CS130 Exam 2 Material Outline

Homework
- Homework 6: Texture mapping, ray tracing
- Homework 7: Practice Test 2

Labs
- Lab 5: Texture Mapping
- Lab 6: SLERP
- Lab 7: Ray Tracing
- Lab 8: Bezier Curves
- Lab 9: Subdivision

Assignments
- Assignment 2: Ray Tracing
  - View rays, shadow rays, reflection rays
  - Object-ray intersections
  - Phong reflection model

Lectures
1. Texture Mapping
   - Coordinate Systems
   - Intermediate Surfaces
   - spherical, cylindrical, box mappings
   - mapping from actual shape to intermediate shape (position, surface normal, centroid)
   - Parametric surfaces
   - Triangle texturing
   - Multitexturing
   - Aliasing, Magnification, Minification
   - Mipmapping
   - filtering, point sampling
   - Perspective correct interpolation
   - Environment mapping
2. Rotations
   - rotation about arbitrary axis
   - composite transformations
   - Euler Angles
   - Gimbal Lock, extrinsic and intrinsic rotations
   - Quaternions
   - Slerp

3. Raytracing
   - basic algorithm components: cast, intersect, shade, recursion
   - Anti-aliasing raytracing techniques
   - soft shadows
   - soft focus
   - soft reflections
   - motion blur
   - acceleration structures: bounding boxes, spatial partitioning, bounding volume hierarchy
4. Curves

- goals: local control, smoothness and continuity, derivative evaluation, stability, ease
- Parametric curves, tangent vector to
- Reparameterization
- Piecewise curves
- continuity C0, C1, ..., Cn, G1
- higher order polynomial interpolation: overshoots and non-local effects
- Blending functions
- Cubics
- Cubic Hermite Curves, blending
- Bezier Curves, blending, subdivision
- Parametric surfaces, tangent plane to
- Bezier surface patches