UOW MALAYSIA

PART OF THE UNIVERSITY
OF WOLLONGONG AUSTRALIA
GLOBAL NETWORK

Bachelor of Game Development (Honours)

XBGT2064N

GRAPHICS PROGRAMMING

Prepared by Mohamad Faris Zakwan

Semester September 2023 (2214)

ASSIGNMENT

Course Title : Bachelor of Game Development (Honours)
Course Code : XBGT2064N
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BRIEF

Create one articulated model of a character with an animation that loops indefinitely.

Provide environment and additional effects that suit the character.

REQUIREMENTS

Use the project **xbgt2064_asgn** as the base for this assignment.

Go to main.cpp line #17 and put your student ID

Character

1. MUST be from Pokemon, Digimon, Transformers, or Gundam series.
   - Provide reference information.
2. MUST have AT LEAST one head.
3. MUST have AT LEAST 4 limbs of 2 different types e.g., two arms and two legs
4. Limbs MUST be made of AT LEAST 2 parts e.g., upper arm & lower arm.
   - Hand or foot DOES NOT count as a part.
5. The looping animation MUST match the character.

Features

1. GLU library is STRICTLY NOT ALLOWED.
2. Primitives allowed: Points, Lines, and Triangles.
3. MUST make use of texturing.
   a. Some `glColor` is OK.
   b. Use transparency when needed.
4. Transformations MUST be done via matrix multiplication, not by using `glTranslate`, `glRotate` or `glScale`.

NOTES

- Sometimes, the details of the character require detailed modelling.
- Sometimes, the details of the character can be provided via textures.
- Animation is a creative, design and technical problem, not a computer graphics problem.
    - Time is very important in animation.
    - The application time can be obtained via `App::getTime()`. The value returned is application running time in seconds. It always increases over time.
    - The delta time can be obtained via `App::getDeltaTime()`. If you are running your own timing, you need to use the value returned from this function.
    - Sine and cosine wave are very useful in animating. Triangle wave is also useful, though you will need to write the algorithm yourself.
    - Make use of interpolation to reduce animation work complexity.
- Single image texture might be better than multiple image textures.
    - Use image editing software to pack multiple images to one image in a grid layout.
    - Example:
      Four 512x512 images can be packed into one 1024x1024 image.
      Each image will take a quarter section nicely.
      Converting UV from 0~1 to the real UV in each sub-image is a mathematical problem.
- Ensure your image file sizes are within 2MB per image.
    - Use JPEG format for opaques.
    - Use PNG format for transparency.
- Ensure each image file dimensions are 1024x1024 AT MOST.
- Images with 2^n x 2^m dimensions, where n & m is 0~10 (e.g. 1x1, 32x32, 256x256, 1024x512x 1024x1024) fares better in computer graphics.

CHARACTER MODELLING

RUBRICS	
Great	Completed model that closely match the reference. Very detailed modelling, e.g. individual fingers are modelled. Great use of textures and colours for character details. Textures are packed as one single image where possible. Hierarchical transformation using Transform class (or similar) to reduce redundant codes. Great work separation – non-monolithic code files.
Good	Completed model that generally match the reference. Somewhat detailed modelling, e.g. general hand shape modelled, fingers using texture. Usage of textures and colours for character details, though texture usage look awkward. Hierarchical transformation using standard matrix multiplication – redundant codes.
Bad	Incomplete model or very simple model or very different from reference. Not following hierarchical transformation approach. Incorrect polygon facing direction. Runtime error on resource loading.

ANIMATION

RUBRICS	
Great	Great looping animation: • Multiple rotational axes (where possible) • Animation looping does not look obvious.
Good	Basic looping animation: • Single rotational axis. • Animation looping look obvious.
Bad	No animation.

ENVIRONMENT/ADDITIONAL EFFECTS

RUBRICS	
Depends	Creative usage of textures, e.g. flipbook animation. Creative usage of transparency, e.g. lightning strikes. Environmental effects that suit the character e.g. tornado/blizzard surrounding character. Simple particle effects.

SUBMISSION INSTRUCTIONS

⚠ **Delete the highlighted folders in project/ before zipping your submission!** ⚠

The .vs directory is hidden by default.

Enable **Hidden Items** to make it visible in Windows Explorer.

Your zip archive should contain:

1. deps/ folder.
2. project/ folder.
3. Documentation or readme, if any.

Zip archive naming format: STUDENTID_XBGT2064_ASGN
e.g. 0120123_XBGT2064_ASGN.zip

Email title naming format: XBGT2064_ASGN_SEP2023_STUDENTID
e.g. XBGT2064_ASGN_SEP2023_0120123

Email your work at faris.z@uow.edu.my.

Attach your work directly in the email when possible. Otherwise, attach via OneDrive.

Email using your @student.uow.edu.my email address, not @kdu-online.com or your personal email address.

NOTES:

It is your responsibility to check if your submission email goes through.
If your email is rejected/blocked for any reason, it is your responsibility to rectify it.

ASSESSMENT CRITERIA

Coursework marks allocated for this assignment is **50%**, of which:

- Character Modelling : 30%
- Animation : 10%
- Environmental/Additional Effects : 10%

No submission or non-working submission is assessed as 0% of the allocated marks.

DUE DATE: 17 DECEMBER 2023