



Australian Government

Department of Education, Employment and Workplace Relations

ICAGAM506A Create complex code for mobile game devices

Release: 1

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Modification History

Release	Comments
Release 1	This Unit first released with <i>ICA11 Information and Communications Technology Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to create complex code for mobile game devices.

Application of the Unit

This unit applies to concept artists, games designers, games programmers, animators and other personnel working in the game development industry.

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. Research and identify appropriate implementations for complex code for mobile game devices	1.1 Obtain or create a mobile game device framework 1.2 Identify <i>tools and technology for creating applications for mobile game devices</i> 1.3 Research and identify appropriate <i>game physics</i> implementation for a <i>mobile game device</i> 1.4 Research and identify appropriate <i>artificial intelligence</i> (AI) implementation for a mobile game device 1.5 Research and identify appropriate <i>shaders</i> for mobile game device 1.6 Identify technical limitations and constraints of the mobile device with the game
2. Implement physics code for mobile game devices	2.1 <i>Develop code</i> for simulating velocity and momentum 2.2 Develop code for simulating acceleration and gravity 2.3 Develop code for simulating frictional effects 2.4 Develop code for simulating collisions and collision detection 2.5 Implement the code for game physics in the mobile game device
3. Develop and implement artificial intelligence for mobile game devices	3.1 Use finite state machines to model behaviour 3.2 Develop pathfinding algorithms 3.3 Develop code based on a genetic algorithm 3.4 Implement the code for AI in the mobile game device
4. Develop and implement shader for mobile game devices	4.1 Develop code based on shading algorithm 4.2 Implement the shading algorithm code in the mobile game device

Required Skills and Knowledge

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

Required skills

- analytical skills to:
 - analyse documentation and images to inform implementation of game specifications
 - interpret briefs, work instructions, and technical and conceptual information
- communication skills to:
 - check and confirm design requirements
 - collect, interpret and communicate in visual and written forms effectively for various audiences, including engineers and artists
 - communicate clearly using speech and text
 - communicate complex designs in a structured format drawn from industry standards, styles and techniques
 - communicate technical requirements related to software development, graphics requirements and code development to supervisors and other team members
 - provide practical advice, support and feedback to colleagues and management
- initiative and enterprise skills to exercise a high level of creative ingenuity in game design and innovation
- learning skills to make improvements based on reviews and feedback
- literacy and numeracy skills to write instructions for the normal and competent operation and testing of all game features and permutations
- management skills to manage teams in order to extract useful feedback
- planning and organisational skills to:
 - balance talent, experience and budget
 - establish clear roles and goals to achieve required game development outcomes
 - meet project deadlines
 - organise equipment and resources to achieve required outcomes
 - organise own time to meet milestones
 - refer decisions to a higher project authority for review and endorsement
- problem-solving skills to recognise and address potential quality issues and problems at the design and development stage
- research skills to undertake practical, technical or desktop research into mobile game devices
- self-management skills to manage own work and priorities to meet deadlines
- teamwork skills to:
 - contribute to and work in a collaborative team
 - delegate tasks and responsibility appropriately
 - realise a unified game-play vision
- technical skills to:
 - develop game design and technical design documents
 - resolve basic hardware, software and other technical issues associated with game production
 - translate design requirements into specifications

- use correct file formats and archiving procedures.

Required knowledge

- basic programming techniques
- budgeting and scheduling considerations for game design
- capabilities and constraints of game engines
- computer game development, including specific terminology
- concept development
- concept visualisation
- current game-play hardware and software products
- environmental impact and sustainability considerations
- human resources required in the process of creating a game and their respective skills and technology requirements
- OHS requirements for:
 - ergonomics
 - electrical safety
 - materials handling
 - physical hazards
- risk and critical path management
- technical constraints that hardware imposes on software development, graphics requirements, code development and creative visual design.

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 ability to: • develop physics for mobile game devices • develop artificial intelligence for mobile game devices • develop shading algorithm for mobile game devices.
Context of and specific resources for assessment	Assessment must ensure access to: • computer hardware, software, games engines and file storage • internet access for research purposes • copyright and intellectual property legislation • OHS legislation and enterprise policy • appropriate learning and assessment support when required • modified equipment for people with special needs.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • evaluation of work samples or simulated workplace activities • verbal questioning or interview concerning aspects of game document development, including: • industry standards for concept art • design and technical specification development • game testing and trialling procedures • resources required for game development • assessment of written or interactive computer-based test or quiz • setting and observing fault-finding exercises • evaluation of reports or logbooks.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate. 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. Indigenous people and other people from a non-English speaking background may need additional support. 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>Tools and technology for creating applications for the mobile gaming device</i> may include:	• compilers • debugging software • development software • efficiency • flexible systems suitable for non-programmers • graphics • graphics system design • integrated development environments • middleware • operating systems • plug in tools • programming for game integration • rendering • sound • system architecture for real time game environments and simulations • tools for designers and play analysis.
<i>Game physics</i> may include:	• collision • combat: • blood spots • debris • explosions • footprints • salvo • smoke and fire • sparks • water • wreckage • movement: • creaking floors • footfalls • puddle stepping • wading

	• wind.
Mobile game device may include:	• mobile phones • personal digital assistants (PDAs) • tablets.
Artificial intelligence may include:	• decisions • movement • pathfinding • reactions • simulated intelligence • situations • statistics • target selection • tests and events for reactionary behaviour.
Shaders may include:	• Blinn-Phong • Cook-Torrance • Gouraud • Lambert • Oren-Nayar • Phong • Ward anisotropic.

Unit Sector(s)

Game development