ICAB4222A Apply introductory programming skills in another language

Unit Descriptor

This unit defines the competency required to undertake introductory programming tasks using a procedural approach to programming. An objectoriented language may be used in this approach

There may be benefit in concurrent learning with the following units:

ICAB4224A Apply mathematical techniques for software development

Unit Sector Build

ELEMENT	PERFORMANCE CRITERIA
1. Apply basic language syntax and layout	1.1 Demonstrate understanding and application of basic *language* syntax rules 1.2 Use *language* data types, operators and expressions to create clear and concise code 1.3 Select and use the appropriate *language* syntax for sequence, selection and iteration constructs
2. Code using standard algorithms	2.1 Develop algorithms that use the *basic programming constructs* 2.2 Use a modular programming approach limited to pass-by-value parameters and module return values 2.3 Demonstrate ability to create sequential search, insertion and deletion algorithms to operate on one-dimensional arrays 2.4 Use text files and develop and code standard sequential access algorithms, including end-of-file detection loops
3. Debug code	3.1 Apply standalone debugging tools or tools provided by an *integrated development environment* to debug code 3.2 Use a debugger to trace code execution and examine variable contents to detect and correct errors
4. Document activities	4.1 Follow *organisational guidelines* for developing maintainable code and adhere to the provided *coding standard* when documenting activities 4.2 Apply internal documentation suitable for consumption by peers to code created and utilise documentation tools available in the target *language* when documenting activities
5. Test code	5.1 Create and conduct simple tests to confirm code meets design specification 5.2 Document the tests performed and results achieved
6. Create an application	6.1 Develop a solution when provided with a basic design document, including a program specification 6.2 Design the algorithm, construct and test applications in response to a problem description and language elements

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.

Key Competency	Performance Level
Communicating ideas and information	2
Collecting analysing and organising information	2
Planning and organising activities	2
Working with others and in teams	1
Using mathematical ideas and techniques	2
Solving problems	3
Using technology	3

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.

Organisational guidelines	May include but are not limited to personal use of emails and internet access, content of emails, downloading information and accessing particular websites, opening mail with attachments, virus risk, dispute resolution, document procedures and templates, communication methods and financial control mechanisms
Basic programming constructs	May include but are not limited to validation loops, sentinel-controlled loops and nested selections
Language	May include but is not limited to C, VB, Java, C++, Small Talk, VB.net
Integrated development environment	May include but is not limited to C, VB, Visual C++, Visual Studio suite, Eclipse, J-Edit, Code Warrior
Coding standard	May include Java coding standard, GNU coding standard

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 that application programs are designed and built from a provided problem scenario and program specification.

Design and code documentation must be generated. Testing must be used to confirm that created application meets original specifications and solves original problem.

Assessment must confirm competency in all areas of the software development cycle. Code only solutions are not acceptable.

Questions related to the performance criteria will assist in assessing competency. Observation of skills may assist in the collection of evidence.

Knowledge and skills

Knowledge includes:

- Programming language
- Small size application development
- Data structures
- GUI interfaces
- Best practice in application of language syntax rules

Skills include:

- Reading and interpreting program specifications
- Translating requirements from problem space to machine space
- Integrated development environment usage
- Basic programming techniques
- Internal (code) documentation techniques
- Basic debugging techniques
- Testing techniques
- Basic documentation techniques

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.

Resources

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

- Software development environment
- Technical requirements

Role context

Programming languages form the underpinning software infrastructure of all computer data processing

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