GAME2012 – 3D Graphics Programming

Midterm

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You will have 4.5 hours to complete this midterm. The midterm link will disappear after that window and no submissions will be accepted. Make the best use of the four hours.

Start Project

You can use any starting project that we have provided for you in this course. You will be drawing shapes from scratch so there should be nothing else besides these requirements in the window.

View/Camera Configuration

Use a perspective view with the following atttributes: **(3 marks)**

- 45 degrees
- 1:1 aspect ratio
- a display range of 0.1 to 100 units

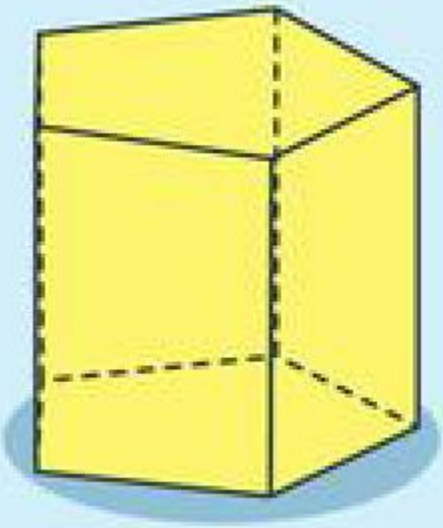
Set your camera with the following attributes: **(3 marks)**

- A position of 0,0,3
- A look target of 0,0,0
- An up vector of 0,1,0

Set the color of the background to a color other than black. (**1 mark)**

Prism Platform

The first shape you will need to draw is a geometric prism of with 5 equal sides as pictured below:



(no wireframe required)

Use the following attributes for the prism: **(3 marks)**

- A radius of 1 unit
- A height of 2 units
- Any solid color for all the vertices other than black, yellow preferred

Render the prism with shaders using indexed draws, using an array for the indices, an array for the vertices, and one for colors **(4 marks)**

Note: the sides MUST be equal (mathematically-calculated, not guessed!) or you forfeit the above 4 marks. Hooman did this for you in a lab!

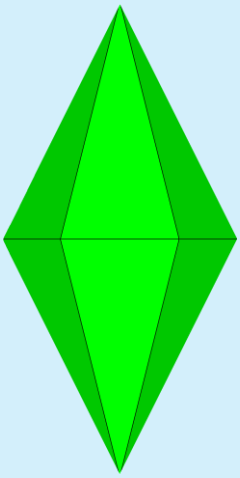
Face culling is on and you're only rendering front faces. **(2 marks)**

Transform the prism and make the XZ scale 150% of the original size and the Y scale 25% of the original size so it looks more like a platform. **(2 marks)**

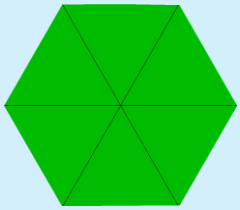
Crystal Shape

The next shape you are to render is a nice green crystal as follows:

front view



top view



(no wireframe required)

Use the following attributes for the crystal: **(3 marks)**

- A radius of 0.5 units
- A height of 4 units
- A green color (0,1,0)

Render the crystal with shaders using indexed draws, using an array for the indices, an array for the vertices, and one for colors **(4 marks)**

Note: the sides MUST be equal (mathematically-calculated, not guessed!) or you forfeit the above 4 marks. Hooman did this for you in a lab!

Transform the crystal and make the entire scale 50% of the original size. Move both the shapes so that the crystal is a little bit above the platform but does not touch it. Center the objects in view and use your judgement. You can alter the view if you have to. **(2 marks)**

Rotate the green crystal constantly along its Y axis at a slow speed. You can rotate in either direction, i.e. clockwise or counterclockwise. Remember, animations will need a fixed framerate, timestep or delta time. **(1 mark)**

Along with the rotation of the crystal, have it bob up and down slightly above the prism platform. Again, use your best judgement, but it must bounce between two vertical points. **(2 marks)**

Midterm Weight: 30% of course grade

Task	Possible Marks	Description
View Config	7	You configered the projection and view properly
Prism	11	You created the prism platform properly
Crystal	12	You created the crystal properly
Total:	**30**	

Submission Details:

- Delete the .db file and any AutoPCH folders inside the hidden .vs directory
- **Submit the ENTIRE project, NOT just the .cpp and shader files**
- Submit through Midterm link ONLY
- Naming convention:

  GAME2012_Midterm_LastnameFirstmane.zip (or .7z or .rar)

Penalties:

- You submit only a .sln file: 0% for submission
- You only have a template that we provided and no extra code: 0% for submission and plagiarism report
- You coded it in any language other than C++ with OpenGL: 0% for submission
- You still have a hidden .vs path in your submission: 50% off submission
- Wrong naming convention: 50% off submission
  - So make sure you take 10 seconds and rename it!