guides • reference documents • user manuals.
<i>Test environment requirements</i> may include:	<ul style="list-style-type: none"> • communications • configuration • hardware • software • versions.
<i>Set up test environment</i> may include:	<ul style="list-style-type: none"> • obtain and install software releases • set up logging and archiving processes • set up or obtain test input data • set up test tracking processes.
<i>Testware</i> may include:	<ul style="list-style-type: none"> • automation tools • defect repositories • script • test cases • test plan • test report • test result • testing framework.

Unit Sector(s)

Programming and software development