

Spring 2017  
CAP 4730 Computer Graphics  
Homework #1 Due February 12<sup>th</sup> 11:59pm

Note: No late submissions allowed for this assignment as we will review the answers in class February 13<sup>th</sup> in preparation for exam 1.

### Texture Mapping

Texture functions add realism to rendered scenes without increasing geometric complexity.

1. One technique applies a 2-D image to a 3-D geometric model.
  - (a) Describe this texture mapping pipeline for a simple model.
2. It is difficult to apply 2-D textures to complex 3-D shapes.
  - (a) Suggest a simplified approach that approximates a textured model of a complex object.
3. Rendering highly specular objects can be computationally intensive. Assume a curved object with mirror reflectance.
  - (a) Suggest a texture mapping method that accurately depicts the reflected surroundings on the object with minimal computational cost regardless of scene complexity.
  - (b) Explain how you would implement your solution. How are the per pixel *RGB* texture values computed, stored and retrieved?
  - (c) Describe two factors that reduce the accuracy of this technique and explain how to minimize these effects.
4. Texture functions may modulate other parameters rather than *RGB* values.
  - (a) Describe an example.
  - (b) Describe potential artifacts that may occur and explain how you would mitigate them.