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SPECIALIST EDUCATORS IN
GAMES, ANIMATION & FILM VFX

2022 Subject & Assessment Guide

Introduction to C++

ICT50220 Diploma of Information Technology (Game Programming)

CUA51020 Diploma of Screen and Media

academy of interactive entertainment
Sydney Melbourne Canberra Adelaide Lafayette Seattle Online

Table of Contents

Introduction to C++

Units of Competency

The units of competency that are covered in this subject are as follows:

ICTPRG443 - Apply intermediate programming skills in different languages

ICTICT449 - Use version control systems in development environments

Assessment processes and competency evidence requirements are described in the *Assessment Criteria* section below. If you have prior or other evidence against competency you should discuss this with your teacher.

Subject Overview

Overall Learning Outcomes

- Achieve a working understanding of C++ and its basic syntax and layout, including syntax, expressions, operators, data types, data structures, classes and memory management.
- Apply object-orientated principles, including inheritance and polymorphism.
- Demonstrate an understanding of industry best practices for writing clear and concise code.
- Demonstrate effective debugging techniques.
- Use version control systems to track content, versions and maintain a repository of work when.

Subject Description

This subject is your guide to understanding intermediate-level C++ programming, as well as object-oriented programming principles and practice. The knowledge and skills you gain in this subject will allow you to write applications of intermediate complexity and equip you with the industry-standard practices and techniques that you'll use throughout your programming career, even in languages other than C++.

C++ is one of the most commonly used languages within the games industry. It can be used for games on almost every platform and is used heavily throughout the simulation industry and related industries due to its performance and low-level access to underlying hardware and systems.

It can be a complex language, but we will be demystifying its features with practical demonstrations throughout this subject.

Industry Relevance

Because of its power and performance, C++ is the language of choice for almost all of today's AAA game development studios. Game engines are almost exclusively written in C++ to achieve the high performance and low-level control needed by video games.

C++ is also widely used throughout related industries, particularly in areas where performance is important (some would argue that performance is always essential no matter the task). Such sectors include engineering, science, robotics, military, real-time control systems, communications, and many others.

Assumed Knowledge

- A basic understanding of programming concepts and/or some exposure to at least one programming language (not necessarily C++)
- Knowledge of computer use
- Basic logic and problem-solving abilities

Subject Textbooks

The following is a selection of textbooks we recommend for this subject, with an emphasis of the first book listed, C++ Primer Plus:

- Prata, S, ***C++ Primer Plus***, 6th Edition, Addison-Wesley Professional
- Meyers, S, ***Effective C++***, Addison-Wesley Professional
- Rao, S, ***Sams Teach Yourself C++ in One Hour a Day***, 7th Edition, Sams Publishing

Assessment Criteria

Assessment Description

Assessment Milestones

Please refer to your Class Schedule for actual dates on your campus

General Description

Throughout the instruction period, you will be required to compete several assessment items to fully satisfy the assessment requirements of the subject. The details of each assessment task are outlined in the following assessment briefs, available on Canvas:

- Assessment Brief – Exercises on Arrays
- Assessment Brief – Debugging Exercises
- Assessment Brief – Version Control Exercises
- Assessment Brief – Retro Game

Each assessment item needs to be completed satisfactorily prior to the conclusion of the instruction period, but your trainer may also set a specific date for each assessment task to coincide with the conclusion of each section of learning. You may utilise pre-approved templates provided by your instructor or request approval for alternative materials for each assessment task.

Evidence Specifications

This is the specific evidence you must prepare for and present by your assessment milestone to demonstrate you have competency in the above knowledge and skills. The evidence must conform to all the specific requirements listed in the table below. You may present additional, or other evidence of competency, but this should be as a result of individual negotiation with your teacher.

Your Roles and Responsibilities as a Candidate

- Understand and feel comfortable with the assessment process.
- Know what evidence you must provide to demonstrate competency.
- Take an active part in the assessment process.
- Collect all competency evidence for presentation when required.

This table defines the individual requirements for each part of the assessment criteria. Listed here are the cumulative requirements for all assessment items. The evidence requirements for specific assessment items can be seen by referring to the table listed for that assessment item in the following sections.

Assessment and Competency Requirements
1. Completed Exercises on Arrays Evidence that includes: • Complete the programming tasks (Exercises 1 to 6) described in the assessment brief *Exercises on Arrays*
2. Completed Debugging Exercises Evidence that includes: • Complete the debugging tasks described in the assessment brief *Debugging Exercise*
3. Completed Version Control Exercises Evidence that includes: • Complete the tasks described in the assessment brief *Version Control Exercises*

4. Retro Game
Evidence that includes:
• Program a retro game of your choosing. Acceptable games include:
  ○ Pong
  ○ Arkanoid
  ○ Snake
  ○ Asteroids
  ○ Space Invaders
• Document the design of your game, including the data structures and algorithms used, in a brief design document (1-2 pages)
• Use version control to create and manage a repository for your code

Assessment Instructions for Candidate

METHOD OF ASSESSMENT

Assessment is a cumulative process which takes place throughout a subject. A 'competent' or 'not yet competent' decision is generally made at the end of a subject. Your assessment will be conducted by an official AIE qualified assessor. This may be someone other than your teacher. The evidence you must prepare and present is described

above in this assessment criteria document. This evidence has been mapped to the units of competency listed at the beginning of this document. Assessments will be conducted on a specific milestone recorded above in this assessment guide document.

ASSESSMENT CONDITIONS

Formative assessment takes place as your teacher observes the development of your work throughout the subject and, although the assessor is likely to be aware of the evidence you are submitting, it is your responsibility to be prepared for the interview where a competency judgement is made (summative assessment). Forgetting something, or making a small mistake at the time of the milestone assessment,

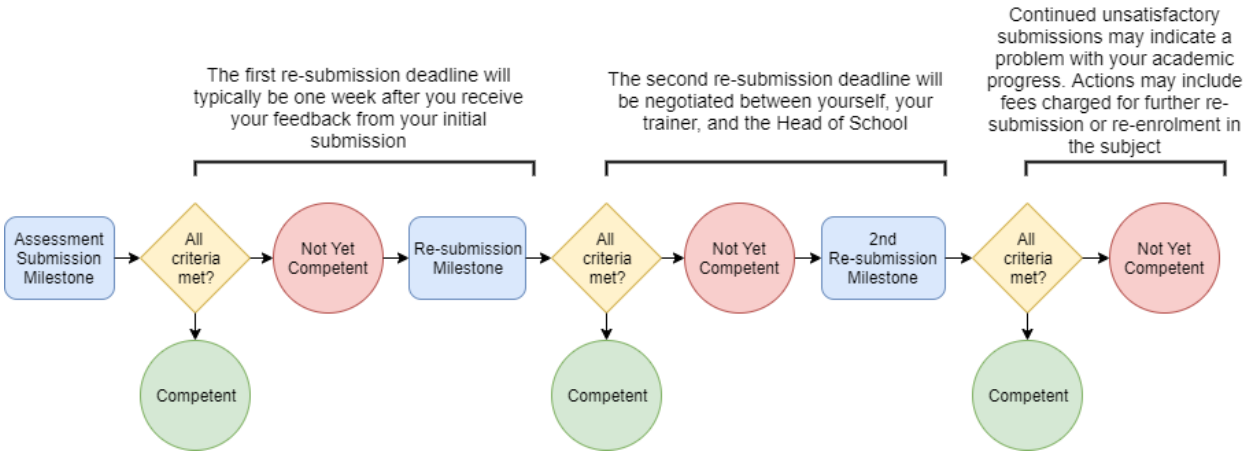
can be corrected. However, the assessor may choose to assess other candidates who are better prepared and return to you if time permits.

Upon completion of the assessment you will be issued with feedback and a record of the summative assessment and acknowledge that you have received the result. If you are absent for the nominated assessment milestone (without prior agreement or a sufficiently documented reason) you will be assessed as not yet competent.

GRADING

The assessment you are undertaking will be graded as either *competent* or *not yet competent*.

REASSESSMENT PROCESS



If you are assessed as being not yet competent you will receive clear, written and oral feedback on what you will need to do to achieve competence. Failing to submit an assessment will result in you being assessed as not yet competent. You will be given a reassessment milestone no more than one (1) week later to prepare your evidence. If you are unsuccessful after your reassessment, you may be asked to attend a meeting with your Head of School to discuss your progress or any support you may need and further opportunities to gain competency.

REASONABLE ADJUSTMENTS

We recognise the need to make reasonable adjustments within our assessment and learning environments to meet your individual needs. If you need to speak confidentially to someone about your individual needs, please contact your teacher.

FURTHER INFORMATION

For further information about assessment and support at AIE, please refer to the assessment and course progress sections of your student handbook.

Software

Core

Microsoft Visual Studio

Microsoft's Visual Studio is the recommended IDE for this subject. Other IDEs may be employed if desired as the content of this subject is designed to be cross-platform and IDE agnostic, however we cannot guarantee that all subject material will operate as intended on other IDEs and platforms.

- https://www.visualstudio.com/

Suggested

GitKraken

GitKraken is a leading Git GUI client for Windows, Mac and Linux, used to create and maintain version control repositories. It helps developers become more productive with Git, and provides an integrated conflict editor, built-in code editor and task tracking. Other version control clients may be employed if desired.

- https://www.gitkraken.com/

References and additional material

C++

- http://www.cplusplus.com/ (a good online reference site for C++)
- http://stackoverflow.com/ (a good forum site for C++ questions and answers)

