General

- Write-up
  - Brief introduction (What / why / motivation / goal)
  - Explanation (math / physics / algorithmic exposition)
  - Documentation (explanation of the code)

- Implementation
  - Source code

- Demonstration
  - A compilation of results that best highlight the significance of the topic
  - A video clip, or pictures in the write-up if it is not real-time
Four topics

- Shadow mapping with projective transform (Baichuan Wu)
- Subdivision surfaces (Dylan Rowe)
- Global illumination with ray tracing (Joseph Warmus)
- Rigid body motion (Edward Xie)
Shadow mapping

- Implement the basic shadow mapping.
- Build an example so that the shadow is obviously pixelated.
- Reason a perspective transformation that “rearranges” the resolution in the shadow space.
- Implement this perspective transformation and compare it with the pixelated result!
Subdivision surface

- Generate a smooth mesh by recursively subdivide and average vertices
- Week-6 will cover subdivision for curves and some basic data structure for surface
Global illumination with ray tracing

- Non-OpenGL pipeline
- The scene graph / camera class etc can still be used
- Write your own renderer with C++
- Week-7 we will learn the basic ingredients of a ray tracer and what optical phenomena to expect
Rigid body motion

- Physics based animation
- Recover the Dzhanibekov Effect (See Wikipedia entry: “Tennis racket theorem”)
- Also visualize the trajectory of rotation axis on the Poinsoit ellipsoid
- Week-8: Differential equation solver