



CS 450/550 -- Fall Quarter 2020 Test #2 Review

This page was last updated: September 10, 2020

Test #1 will be taken using the Canvas Quiz mechanism.
It will consist of ~40 multiple choice questions to be done in 60 minutes.
It will be **Open Notes**.

Warning! "Open Notes" is not the same as "I don't need to study for it"! You will run out of time if you have to look up in the notes every one of the questions.

Test date and time range:

The test will open on Thursday, December 10, at 12:01 AM PST.
It will close Sunday, December 13, at 11:59 PM.
Once you start, you have 60 minutes to finish or until Sunday 11:59 PM, whichever comes first.

Test rules:

- This is Test #2, not a comprehensive final. However, ...
- ... **I reserve the right to re-use a few questions from Test #1, \pm a slight change.**
- The test is worth 100 points.
- It is closed friends.
- You are responsible for
 1. what is in all handouts
 2. what was said in class
 3. what was on the quizzes
 4. what you have done in the projects.

The test can potentially cover any of the following topics

- Casting shadows with OpenGL
Render from the point of view of the light source
If a fragment is in a shadow, only light it with ambient
- Vertex Buffer Objects:
What they are, where they live, what the advantage is of using them.
GL_ARRAY_BUFFER vs. GL_ELEMENT_ARRAY_BUFFER: what each is used

for.

glDrawArrays() vs. glDrawElements().

(You don't need to be able to replicate the code.)

- Geometric Modeling:
Meshes, Triangular Irregular Networks (TINs).
Constructive Solid Geometry (CSG).
Cubic Bézier curves (although, in the general case, they can be any order).
Bézier curve drawing. (You don't need to know the equation.)
Catmull-Rom curves. (You don't need to know the equation.)
The fact that Bézier surfaces exist, and that the bicubic ones are sculpted with 16 points.
Lattices/Cages.
Voxelization.
Metaballs.
- Rendering:
What the Rendering Equation means (you don't need to know the equation itself).
Local versus Global illumination.
OpenGL rendering: Painter's method, Z-buffer.
Ray-tracing: what it is good at, what it isn't, how it models light transport, intersecting a ray with a xxx.
Sub-surface scattering: what materials is it good for creating the illusion of?
Radiosity: what it is good at, what it isn't, how it models light transport, system of equations.
Bidirectional Reflectance Distribution Function (BRDF). (Distribution of the bounced light rays.) Physically-Based Rendering (PBR): Path Tracing.
Screen Space Ambient Occlusion – what does it produce?
- 3D Printing:
Additive versus subtractive manufacturing.
The STL file format.
Overhangs.
Definition of the Vertex-to-Vertex rule.
Simplified Euler's Formula (yes, you need to know this one: $F - E + V = 2$).
- Animation:
Key-framing: what it is, why do it this way.
Forward kinematics: what it is, why do it this way.
Inverse kinematics (IK): what it is, why do it this way.
Particle systems: what they are, the three elements of doing it, what effects you can create this way.
Rigid Body Physics: why do it this way, $F=ma$, springs, chains/strings, cloth, Jello.
Functional animation: what it is, how it is done, why do it this way, its use in collision avoidance.

Motion Capture (MoCap): what it is, why do it this way.

- Stereographics:
Horizontal parallax
Vertical parallax
Plane of zero parallax
Non-symmetric viewing volumes
Different ways of channeling the images into each eye
Lenticular stereo images
ChromaDepth
- Virtual and Augmented Reality:
Walking through the 3D scene
Spherical Stereo Images – advantages, disadvantages
OpenXR – what is it, why do we care?
- Vulkan:
General information,
Why it was created.
Create many pipeline data structures that contain all of what OpenGL calls state/context.
Compiling shaders
Its relationship with OpenGL.
What would make you care.
- More Information.
- Projects:

4	Lighting
5	Shaders
6	Catmull-Rom Curves