Virtual Environment Development

5CM503

Assessment Brief

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For office hours please see the notice on MS308

Key dates and details

Assessment Detail	Assessment Information
Assessment Type:	Individual Report / Artefact
Assessment Weighting:	100% (50% component 1, 50% component 2)
Word count/Length:	3000 words (indicative, no penalty for variation).
Learning Outcomes:	1, 2
Submission Method:	Blackboard Assignment
Submission Date:	12:00 Noon UK time, 19/05/2024
Provisional Feedback Release Date:	12:00 Noon UK time, 09/06/2024

Description of the assessment

This assessment covers learning outcomes 1 and 2 of this module: "Design and evaluate a real-time environment", and "Implement interaction methodologies within an environment". This assessment looks at how virtual environments are designed from an initial brief, through a concept, layout, block out, and then the interaction and lighting. Through this process you will gain an understanding of how level design, narrative, and interaction are tied together as part of the game development process.

While it may seem that this is not the role of a programmer, many independent developers, QA testers, gameplay programmers and similar need to undertake and understand the role the environment plays in the game lifecycle. This assessment gives you the opportunity to explore and understand how various factors interact and influence your design and gameplay.

Relationship to Programme Assessment Strategy

This module follows on from the skills and knowledge you developed within 4CM512 Game Technologies and acts to broaden your skillset to consider the interaction between level design, gameplay mechanics, and character mechanics. The assessment takes you through the full level and mechanic design process and considers professional skills through your critical reflection and peer evaluation.

This module alongside 5CM508 Game Engine Systems will develop your skills towards the capstone module 6CM501 Game Development where you will take on the role of a professional game developer.

Attributes and Skills

	Skills	Links to useful resources
X	Critical thinking	
X	Communication	
☐	Collaboration	
X	Creative problem solving	
X	Self-direction & planning	
☐	Numeracy, statistics & financial literacy	
X	Digital	
☐	Resilience	
☐	Adaptability	
☐	Leadership & future thinking	

Assessment Content

For the following brief, you are tasked with developing the following:

Component 1

This component requires you to go through the level design process from creating a level description from a simple brief, through layout, block out and grey-box models before looking at the impact of lighting on performance and perception.

- A brief description (500 words maximum) of the environment you plan to build with supporting images (may be AI generated) showing the look and feel of the environment.

- A layout diagram for your level showing points of interaction, interest, combat, and other relevant factors.

- A white box/block out of your level using primitive models.

- A grey box of your level replacing the primitive models with sourced/created assets.

- Lighting applied to the grey-box model demonstrating the appropriate use of static, stationary, and dynamic lighting.

- A short critical review (500 words maximum) of your work, optionally a peer-review (250 words maximum).

Component 2

This component requires you to develop gameplay and character mechanics that interact with your level design and demonstrate your ability to design and test mechanics within a prototype environment.

- A brief description (500 words maximum) of your planned interactions demonstrating appropriate use of interactions with single and multi-stage events.
- An interactive and real-time instance of your [component 1] level or a level provided by your tutor.
- A set of character mechanics that interact with the level design.
- A set of gameplay mechanics that define the style and feel of the game.
- A gameplay interaction.
- A short critical review (500 words maximum) of your work, optionally a peer-review (250 words maximum).

Brief

"… No Dr Awesome, I expect you to die!"

In the fashion of all good spy movies, you are asked to create a game that gives players the opportunity to mix gameplay, character, and a variety of interactions. Whether its stealth followed by an amazing round of gunplay, or a fancy dialogue in which you can convince your guard that destroying the atmosphere really is a bad plan before whipping out your Derbymón cards in a climactic battle to the… end? Using a first- or third-person perspective, develop a game that demonstrates your understanding of the interaction between level design, gameplay mechanics and character mechanics.

Your game should demonstrate at least 3 character and gameplay mechanics, and an interactive element which alters the direction of the game.

Description of Terms

Layout diagrams – top down or isometric maps of the level or subsections showing major features with appropriate legends. Generally presented in colour with indication of pacing/flow/key moments.

Pacing graph – a line chart showing pacing (or intensity) against time with key points plotted.

Flow map – top down or isometric views of the level with the player path and interactions indicated using a line + points.

Walkthrough – a detailed top-down view of the area with indication of scale and direction of transitions, a summary of the area and events/puzzles/combat and appropriate supporting in game or reference images.

Block out – a simple version of the layout implemented in engine showing scale and location of major features, however, is not collision accurate and contains minimal additional information e.g. water may be blue, the path may be green, everything else may be grey.

Grey box – a collision accurate version of the block out replacing simple primitives with models that are better representations of the final models, collision boxes are correctly sized, but textures and lighting are not provided/correct.

Lit grey box – a grey box model with at least one lighting pass showing positioning, type, and feel of the lighting in the final game.

Character mechanics

Simple – single button/action mechanics e.g. crouch (+associated movement alteration), double jump style interactions.

Average – multi-stage mechanics e.g. cooldown linked double jumps, multi-input abilities e.g. "Hadouken" – down, down-forward, forward, attack.

Complex – multi-stage mechanics with additional considerations e.g. combo systems, perception based stealth systems

Gameplay mechanics

Simple – enemy with weapon attacks player (+ associated health/damage); static terrain interactions e.g. ladders, climbing; or simple dynamic terrain interactions e.g. moving platforms, drawbridges.

Average – dynamic interactions e.g. rope climbing and swinging; enemy management e.g. waves, enemy respawn mechanisms.

Complex – enemies roles are established within combat, e.g. flanking; physics based puzzle systems; switches capable of controlling multiple dynamic objects.

Assessment Rubric

The following two components are marked against their individual rubrics, each component is worth 50% of your overall mark. If the mark for a component is below the passing threshold (40%), the other component is capped at that same mark. Where there are questions from your marker about the source, or your understanding of your submission you may be asked to take part in a viva to clarify these points.

Component 1: Environment development

Section	Grade	Fail (0-34)	Near Fail (35-39)	Satisfactory (40-49)	Good (50-59)	Very Good (60-69)	Excellent (70-79)	Outstanding (80-89)	Exceptional (90-100)
Description		Provides a limited description of the level that cannot be easily translated into a layout. Theme of the level is unclear or inconsistent ("Aliens"). References are not provided.	Provides an unclear concept of what the level is supposed to represent. Theme of the level is unclear or somewhat inconsistent (e.g. space opera mixed with science fiction). References are very limited (1-2 images).	Provides a general but unclear concept of what the level is supposed to represent, Theme of the level is not clear but is internally consistent (e.g. space opera). References are limited (2-3 images).	Provides a clear concept of what the level is supposed to represent. Theme of the level is clear (e.g. Kardashev level 3 space with a dystopian feel). References are reasonable (4-5 images).	Provides a clear concept of what the level is supposed to represent with indications of a limited (1-2) number of factors like pacing. Theme of the level is clear and linked to the references (e.g. Neo-noir Derby with a feel like Sin City). References are reasonable	Provides a clear concept of what the level is supposed to represent with indications of multiple factors like pacing, combat zones, safety/cooldown areas. Theme of the level is clear, linked to the references and takes gameplay factors into account. References are reasonable (4-5 images), all citations are correct, correct attribution is provided.	As Excellent, with a clearly thought-out structure including composite images and consideration given to the flow and readability of the document.	As Outstanding with evidence of consideration of implementation viability.

					(4-5 images), all citations are correct.			
Layout	Layout is provided partially digitally but is of very low quality (e.g. no straight lines). Layout shows less than 2 "areas". Evidence of pacing/ combat/ other factors is missing.	Layout is provided partially digitally (e.g. hand drawn scanned map) but is of low quality. Layout shows less than 3 "areas". Evidence of pacing/ combat/ other factors is minimal or incomprehensible.	Layout is provided partially digitally (e.g. hand drawn scanned map). Layout shows at least 3 "areas", the transition between these may be unclear e.g. no height difference information. Evidence of pacing/ combat/ other factors is difficult to read/comprehend.	Layout is provided fully digitally. Layout is clear showing at least 3 "areas" and how the player moves between these. Evidence of pacing/ combat/ other factors is indicated but not clearly.	Layout is provided fully digitally. Layout is clear showing at least 4 "areas", the navigation paths and transitions, and at least one instance of alternate pathing. Evidence of pacing/ combat/ other factors is indicated clearly, e.g. through the use of icons, colours etc..	Layout is provided fully digitally. Layout is clear showing at least 5 "areas", the navigation paths and transitions, and at least one instance of alternate pathing. Evidence of pacing/ combat/ other factors is indicated clearly with clear visual identification of requirements to enter/interact with areas.	As Excellent with the addition of at least 1 of the following: Pacing graph Flow map Combat zones	As Outstanding with all three components and a detailed flow map.
Block out	Block out is completely unrelated to the	Block out has little relevance to the layout.	Block out does not map to layout correctly or is scaled inconsistently.	Block out maps to layout correctly.	Block out maps to the layout correctly.	Block out has supporting documentation showing overlays of	As Excellent with the addition of height and interaction	As Outstanding with evidence of narrative or environmental

	layout or is missing.			Areas are scaled to character size.	Block out is coloured to show gameplay factors (e.g. water, destructible terrain, walkable areas).	layout information.	mechanisms (e.g. spawn points or cover).	story telling points-built in.
Grey-box	Most primitives remain. Level is not playable.	A significant number of primitives remain or are highly inappropriate. Level is not playable outside of editor.	Inappropriate assets remain, or models are inappropriate (e.g. a streetlight being represented by a tree). Level is generally playable but requires in-editor support.	All assets have been replaced with appropriate models. Level is playable with significant errors (e.g. falling through floor).	All assets have been replaced with appropriate models. Models are appropriate level of detail and complexity. Level is playable with errors (e.g. camera clipping through walls).	All assets have been replaced with appropriate models. Models are appropriate level of detail and complexity. Models have textures/ materials applied as appropriate. Level is playable with errors (e.g. camera catching on walls).	As Excellent with the addition of full game loop (start/ restart / ending).	As Outstanding with the addition of gameplay mechanics (e.g. combat represented by enemies moving towards you/ cover)
Lighting	Lighting model is not present or causes	Lighting model demonstrates only one of static,	Lighting model demonstrates at least 2 of static,	Lighting model demonstrates at least 1	Lighting model demonstrates at least 1	As Very Good with the addition of a mechanism to	As Excellent with the addition of at least 1	As Outstanding with a demonstration of multiple

	the frame rate to go below 30fps.	stationary, and dynamic lighting. Frame rate is between 30 and 60fps.	stationary, and dynamic lighting. Frame rate is between 45 and 60fps.	instance of static, stationary, and dynamic lighting. Lighting model makes use of at least 2 different light types. Frame rate is at least 55fps.	instance of static, stationary, and dynamic lighting; with at least one "area" having multiple of these. Lighting model makes use of at least 3 different light types. Frame rate is at least 60fps.	limit player visibility (e.g. fog, darkness).	environmental effect that alters lighting in an "area".	environmental effects.
Critical review	Critical review is missing or has very little relevance to the final model.	Critical review is unclear in the presentation of the link between the initial brief and the final lit grey-box model, or the final model was not to be reviewed.	Critical review articulates the link between the initial brief and the final lit grey-box model.	Critical review clearly articulates the link between the initial brief and the final lit grey-box model. Review highlights at	Critical review clearly articulates how the initial brief is met by the final lit grey-box model. Review highlights at	As Very Good with the addition of: Theme and implementation are considered. Flow and narrative of the work is supported by appropriate	As Excellent with a peer-review (max 250 words) of another piece of work.	As Outstanding with the addition of a critical comparison between the peer-reviewed work and your own (max 250 words).

				least 1 positive factor and 1 negative factor.	least 1 positive factor and 1 negative factor with a reflective comment.	references and images from previous models.		

Component 2: Interaction development

Grade Section	Fail (0-34)	Near Fail (35-39)	Satisfactory (40-49)	Good (50-59)	Very Good (60-69)	Excellent (70-79)	Outstanding (80-89)	Exceptional (90-100)
Description	Provides a limited description of the mechanics that cannot be easily translated into gameplay. References are not provided.	Provides an unclear concept of how the gameplay is supposed to function mechanically. Mechanics are inconsistent or have no consideration of modern game design.	Provides a generally clear concept of how the gameplay works mechanically but misses at least one area such as mechanic interaction. Mechanics are internally consistent.	Provides a clear concept of the mechanical implementation of gameplay. Mechanics are synergistic. References are reasonable (4-5 images).	Mechanics are discussed in the context of the level design. Clear mechanical implementations of the gameplay concepts are provided. Mechanics are intentionally synergistic. Mechanics are linked to references (4-5),	As Very Good and mechanical implementations are linked to level design e.g. distances, fall times.	As Excellent, with the addition of video references provided to show look and feel of mechanics.	As Outstanding with the addition of mechanics that interact with the lighting model e.g. flares.

| Character Mechanics | No additional mechanics are provided, or those that are non-functional e.g. jumps cannot cross the gaps. | References are very limited (1-2).

At least 1 [Simple] character mechanic is provided outside of those provided in standard templates (e.g. walking/ jumping do not count).

Mechanic is demonstrated at least once and is nearly functional. | References are limited (2-3).

At least 2 [simple] and 1 [average] character mechanics are provided outside of those provided in standard templates.

Mechanic is demonstrated at least once and is functional. | At least 3-character mechanics, of which 2 are [average] or better are provided outside of those provided in standard templates.

Mechanics are demonstrated at least once in the level.

All mechanics are functional with some errors (e.g. jumps not resetting on landing) | all citations are correct.

At least 3 [average] or better character mechanics are provided outside of those provided in standard templates.

Mechanics are demonstrated at least once in the level.

All mechanics function with at most minor errors (e.g. too long dashes). | At least 2 [average] and 1 [complex] character mechanics are provided outside of those provided in standard templates.

Mechanics are demonstrated at least once in the level.

At least two mechanics have some synergy.

All mechanics function with at most trivial errors (e.g. floaty jumps). | As Excellent with:

3-character mechanics, at least 2 [complex] and one [average] or better.

The synergistic mechanics being demonstrated in at least two places, one of which is a "tutorial", the other of which alters the path of the player (e.g. they cannot die on the first one, but the second can kill them).

. | As Outstanding with the addition that the character mechanics represent a significant investment in creating a playable and enjoyable experience. |
|---|---|---|---|---|---|---|---|---|

| Gameplay Mechanics | No additional mechanics are provided, or those that are non-functional e.g. an oxygen bar that does not kill the player or present any gameplay alteration. | At least 1 [Simple] gameplay mechanic is provided.

Mechanic is demonstrated at least once and is nearly functional. | At least 2 [simple] and 1 [average] gameplay mechanics are provided.

Mechanic is demonstrated at least once and is functional. | At least 3- gameplay mechanics, of which 2 are [average] or better are provided.

Mechanics are demonstrated at least once in the level.

All mechanics are functional with some errors (e.g. jumps not resetting on landing) | At least 3 [average] or better gameplay mechanics are provided.

Mechanics are demonstrated at least once in the level.

All mechanics function with at most minor errors (e.g. too long dashes). | At least 2 [average] and 1 [complex] gameplay mechanics are provided.

Mechanics are demonstrated at least once in the level.

At least two mechanics have some synergy.

All mechanics function with at most trivial errors (e.g. floaty jumps). | As Excellent with:

3 gameplay mechanics, at least 2 [complex] and one [average] or better.

The synergistic mechanics being demonstrated in at least two places, one of which is a "tutorial", the other of which alters the path of the player (e.g. they cannot die on the first one, but the second can kill them).

. | As Outstanding with the addition that the gameplay mechanics represent a significant investment in creating a playable and enjoyable experience. |
|---|---|---|---|---|---|---|---|---|
| Gameplay interaction | A gameplay interaction is not provided or contains | A gameplay interaction is provided but contains | A [simple] gameplay interaction is provided and | An [average] gameplay interaction is provided and | A [complex] gameplay interaction is provided and | As [Excellent] with the addition that the gameplay | As Outstanding with the addition that the gameplay mechanics represent a significant investment in | |

	errors that stop it from functioning.	errors or ways to skip the interaction without using character/ gameplay mechanics.	contains minimal errors.	contains minimal errors.	contains minimal errors	interaction alters the subsequent gameplay in some significant manner.	creating a playable and enjoyable experience. Marks within this section are awarded based on quality and academic judgement.	
Critical review	Critical review is missing or has very little relevance to the final model.	Critical review is unclear in the presentation of the link between the initial brief and the final lit grey-box model, or the final model was not to be reviewed.	Critical review articulates the link between the initial brief and the final lit grey-box model.	Critical review clearly articulates the link between the initial brief and the final lit grey-box model. Review highlights at least 1 positive factor and 1 negative factor.	Critical review clearly articulates how the initial brief is met by the final lit grey-box model. Review highlights at least 1 positive factor and 1 negative factor with a reflective comment.	As Very Good with the addition of: Theme and implementation are considered. Flow and narrative of the work is supported by appropriate references and images from previous models.	As Excellent with a peer-review (max 250 words) of another piece of work.	As Outstanding with the addition of a critical comparison between the peer-reviewed work and your own (max 250 words).

Anonymous Marking

Submissions in Turnitin and Blackboard

You must submit your work using your **student number** to identify yourself, not your name. You must not use your name in the text of the work at any point. When you submit your work in Turnitin you must submit your student number within the assignment document <u>and</u> in the *Submission title* field in Turnitin. Guidance is available showing how to do this.

Submissions that require a name

This assignment cannot be marked in line with the Anonymous Marking Policy requirements as you are required to be assessed by your name in case of viva. Please ensure that in this assessment you are identified by your **name**.

Assessment Regulations

The University's regulations, policies and procedures for students define the framework within which teaching and assessment are conducted. Please make sure you are familiar with these regulations, policies and procedures.