	COURSE: Computer Graphics		**MARK**:
	TOPIC: All topics	**CODE:** BCM2133	
	ASSESSMENT: Mini Project	**DURATION**: 2 weeks	/90

FACULTY OF COMPUTING (FK)
Group Mini Project (30%)

Learning Outcome:

Demonstrate understanding of **all topics** in BCM2133 course by **constructing** interactive 3D object using suitable tools and API.

1. **CLO2**: Analyze the techniques for creating 2D and 3D graphics using computer graphics concepts and programming principle (15% - 45 marks) – Cognitive skills

2. **CLO3**: Develop simple graphics application using standard graphics libraries (10% - 30 marks) – Practical skills

3. **CLO4**: Demonstrate personal skills effectively through the punctuality and completeness of assessment submissions (5% - 15 marks) – Personal skills

Instructions:

1. Using the provided code template, construct interactive 3D objects and a scene using JavaScript and the GLSL programming language in a WebGL environment.
2. The objects, scene, and interactive functionalities must meet the following requirements:
    a. **Each team member** must create **at least ONE (1) 3D object** that includes at least ONE (1) parent and ONE (1) child component (hierarchical modelling).
    b. **Each team member** must use **at least SEVEN (7) cubes** to construct their portion of the scene.
    c. **A minimum of TEN (10) distinct colors** must be used throughout the entire scene.
    d. **Lighting and shading** must be properly implemented in the scene.
    e. The scene rendering process must utilize **gl.drawElements**, **indices** and **hierarchical modelling** techniques.
    f. Code syntax must be properly **commented**.
    g. Several **buttons and sliders** must be implemented to provide interactive effects within the scene.
    h. The **RGBA** color components must be correctly implemented in the scene.
    i. **All 3D objects must be manually constructed using code** (no external modelling tools are allowed, only a programming text editor).
3. Based on the given report template, answer the questions regarding member's contribution to completing this assessment

** Refer to the provided marking scheme for details on the required outcome for each item.*
*** Refer to the provided demo for an example of the overall result.*

Submission:

1. Submit the project files (compress the folder into a single .zip file) via Kalam
2. Submit the report file (in .pdf format) via Kalam
3. Submit ALL files **before 5.00pm FRIDAY, 20 June 2025**

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Section A: CLO2 – Concept implementation through graphics construction **[45 marks]**

INDIVIDUAL ASSESSMENT – **Object transformation & color:**

1. Parent object's x-axis rotation (on mouse drag) is correctly implemented – **2 marks**
2. Parent object's y-axis rotation (on mouse drag) is correctly implemented – **2 marks**
3. Parent object's x and y-axis rotation are correctly reset (on button click) – **2 marks**
4. Parent object is animated on page load/start – **2 marks**
5. Child object is animated on page load/start – **2 marks**
6. Parent object's transformation animation is correctly stopped (on button click) – **2 marks**
7. Parent object's transformation animation is correctly re-started (on button click) – **2 marks**
8. Child object's transformation animation is correctly stopped (on button click) – **2 marks**
9. Child object's transformation animation is correctly re-started (on button click) – **2 marks**
10. Parent object's transformation speed is correctly implemented (on slider move) – **3 marks**
11. Child object's transformation speed is correctly implemented (on slider move) – **3 marks**

INDIVIDUAL ASSESSMENT – **Hierarchical modelling implementation:**

1. Child object correctly follows the parent's transformation – **2 marks**
2. Child object's transformation does not affect the parent – **2 marks**
3. Parent object's transformation does not affect other objects in the scene – **2 marks**
4. Child object's transformation does not affect other objects in the scene – **2 marks**

INDIVIDUAL ASSESSMENT – **RGBA:**

1. Parent object's color change is correctly implemented (on button click) – **2 marks**
2. Parent object's color change is correctly reverted (on button click) – **2 marks**
3. Child object's color change is correctly implemented (on button click) – **2 marks**
4. Child object's color change is correctly reverted (on button click) – **2 marks**
5. Parent's object alpha value is correctly implemented (on slider move) – **3 marks**
6. Parent's object alpha value is correctly implemented (on color change) – **2 marks**

Section B: CLO3 – Concept demonstration through logical results **[30 marks]**

INDIVIDUAL ASSESSMENT – **Construction results:**

1. At least ONE (1) parent and ONE (1) child object are constructed – **2 marks**
2. At least SEVEN (7) cubes are used in total for all constructed objects in the scene (individual contribution) – **2 marks**
3. *gl.drawElements* and *indices* are used to draw the objects – **2 marks**
4. Parent object's transformation pivot is correctly implemented – **2 marks**
5. Child object's transformation pivot is correctly implemented – **2 marks**

GROUP ASSESSMENT – **Camera & projection manipulation for the entire scene:**

1. Field of view is correctly implemented – **2 marks**
2. Camera rotation along the x-axis is correctly implemented – **2 marks**
3. Camera translation along the z-axis is correctly implemented – **2 marks**
4. 'Reset camera' button is correctly implemented – **2 marks**

GROUP ASSESSMENT – **Overall scene construction process:**

1. No external 3D modelling tools are used to construct the scene – **1 mark**
2. At least TEN (10) distinct colors are used throughout the scene – **2 marks**
3. Color contrast is properly applied throughout the scene – **2 marks**
4. Lighting and shading are correctly and appropriately implemented in the scene – **2 marks**
5. Syntaxes are properly and clearly commented (code comments) – **3 marks**
6. Overall scene design logically reflects real-world objects in terms of shape, size and structure) – **2 marks**

Section C: CLO4 – Personal skills demonstration through assessment submission **[15 marks]**

Punctuality:

5 marks	4 marks	3 marks	2 marks	1 mark
Early/on time submission	Late submission: submission time x **(x < 6 hours)**	Late submission **(6 hrs < x < 12 hrs)**	Late submission **(12 hrs < x < 24 hrs)**	Late submission **(x > 24 hours)**

Completeness of assessment submission (answer to the given questions in written form):

1. "What is your contribution to this Mini Project assessment?"

5 marks	4 marks	3 marks	2 marks	1 mark
Excellent personal contribution	**Good** personal contribution	**Satisfactory** personal contribution	**Poor** personal contribution	**Very poor** personal contribution

2. "Explain how you construct/develop your part of the project?"

5 marks	4 marks	3 marks	2 marks	1 mark
Excellent personal contribution	**Good** personal contribution	**Satisfactory** personal contribution	**Poor** personal contribution	**Very poor** personal contribution

REPORT

MEMBERS:

- CD12345 ABBAS
- CD67891 SALIIMI
- CD23456 LOKMAN
- CD78910 MUHAIMIN

QUESTION 1: What is your contribution to this Mini Project assessment?

- **ABBAS**: I construct the fan's blades … I also helped combined …
- **SALIIMI**: I construct …
- **LOKMAN**: I construct …
- **MUHAIMIN**: I construct …

QUESTION 2: Explain how you construct/develop your part of the project?

- **ABBAS**: First, I sketch the overall coordinates …
- **SALIIMI**: I started constructing the base using …
- **LOKMAN**: Before making the buttons, I first …
- **MUHAIMIN**: From Abbas's objects, I …

********** END OF MINI PROJECT HAND OUT **********