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|  | | **ASSIGNMENT COVER PAGE** | | | C:\Users\hoching.tay\Desktop\Lincoln_UK_06092017-01.png |
| **Programme** | | | **Course code and title** | | |
| Bachelor of Computer Science (Hons) | | | CCG3013/N Computer Graphics | | |
| **Student’s name / student’s id** | | | **Lecturer’s name** | | |
|  | | | Dr. Khoo Hee Kooi | | |
| **Date issued** | **Submission deadline** | | | **Indicative weighting** | |
| 13th February 2023  (Week 3) | 17th April 2023 (Week 12) | | | 30% | |
| **Assignment 2 title** | Motion and animation | | | | |
| This assessment assesses the following course learning outcomes | | | | | |
| **# as in course guide** | **UOW Malaysia KDU Penang University College learning outcomes** | | | | |
| **CLO1** | N/A | | | | |
| **CLO2** | Evaluate and draw the graphics elements involved in a storyboard using image manipulation software. | | | | |
| **CLO3** | N/A | | | | |
| **CLO4** | Implement motions and animation for the rendered scenes. | | | | |
| **# as in course guide** | **University of Lincoln learning outcomes** | | | | |
| **CLO1** | Appreciation of a range of different graphics hardware devices and software used. | | | | |
| **CLO2** |  | | | | |
| **CLO3** |  | | | | |
| **CLO4** | Knowledge and skills in colour models, be familiar with 2D and 3D software programming. | | | | |
| **Student’s declaration** | | | | | |
| I certify that the work submitted for this assignment is my own and research sources are fully acknowledged.  Student’s signature: Submission date: | | | | | |

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| **Dates and mechanisms for assessment submission and feedback** | |
| **Mechanism for handout to students** | OpenLearning LMS |
| **Mechanism for submission of work by student** | *Soft copy online submission.*  ***Question 1:*** *Report file (****report.pdf****) based on the submission arrangement section below, via TurnItIn.*  ***Question 2:*** *Project file (A zip file,* ***code.zip****, which includes a header (****object.h****) and two implementation files only, e.g.* ***main.cpp*** *and* ***object.cpp****), via submission portal provided in this course, Microsoft Teams.* |
| **Date by which work, feedback and marks will be returned to students** | 2nd May 2023 |
| **Mechanism for return of assignment work, feedback and marks to students** | Feedback will be provided by a marking template. This will be available to students via Microsoft Teams. The discussions at the walkthroughs will also provide informal feedback |

# COURSEWORK SUBMISSION GENERAL INFORMATION

# Academic integrity statement

You must adhere to the university college regulations on academic conduct. Formal inquiry proceedings will be instigated if there is any suspicion of plagiarism or any other form of misconduct in your work. Students must **not** collude with other students or plagiarise their work.

# Nature of the submission required

A soft copy of your assignment save **PDF version** should be submitted to lecturer, no later than the date and time stipulated on the cover sheet. In addition, Word document copy of your work must be submitted to TurnItIn. The first page of your report, immediately after the cover page, must be a page from TurnItIn clearly showing your name and your originality score (Please refer to [submission arrangement](#_Submission_arrangement)). Resubmission must be committed, if the submitted report exceeded **20%** of TurnItIn originality, otherwise **10 marks** will be deducted for plagiarism.

Diagrams may be used where they are helpful to support your arguments or description. If they are not your own work, the source must be referenced. Please help us to handle and mark your work efficiently.

# Documentation guidelines

Student is required to submit a **soft copy** of the report and ensure that it uses the following formatted styles: 1) Font family: **Arial (For all pages in the report)**, 2) Font size: **12** **points (1em)**, 3) Line spacing: **2.0**, and 4) Page layouts: **Justify**. Please make sure you have proper format alignment for all paragraphs, following standard writing style and use **Harvard citation style** for references and citations. Please include a **header** with the following information: **Student ID, student name, course code, and assignment type**. Please also include a proper cover page for your submission which contains information about the students, assignment, course, and department with UOW Malaysia KDU Penang University College and University of Lincoln (UoL) logos on top. Also include page number and references, which are shown on the last page, before marking rubric.

# Penalties for late submission

For late submission of this assignment, a penalty of a reduction by 10% of the maximum mark may be applicable for each calendar day or part thereof that the submission is late. An Assignment submitted more than **ten** calendar days after the deadline will have a mark of zero recorded for this assignment.

# Submission arrangement

1. Cover page
2. TurnItIn similarity report
3. Table of content
4. Main report
5. References or bibliography (whichever applicable)
6. Peer assessment form
7. Marking rubric (in landscape orientation)

# Assignment instructions/ Background

**Motion and animation (30%)**

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| **Maximum number of students** | Four |

**Introduction**

Motion and animation are the essential elements to computer graphics related industries, such as games, television (TV), film industries, and additive industries. These elements can enhance the visual effects (UX) and photorealism, which could bring influential messages to audiences about an idea. Note that this is a group work assignment which could consist of up to four students. See Questions 1 and 2 for further details.

**Question 1: Storyboard (40%)**

You are required to write a storyboard to evaluate a series of scenes to animate the graphics user interfaces(GUIs) in the car dashboard, that perform tasks within a display panel. The story should display at least two scenes, which demonstrate a car that navigates from point A and to point B. It is optional to capture the surroundings of the car interior. For each scene, discuss the following topics.

1. Plots and happenings of the car dashboard.
2. Graphics elements involved to render the virtual objects.
3. Motions involved based on Disney’s principles of animation.
4. Interactions between the car driver and graphics.

This report should not exceed **800 words threshold**. Module tutor will not consider reading the report after the threshold.

**Question 2: Animate the scene (60%)**

Using OpenGL toolkit, write a C++ program to animate the discussed storyboard in Question 1. In the rendering scope, you should use glPushMatrix and glPopMatrix functions for every graphics element defined to prevent matrix stack overflow. Aside from that, user interaction, the animation, and management of frames will be evaluated during marking.

Note that all scenes must have only a theme. Meanwhile, the objects in each scene must serve the same theme. The motion and animation in the scenes should serve at least three Disney’s principles of animation. Also, each student is required to fill the peer evaluation form, in order to ensure the fairness of the score awarded to your group members.

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| **CCG3013/N Computer Graphics**  **MARKING RUBRIC**  **Assignment 2**  **Motion and animation (Weighted marks: 30%)** | | | | | | | |
| **Question 1: Storyboard (Score: 40%)** | | | | | | | |
| **LEARNING OUTCOME** | **MARKING CRITERIA** | **SCALE** | | | | | |
| **Failed**  **(0% to 49%)** | **3rd class**  **(50% to 59%)** | **2nd lower**  **(60% to 69%)** | **2nd upper**  **(70% to 79%)** | **1st class**  **(80% to 100%)** | **YOUR MARKS/COMMENTS** |
| **CLO2: Evaluate and draw the graphics elements involved in a storyboard using image manipulation software.** | **1. Creativity in the design of the scenes**  **(10%)** | No plot has captured in the scenes. | Inconsistent plots captured for the scenes. There is no storyline in the plots. | Consistent plots captured for the scenes without emphasis techniques. | Consistent plots captured for the scenes, however need certain emphasis techniques. | Consistent plots captured for the scenes with proper emphasis techniques. |  |
| **2. Graphics elements in the scenes**  **(10%)** | The discussion is irrelevant to the graphics elements in the scenes. | Insufficient discussion on the graphics elements in the scenes. There are misconceptions in the discussion. | Sufficient discussion on the graphics elements in the scenes, however lack of technical aspects. | Good discussion on the graphics elements in the scenes, however need more elaboration on the technical aspects. | Well discussion on the graphics elements in the scenes with good justifications on the technical aspects. |  |
| **3. Discussion on the motion involved**  **(10%)** | There is no discussion on the motion involved. | Insufficient discussion on the motion involved. There are misconceptions in the discussion. | Sufficient discussion on the motion involved, however lack of justifications on the technical aspects. | Good discussion for the motion involved, however need more elaboration on the technical aspects. | Well discussion on the motion involved with good justifications on the technical aspects. |  |
| **4. Discussion on the interactions between human and graphics involved**  **(10%)** | There is no discussion on the interactions between human and graphics involved. | Insufficient discussions on the human and graphics involved. There are misconceptions in the discussion. | Sufficient discussion on the interactions between human and graphics involved, however lack of justifications on the technical aspects. | Good discussion on the interactions between human and graphics involved, however need more justifications on the technical aspects. | Well discussion on the interactions between human and graphics involved, with good justifications on the technical aspects. |  |
| **Total (40%)** | | | | | |  |

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| **Question 2: Animate the scene (Score: 60%)** | | | | | | | | | | | |
| **LEARNING OUTCOME** | **MARKING CRITERIA** | **SCALE** | | | | | | | | | |
| **Failed**  **(0% to 49%)** | | **3rd class**  **(50% to 59%)** | | **2nd lower**  **(60% to 69%)** | | **2nd upper**  **(70% to 79%)** | | **1st class**  **(80% to 100%)** | **YOUR MARKS/COMMENTS** |
| **CLO4: Implement motions and animation for the rendered scenes.** | **1. Animation for the graphics elements**  **(20%)** | There is no animation implemented. | | Limited use of geometrical transformations for animation. | | Sufficient use of geometrical transformations for animation. | | A composition of geometrical transformations has used for animation. | | A comprehensive of geometrical transformations has used for animation. |  |
| **2. Input events for interaction**  **(20%)** | Input events and callbacks are not implemented. | | Limited implementation of input events and callbacks. | | An appropriate use of either keystrokes events or mouse buttons events for callbacks. | | An appropriate use of keystrokes events and mouse buttons events for callbacks. | | Good combination of keystrokes events and mouse buttons events for callbacks. |  |
| **3. Management of frames**  **(20%)** | All frames are not in the correct flow. | | Inconsistent frames are rendered. | | Consistent frames are rendered. Frames are not driven by input events. | | Consistent frames are rendered. Frames are driven by input events. | | Good management of frames, which navigated by input events. |  |
| **Total (60%)** | | | | | | | | | |  |
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| **Overall score (100%)** | | | | | | | | | | |  |
| **Overall score × peer evaluation ratio (100%)** | | | | | | | | | | |  |
| **Weighted marks (30%)** | | | | | | | | | | |  |