Assessment Coversheet
AT03 Indie Game

Qualification details			
Training Package Code and Title:	**ICT - Information and Communications Technology (Release 7.0)**		
Qualification National Code and Title:	ICT40120 Certificate IV in Information Technology (Gaming Development)	**State code:**	BFF9

Assessment Title	**AT03 Indie Game**		
Unit National Code & Title	ICTGAM423 Apply artificial intelligence in game development (Release 1) ICTGAM427 Use 3-D software interface and toolsets (Release 1) ICTGAM430 Design interactive media (Release 1)		
Date Due	**Session 18**	**Date Received**	

Student Name		**Student ID**	
Student Declaration	I declare that the evidence submitted is my own work: ……..		

Assessor Name				
Assessment Decision	☐ Satisfactory		☐ Not Yet Satisfactory	
Assessor Signature			**Date**	
Is student eligible for reassessment (Re-sit)?	☐ No	☐ Yes	**Reassessment Date:**	

Feedback to student
Via Blackboard (LMS) – Please check [Grade] section.
Feedback from student
Via Blackboard (LMS) – Please use [Comment] section during submission.

Student signature		**Date**	

Assessment Instructions

TO THE ASSESSOR

Type of Assessment	*Project*
Duration of Assessment	*18 sessions (session 10 – session 18)*
Location of Assessment	*Classroom (computer lab), at home*
Conditions	*Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.* *This includes access to:* • *the internet* • *research tools* • *required hardware, software and its component* • *path-finding libraries* • *game development testing tools* • *development tools to implement AI strategies* • *game design specifications and documentation* • *reference materials applicable to creating 3-D animation and digital effects* • *required hardware and software and peripheral devices* • *games engine* • *file storage* • *required 3-D modelling and animation software* • *human-computer hardware interface devices* • *a range of event-handling systems* • *application libraries* • *widgets* • *graphical user interface software and libraries* • *a range of browsers and digital devices* • *client requirements documentation* *Learners are required to complete the required tasks and submit the required evidence electronically via Blackboard.*
Elements and Criteria	As detailed in the assessment plan. You are required to make sure that all students meet the elements, performance criteria and foundation skill items as outlined in the provided checklist.

TO THE STUDENT

Purpose of Assessment	You are required to show you can: *ICTGAM423 - Apply artificial intelligence in game development* • Conduct research on AI strategies • Design, implement and test AI game strategy • Evaluate game and confirm with required personnel *ICTGAM427 - Use 3-D software interface and toolsets* • Locate and identify 3-D software navigation controls • Locate and identify 3-D animation toolsets and select required menu categories • Initiate and use software-support materials and customise application interface • Identify and plan 3-D application import and export procedures and use application feedback *ICTGAM430 - Design interactive media* • Identify and research human-computer hardware interface devices, event-handling systems and graphical user interface (GUI) widget sets • Design a simple media software device • Build and implement a simple media software device You are required to meet the elements, performance criteria and foundation skill items as outlined.
Allowable Materials	Blackboard (Topic by topic) will include the following: Weekly Readings, Class notes, and Weekly Activities. Internet resources must be recorded as references for the assessment.
Required Resources	*Computer with:* • *Internet Access* • *Word processing software* • *Access to Learning Management System (LMS)* • *Unity (college version)* • *Remote version control software (e.g. GitHub, BitBucket)*
Reasonable Adjustment	In some circumstances, adjustments to assessments may be made for you. If you require support for literacy and numeracy issues; support for hearing, sight or mobility issues; change to assessment times/venues; use of special or adaptive technology; considerations relating to age, gender and cultural beliefs; format of assessment materials; or presence of a scribe you need to inform your lecturer.
Assessment Submission	*All activities must be attempted.* *Use of research tools and peers in formulating answers are acceptable – but work submitted must be your own work and must not be plagiarised.* *Final files and documentation are to be uploaded to the appropriate area in the Blackboard course created for this unit.* *If you are marked as NYS (Not Yet Satisfactory) on your first attempt, you will be provided with another opportunity to re-attempt the assessment.*
Project contents	This project consists of the following tasks:

- Research and analyse production
- Undertake pre-production processes
- Prototype the game
- Develop a gold-master

Production Diary Documentation Guidance\Requirements:

Throughout the assessment task you are required to research, gather ideas, evaluate techniques, plan production, gather inspiration, up skill, reflect on your performance and undertake professional conversations.

The production diary could include, but is not limited to, a journal featuring screenshots, written records of conversations, textual explanations and reviews, before and after images, links, videos, or other types of media.

There is an expectation that all visual and audible content has supporting written documentation to provide a clear overview of the intent.

Your final diary must clearly show that you have evidence to support the outlined requirements in each part below. The diary needs to be one overall complete item that contains all requirements other than asset development files.

Scenario:

After some experience working in the game development industry you have decided to take a step back from large-scale development and re-focus your efforts towards more small-scale 'indie' development. Although you aim to primarily work as a solo-developer, you have reached out to a former colleague (who is an experienced indie developer) to help guide you through your first indie game production as your co-developer. They have outlined some simple creative constraints for the design of your first indie game in order to help ensure that you don't fall into the trap of designing an over-scoped game.

Criteria:

You will need to generate all of the required source files and assets using Unity version 2020.3.13f1 or a more recent version.

The 3-D model for the AI NPC will need to be appropriately rigged before importing it into the game engine, as it is a requirement that you generate the required animations for the NPC using the tools provided by Unity.
In implementing the path-finding for the required AI NPC you will need to use the A* algorithm. For this project you may use Unity's native implementation of this algorithm as well as the corresponding AI tools.

The controls for your game will need to be compatible with a range of HCI devices including the keyboard, mouse, and either a PlayStation or an Xbox gamepad controller.
You will also need to produce a custom UI widget that displays input events which are captured from compatible HCI hardware devices.

All code you write must be appropriately commented to demonstrate your understanding of the produced functionality. You will need to make use of appropriate naming conventions – with all variable names applying lower camel case, and all class and method names applying upper camel case.

The final version of the project will need to be constructed for both the Windows and Web GL platforms. The web version of the project must be tested across multiple web browsers.

For a complete overview of the project specifications, refer to the game brief associated with this assessment – "AT03 - Game Brief".

Where consultation with the co-developer of the game is required, your lecturer will assume the role of the co-developer.

Section 1 – Research and analysis

PART 1 – Research and analyse AI strategies

1. *In order to implement the A* path-finding algorithm efficiently, you will need to develop a sufficient understanding of how the algorithm works. Conduct research relating to the use of the A* path-finding algorithm for AI in video games. Analyse the findings of your research in order to determine how the design of a video game may be influenced by the video game genres and environments that the A* algorithm is typically associated with. As a part of your research you will also need to describe definitions for the following words as they relate to the A* path-finding algorithm – **'F cost'**, **'heuristic'**, and **'priority queue'**. Document and organise the findings of your research an analysis in your production diary.*
2. *Once you have documented the required research and analysed the findings, you will need to confirm your understanding of the A* path-finding algorithm and how it will impact the design of your game. In consultation with the co-developer of your game, discuss the findings of your research and analysis in order to confirm you understand how the algorithm will be applied to the design of the AI strategies for your game.*

PART 2 – Research and analyse 3-D software

1. *You have decided to animate the 3-D model of your AI NPC in Unity instead of Blender. In order to create the required animations for the NPC, you will need to clarify the requirements of the 3-D model so that it will be ready to be animated in Unity. In your production diary briefly describe how you will need to prepare the 3-D model for your NPC in order to ensure it is suitable for animation in Unity. You should also describe any specifications for the required animations. Once you have an understanding of these requirements, research the features, toolsets, and capabilities of Unity that will allow you to create and implement the required animations for the NPC. Document the findings of your research in your production diary.*
2. *An important aspect of an efficient workflow in Unity is your ability to navigate the scene viewport. In your production diary describe the processes for panning, zooming, and rotating the viewport camera in order to navigate a 3-D scene in Unity.*
3. *To make your workflow in Unity even more efficient, you will need to develop habits that improve your user performance. In your production diary describe at least two (2) keyboard hotkey (shortcut) input procedures, and one (1) navigational input procedure that helps to improve your user performance and make your workflow in Unity more efficient.*
4. *Before you begin the process of animating the 3-D model for your AI NPC, your co-developer would like to confirm your ability to navigate Unity. In consultation with the co-developer of your game demonstrate your ability to navigate the Unity editor by performing a series of processes. First you need to define the three (3) different types of 3-D transformation (translation, rotation, and scaling) as well as the different types of toolsets that will be applicable to the animation process. Then you*

will need to identify the menus and menu categories and analyse them in order to determine which menu categories will be associated with the animation process. You must demonstrate appropriate use of application hotkeys in conducting these processes.

5. *Your co-developer would also like to confirm that you are familiar enough with Unity that you will be able to troubleshoot any issues that you may potentially encounter during development. In consultation with the co-developer of your game identify relevant support procedures, documents, help files, and other applicable support materials by accessing relevant application menus and hotkeys in Unity.*

PART 3 – Research and analyse GUI & HCI

1. *Before you can begin designing a custom UI widget for your game, you need to research and select the HCI devices that will be compatible. In your research you will need to identify and describe at least two (2) standard HCI devices that you could integrate into your game. You will then need to select the HCI devices that will be integrated into your game and describe their associated controls in your production diary alongside the findings of your research.*
2. *It's important to ensure that you have appropriately planned the technical implementation of the UI and the selected HCI device functionality. Review the software libraries and the GUI libraries that are compatible with the Unity game engine. In your production diary identify and describe at least one (1) potential industry-standard method for implementing the required device functionality using event-systems. You must also identify and describe how at least two (2) compatible GUI libraries may be used in Unity to implement the required UI widget. Once you have documented the required information, meet with the studio manager for assistance in selecting the most suitable GUI library for production and to discuss the ramifications of the selected library.*
3. *In order to produce a UI widget that is well-designed for use in a video game heads-up display HUD, it's a good idea to analyse a range of relevant widget designs that have been implemented in existing video games. In your production diary identify a selection of at least two (2) examples of UI widgets from the HUDs of existing video games that perform similar functionality to the widget you are required to design. Describe the functionality of each example, and how each example has been used within the HUD of the video game they are from.*

Section 2 – Pre-production

PART 1 – Design a feasible AI strategy

1. *To design an AI NPC that efficiently serves its gameplay purpose, you will need to identify a range of goals, actions, and other factors that will guide its behaviour and decision-making. Create a behaviour chart that outlines the functionality of your AI by defining the states, state transitions, and the conditions of the state transitions and include the chart in your production diary. The behaviour chart should also clearly communicate relevant specifications as outlined in the assessment criteria, and should provide creative solutions to any identified design issues. The AI strategies outlined in the behaviour chart for the NPC must also be technically feasible, and should not be outside of the skills and knowledge you have learned in your course.*
2. *Once you have specified the design of your AI NPC, you will need to determine how it may implicate the production cycle for the game. Reflect on the design of your NPC and assess how technically feasible and user-friendly the design is. Document your assessment in your production diary, and you must also provide estimations of a*

timeline and budget for the production of the NPC using appropriate software.

a. *When estimating a budget for your NPC, use the three-point estimate (beta distribution) formula to calculate your estimation. You may use $32.90 AUD as the average hourly wage for an Australian video game programmer to calculate the estimate.*

PART 2 – Plan 3-D modelling and animation processes

1. *To create high quality animations for your AI NPC, you will need to find a range of suitable reference materials for use in generating the required animations. Research at least three (3) different reference materials that are relevant to the animations required for the 3-D model of the NPC and document them in your production diary.*
2. *You will need to confirm that the reference materials you have sourced are suitable for use in the process of animating your AI NPC. In consultation with the co-developer of your game, present them with your collection of reference materials for the required animations and clarify that they are suitable for use.*
3. *It is important that you clarify the standard procedures for file-management and the configuration of the Unity project to ensure you minimize the risk of encountering asset or file-related issues. In consultation with the co-developer of your game discuss the procedures for opening and saving the Unity project, and for importing assets to and exporting assets from Unity. You will also need to discuss the configuration specifications for the Unity project to ensure it is compatible with the required platforms and HCI devices, as well as reliable sources of user feedback for Unity that can be referenced in the event that an issue is encountered.*

PART 3 – Design a custom GUI widget and integrate HCI

1. *To ensure that the custom UI widget you create will efficiently fulfil its role in the design of your game, you need to create a paper prototype that clearly communicates its functionality. In your production diary include the paper prototype of your custom UI widget, in the form of original illustrations, diagrams, and/or sketches. The paper prototype must include relevant annotations in order to communicate the full functionality of the UI widget such as the input mechanics, relevant C# event-handling methods, and the other specifications outlined in the assessment criteria.*
2. *Once you are satisfied that the design of your custom UI widget fulfils the relevant requirements and specifications, you will need to confirm that it is suitable for use within the HUD of your game. In consultation with the co-developer of your game, confirm that the design of the UI widget that is communicated through your paper prototype is suitable for implementation in your game.*

Section 3 – Prototype

PART 1 – Implement an AI NPC strategy

1. *At this stage you should be ready to begin implementing your AI NPC in your game using Unity. Use the tools and features provided by Unity in order to implement your NPC into the prototype version of your game. Your AI implementation will need to align with your planned NPC design, and must include path-finding using the A* algorithm.*
2. *As you develop your AI NPC, you will need to document evidence that you have appropriately tested and amended the NPC as required. Create a testing log that will record each test case you perform for the AI, including the expected test results and the actual test results. You should also indicate which test cases returned a successful result, and which test cases returned a failed result.*

PART 2 – Implement an animated 3-D model

1. *You will need to prepare your Unity project so that it is ready for the implementation of the required 3-D models and corresponding animations. Create a Unity project for your game, and configure it so that it has been setup to be compatible with the required HCI devices and platforms. As you create the required animation files in Unity, manage them as according to the file-management protocols that you discussed with the co-developer of your game.*
2. *As you develop your game in Unity you will need to troubleshoot error scenarios as you encounter them. In your production diary you will need to document at least one (1) example of Unity's native support documentation and at least one (1) example of user feedback relating to Unity, that you have used to troubleshoot an error or issue that you encountered during development of the game.*
3. *You will also need to setup and save a custom UI layout for Unity that has been configured according to the procedural needs of the required animation tasks. The custom UI layout that you configure must vary from the standard and pre-defined UI layouts of Unity, and will need to improve your workflow for animating the 3-D model for your AI NPC.*

PART 3 – Implement a custom GUI widget and HCI device interaction

1. *Now you will need to use relevant technologies to create the custom UI widget you have designed. Develop the custom UI widget so that it integrates all of the required elements according to the specifications outlined in the paper prototype. All functionality that is implied in the design of the widget must function as expected, including compatibility with the required HCI devices and corresponding event-handling call-backs. All visual and audio assets for the widget must be integrated appropriately.*
2. *As you develop the required UI widget and finalise its implementation, you will need to conduct appropriate testing to confirm that the game functions across the required platforms and HCI devices. You will need to produce two builds of the prototype version of the game – one that is compatible with Windows, and another that is web-compatible. For both builds test the functionality of the required HCI devices to confirm they function as required, and for the web-compatible build test the execution of the game using the Mozilla Firefox and Google Chrome web browsers to confirm the game functions as required. Document the results of your testing in your testing log, and include screenshots of the game running in the required web browsers.*

Section 4 – Gold-master

1. *When you are satisfied with the state of the alpha prototype of your game you will need to seek feedback in order confirm that the design requirements have been met. In consultation with the co-developer of your game, present the prototype version to them and consider the feedback they have to offer. In your production diary document the modifications that need to be made to the design of the game, the AI NPC, the compatible HCI devices, and/or the custom UI widget. A minimum of at least one (1) modification to your alpha prototype must be documented. You then need to implement the required amendments to the prototype as according to the feedback you received.*
2. *After implementing the required amendments to the prototype version of the game, you will need to perform a final review of the game before exporting the gold-master version. In your production diary document a brief review of the design of your*

game, and evaluate the implementation of the AI NPC. In your review, explain how the design requirements of the NPC (as outlined in the assessment criteria) have been fulfilled. You will also need to perform appropriate final checks to confirm that the full functionality of your custom UI widget and integration of the required HCI devices conforms to the original design. The results of these final checks will need to be documented in your testing log.

3. *Once you have confirmed that the state of the gold-master version of your game is satisfactory, you should be ready to create a final gold-master build for the required platforms and obtain the final sign-off on production from relevant personnel by the final deadline. Create the required gold-master builds of the game for each of the required platforms, and store them in separate zipped folders. Both the prototype build and all of the gold-master builds for your game will need to be saved remotely alongside the Unity project files using a suitable version control system. You will then need to send an email to the co-developer of your game by the final production deadline and present them with the completed project by including a publicly accessible link to the remote storage space where all of your files are located. Your co-developer will respond with their endorsement and final sign-off for the project, and will include a completed assessment observation checklist. You will need to include screenshots of the emails to your co-developer in your production diary as well as a textual link to your remote version control space. The completed observation checklist you are provided with must also be submitted with the rest of your assessment submission files.*