ICAB4224A Apply mathematical techniques for software development

Unit Descriptor
This unit defines the competency required to use basic mathematical methods and operations with real numbers and their precedence, the evaluation and construction of formulae in standard and computer notation and the use of Boolean algebra, data types and computer storage.

Unit Sector
Build

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>PERFORMANCE CRITERIA</th>
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</table>
| 1. Manipulate algebraic terms, leading to the solution of linear equations | 1.1 Position number types on the number line  
1.2 Evaluate various numerical expressions involving integers, fractions and indices  
1.3 Simplify various algebraic expressions involving integers, fractions and indices |
| 2. Construct mathematical formulae | 2.1 Solve simple equations  
2.2 Convert formulae between standard algebraic form and computer form  
2.3 Create several formulae in standard algebraic form and in computer form |
| 3. Simplify and evaluate Boolean expressions and formulae | 3.1 Simplify and evaluate several Boolean expressions  
3.2 Complete truth tables based on simple Boolean expressions and logic  
3.3 Simplify and evaluate several formulae |
| 4. Manipulate number and character representation systems | 4.1 Convert numbers between binary, decimal and hexadecimal number systems  
4.2 Add, subtract and multiply numbers in binary  
4.3 Determine binary memory storage of an integer and a character |
KEY COMPETENCIES

The seven Key Competencies represent generic skills considered necessary for effective participation by an individual in the workplace.

Performance Level 1 at this level, the candidate is required to undertake tasks effectively

Performance Level 2 at this level, the candidate is required to manage tasks

Performance Level 3 at this level, the candidate is required to use concepts for evaluating and reshaping tasks

The following Key Competency levels have been considered within the structure of this unit's Performance Criteria.

<table>
<thead>
<tr>
<th>Key Competency</th>
<th>Performance Level</th>
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</thead>
<tbody>
<tr>
<td>Communicating ideas and information</td>
<td>2</td>
</tr>
<tr>
<td>Collecting analysing and organising information</td>
<td>3</td>
</tr>
<tr>
<td>Planning and organising activities</td>
<td>2</td>
</tr>
<tr>
<td>Working with others and in teams</td>
<td>1</td>
</tr>
<tr>
<td>Using mathematical ideas and techniques</td>
<td>3</td>
</tr>
<tr>
<td>Solving problems</td>
<td>3</td>
</tr>
<tr>
<td>Using technology</td>
<td>3</td>
</tr>
</tbody>
</table>

RANGE STATEMENT

The Range Statement contextualises the unit of competency and provides a focus for assessment. The information provided is intended to define the scope of assessment and to assist assessors define the performance to be achieved by an individual in the workplace. The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Italicised wording in the Performance Criteria is detailed as follows.

Boolean expressions May include the use of AND, OR and NOT

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the assessment guidelines for this Training Package.

Critical aspects of evidence

Assessment must confirm the ability to solve and evaluate various mathematical problems, and demonstrate an understanding of use and manipulation of Boolean algebra, number types and memory storage in various computational contexts.

Knowledge and skills in this competency are expected to give the person a good understanding of the use of mathematical ideas and techniques.
Knowledge and skills

Knowledge includes:

• Basic understanding of mathematical terms and operations
• Calculation tools

Skills include:

• Problem solving skills with real numbers
• Manipulation of algebraic terms and equations
• Evaluation of Boolean expressions and formulae
• Integer and character storage in bytes in computer memory

Assessment guidance

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

Competency in this unit should 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.
Role context

Mathematics and algebraic manipulation forms the underpinning structure of computer architecture and memory storage as well as programming languages.

The breadth, depth and complexity of knowledge and skills in this competency would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance would be involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.

Performance of a broad range of skilled applications including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills would be characteristic.

Applications may involve responsibility for, and limited organisation of, others.

An individual demonstrating this competency would be able to:

• Demonstrate understanding of a broad knowledge base incorporating some theoretical concepts
• Apply solutions to a defined range of unpredictable problems
• Identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas
• Identify, analyse and evaluate information from a variety of sources
• Take responsibility for own outputs in relation to specified quality standards
• Take limited responsibility for the quantity and quality of the output of others