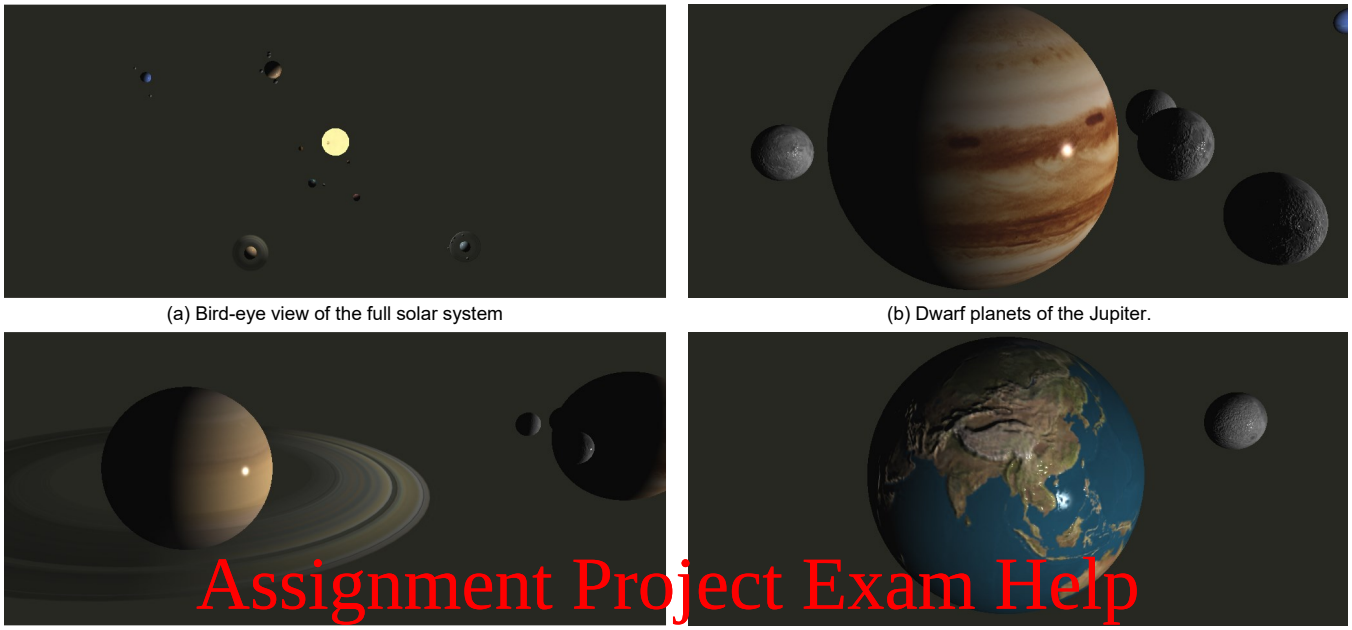
Computer Graphics, 2018

Assignment 4: Full Solar System (Solar System II)
Submission Due: Dec. 2 (Sun.), 23:59, at i-campus



(a) Bird-eye view of the full solar system

(b) Dwarf planets of the Jupiter.

(c) The ring system of the Saturn

(d) Earth with additional bump mapping (optional)

Figure 1: *Example renderings of a solar system.*

First, refer to the general instruction for computer graphics assignments, provided separately. If somethings do not meet the general requirements, you will lose corresponding points or the whole score for this assignment.

1. Objective

In the last assignment, you learned how to place and transform 3D objects for 3D animation. This assignment is to complete your solar system with shading/textures and advanced features.

2. Requirements

- (20 pt) Make and animate dwarf planets of each planet.
- (20 pt) Apply a point light (the Sun) based per-pixel shading using Blinn-Phong model. The Sun does not need to be shaded (otherwise, -5 pt).
- (20 pt) Apply texturing using freely-available resources; e.g., http://planetpixelemporium.com/planets.html.
  Please make sure *not to distribute the maps in public domain*, which violates copyrights.
- (20 pt) Make a textured ring system of the Saturn.
- (10 pt) Apply the alpha blending to the ring system. For the alpha blending, you need configure OpenGL as:

```
glEnable( GL_BLEND );
glBlendFunc( GL_SRC_ALPHA, GL_ONE_MINUS_SRC_ALPHA );
```

Then, apply alpha values from the alpha textures to fragColor.a.

3. Additional Features (Optional)

When you implement additional features listed below, you can get additional credits.

- (20 pt) Apply bump mapping on the planet surfaces. A correct implementation requires to define tangent vectors in your vertex attributes, which is too hard to implement. Here, use a tricky way available from from http://www.ozone3d.net/tutorials/mesh_deformer_p2.php.

4. Example Results

The rendering results will be similar as shown in Figure 1. Refer to them for your implementation.

5. What to Submit

- Source, project, and executable files (90 pt)
- A PDF report file: YOURID-YOURNAME-A4.pdf (10 pt)
- Compress all the files into a single archive and rename it as YOURID-YOURNAME-A4.7z.