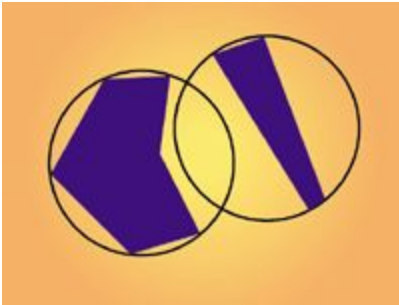


Name	Question	Answer
Jermaine Newton	List two (2) types of Anti-aliasing techniques and explain how each technique is implemented.	<p>1. Super-sampling - This is implemented by taking the corners of each pixel and creating what would be the average color. By doing this you are effectively smudging the image and averaging out the color.</p> <p>Multisampling - This is implemented by taking multiple samples for each pixel. In a fairly standard example the quincunx system takes 4 samples in the corners and 1 sample in the middle. Each of these samples is given a weight. The corners are given a weight of $\frac{1}{8}$ each and the centre sample is given a weight of $\frac{1}{2}$. The color of the pixel is then determined by similar calculations to Super-sampling (averaging)</p>
Farnaz Baksh	With the aid of a simple diagram, explain what is Shadow Mapping.	<p>The idea behind shadow mapping is quite simple: we render the scene from the light's point of view and everything we see from the light's perspective is lit and everything we can't see must be in shadow.</p> <p>https://learnopengl.com/Advanced-Lighting/Shadows/Shadow-Mapping</p>
Ridwan Azeez	What are the types of shadows and briefly explain each	<p>1. No Shadow (invisible shadow) Caused by an abundance of light sources or a high level ambient light</p> <p>2. Single Point Shadow Shadow cause by one light source</p> <p>3. Multi-point Shadow Shadow caused by more than one light sources</p> <p>4. Simple Shadow Shadow falling on a flat surface (usually a plane)</p> <p>5. Not So Simple Shadows Shadow falling on the surfaces of other objects with one or more light sources</p>
Stephanie Joseph	Give two advantages and two disadvantages of Ray tracing.	<p>Advantages of Ray tracing:</p> <ul style="list-style-type: none"> - Accurately renders direct illumination, shadows, specular reflections and transparency effects. - Memory efficient <p>Disadvantages of Ray tracing:</p> <ul style="list-style-type: none"> -Doesn't account for diffuse inter-reflections -Process must repeat for each view(view

		dependent)
Stephanie Simon	Give two pros and two cons of Anti-aliasing	<p>Pros:</p> <ul style="list-style-type: none"> -Smooth out screen fonts -Rounded edges look to have smooth curves. <p>Cons:</p> <ul style="list-style-type: none"> -Small text can be too blurred to read -Static image sizes are larger.
Maryam Nasir	What are the three ways of applying textures? Give an example for each.	<p>Textures can be applied by texture mapping, bump mapping or environmental mapping. Texture mapping is the application of fixed patterns, procedural texture or digitized images to three dimensional graphics to enhance realism of surfaces, e.g. when creating a model processed wood. Bump mapping simulates bumps and wrinkles on the surface of an object by using the perturbed normal during lighting calculations, e.g. modelling the surface of an orange. Environment mapping is a scheme that improves on the mapping techniques of chrome and refraction mapping, e.g. creating a reflective, shiny teapot.</p>
Steve Ramoutar	What is a and describe at least 4 types of buffers	Whenever data is stored uniformly for each pixel, such storage for all the pixels is called a buffer – these buffers make up the final image that is displayed on the screen
Arianna Mahase	Explain the concept of ray tracing	In computer graphics , ray tracing is a rendering technique for generating an image by tracing the path of light as pixels in an image plane and simulating the effects of its encounters with virtual objects.
Melanie John	What is a light and explain how it can be represented in computer graphic.	<ul style="list-style-type: none"> -Light is simply a name for a range of electromagnetic radiation that can be detected by the human eye. -It can be represented through images, shadow and environment maps, light sources, radiosity and radiance basis function and ray tracing procedures.
Andrew Garnett	<p>Define the 4 steps for adding light.</p> <p>Provide an example for one of the aforementioned steps.</p>	<ul style="list-style-type: none"> ● Define normal vectors for each vertex of all the objects. ● Create, select, and position one or more light sources. ● Create and select a lighting model ● Define material properties for the objects in the scene

		<p>Example of defining normal vectors:</p> <pre>glBegin(GL_QUADS); glNormal3f(1,1,1); glVertex3f(1,1,1);</pre>
Alana Hasan	What is z-buffering and explain the visibility problem.	<p>Z-buffering is the management of depth coordinates in 3 dimensional graphics. It is used to determine whether an object or part of an object is visible in a scene. It can be implemented either in hardware or software and increases rendering efficiency. The visibility problem is determining which objects or parts of the objects are closest and visible.</p>
Mark Mahabir	Why is it important to specify material properties of the objects in the scene when lighting is implemented?	<p>It is important to specify your material properties in your scene because once color is enabled everything in the scene will be painted by the color of the light</p> <p>In reality, a red ball in white light does not turn white</p>
Abdur Baksh	Briefly explain the two algorithms which are used to solve the visibility problem and list the steps necessary to enable depth buffering in OpenGL	
Denzil Hermonstine	What is the benefit of using an axis aligned boundary box	<p>Axis Aligned Boundary Box it's a 3D version of a rectangle that covers the object. Being spawned from the center of the object it is containing. We define a 3D AABB by the center point (position). Commonly called boundary volumes are used to improve the efficiency of the geometrical operations by using simple volumes to contain more complex objects. Normally simpler volumes have simpler ways to test for overlapping</p>
Dacia Chappelle	What is meant by the term fog in computer graphics? With the aid of examples, briefly describe two advantages of fog.	<p>Fog is a general term that describes similar forms of atmospheric effects; it can be used to simulate haze, mist, smoke Or any form of pollution . Advantages: adds realism and improves performance .</p> <p>http://www.iquilezles.org/www/articles/fog/fog.htm</p>
Michael McLennan	List and give a short explanation of the 4 different approaches used to simulate shadow in a scene.	<p>a. Radiosity</p> <p>A rendering method that simulates light reflecting off diffuse surfaces and onto others. Radiosity produces the soft shadows from</p>

		<p>multiple reflections and light sources that exist in the real world.</p> <p>b. Ray tracing</p> <p>A rendering method that simulates light reflections, refractions and shadows. It follows a light path from a specific source and computes each pixel in the image plane to simulate the effect of the light with the virtual objects.</p> <p>c. Shadow mapping</p> <p>Shadow mapping is a process by which shadows are created by testing whether a pixel is visible from the light source, by comparing the pixel to the depth image of the light source's view, stored in the form of a texture.</p> <p>e. Shadow volume</p> <p>Shadow volume is a technique that divides the virtual world into areas that are in shadow and areas that are not.</p>
Gregory Dey	Compare and contrast Radiosity and Ray Tracing	
Zeenat Wilson	The two basic classes of planar geometric projections are parallel projection and perspective. Explain the difference between the two and give an example where each may be applicable.	<p>In parallel projection, the distance from the center of projection (COP) to the projection plane (image plane) is infinite and the relative proportion of the object is preserved while in perspective projection, the distance from the COP to the projection plane is finite and the size of the object varies inversely with the distance which makes it looks more realistic.</p> <p>Parallel projection is suitable for displaying objects such as architecture drawings eg building plans.</p> <p>Perspective projection is applicable for displaying more realistic scenes or objects eg virtual classroom</p> <p>Perspective projection is seeing things larger when they're up close and smaller at a distance. It is a three-dimensional projection of objects on a two-dimensional medium such as paper.</p> <p>Parallel projection, on the other hand, resembles seeing objects which are located far from the viewer through a telescope. It works by making light rays entering the eyes parallel, thus, doing away with the effect of</p>

		depth in the drawing. Objects produced using parallel projection do not appear larger when they are near or smaller when they are far. It is very useful in architecture.
Andrea Preston	Briefly describe a polygon and list the properties to ensure that a polygon is displayed correctly by giving examples of each.	A polygon is any object that has closed borders. Three(3) properties to ensure that a polygon is displayed correctly are simple, convex and flat objects.
Teekae Jordan	Explain the difference between multi-sampling and super-sampling	Super-Sampling takes the corner of each pixel and creates an average color of the pixel while Multi-Sampling takes multiple samples of each pixel, gives each sample a weight $\frac{1}{8}$ (corners) and $\frac{1}{2}$ (centre) and then performs calculations similar to super-sampling to average the color of the pixel.
Marcellous Bhagwandeem	list 3 or more types of shadows that can be found in a scene and briefly explain using situations it can be useful	
Renard Jacobis	<p>a) Explain with the use of a diagram, the most primitive way of doing collision detection. (5 marks)</p> <p>b) Why is the method explained in part (a) still being widely used today? (1 mark)</p>	<p>a) The most primitive way of doing collision detection is by approximating each object or parts of the object with a sphere and then check to see if the spheres intersect each other.</p> <p>This is the diagram. Check to see if the distance between the centers of the two spheres is less than the sum of the two radius of the circles (if so, then collision has occurred).</p>  <p>b) This method is still being used since it is computationally inexpensive.</p>
Dwight Ferguson	Explain the term "jaggies" in your own words, and why does it occur?	<p>Jaggies are rigid, non-straight line or edge of an image or graphic./ Fuzzy lines when zooming in on an image or graphical representation. / Blurry lines when zooming in on an image./ Stair Step lines in an image.</p> <p>Jaggies occur because the output device is not high enough in resolution to represent smooth lines.</p>

Daniel Griffith	Describe an implementation that we can use for collision detection	<p>Implementation 1:</p> <pre>while(1){ process_input(); update_objects(); render_world(); } ` update_objects(){ for (each_object) save_old_position(); calc new_object_position {based on velocity accel. etc.} if (collide_with_other_objects()) new_object_position = old_position(); {or if destroyed object remove it etc.}</pre> <p>}</p> <p>Advantage: Captures more collisions if we calculate the space between t1 and t2 with a solid and test against the collision boundary.</p> <p>Disadvantage : Inefficient</p> <p>Implementation 2:</p> <p>Subdivide the given time interval in half for intersection at the midpoint.</p> <p>Advantage: Faster than implementation 1</p> <p>Disadvantage: Not guaranteed to capture all collisions</p>
Triston Carter Taekonda	How many vectors Phong reflection model has and what does it support?	<p>Phong models has 4 vectors and it supports:</p> <ul style="list-style-type: none"> -ambient - diffuse -specular light material -interactions
Carlson Wickham	<p>a. Differentiate between collision detection and collision response</p> <p>b. State two situations where collision detection can occur.</p>	<p>Collision detection is the observation of intersection (close-to) of two or more objects in 2D/3D space whereas collision response is the programmed reaction for a collision which is heavily dependent on the reaction of the stimulated of the desired effect.</p> <p>Situations</p> <ol style="list-style-type: none"> Boundaries created by walls/floors Interaction between two or more objects in space
Romeo Matthews	It is important to specify material properties of an object in the scene when implementing light. Explain why with an example.	
Shemar Brandon Austin	List the type of Shadows and explain how two are caused	
Rene Henry	Briefly define the terms 'stitching' and 'z-fighting'. Identify a technique which can be used to solve these.	<p>Z-fighting occurs when polygons overlap, attempting to occupy the same space.</p> <p>Stitching occurs when an object is rendered in fill mode and combined with line mode (of a</p>

		<p>different colour). Stitching occurs along the edges of the object.</p> <p>Polygon offset is a technique used to solve these problems.</p>
Brandon Samaroo	<p>a) What is texture mapping? b) List two types of texture mapping.</p>	<p>Texture mapping is applying images or patterns to an object to enhance its surface or realism</p> <p>Complex Texture Mapping Bump Texture Mapping 2 Dimensional Texture mapping</p>
Tyreke Wilson	<p>A) What are the 3 types of Material Properties?</p> <p>B) Give one example of each type of Material Property.</p>	<p>A) 1. Specular Surfaces 2. Diffuse Surfaces 3. Translucent Surfaces</p> <p>B) 1. Mirror, shiny objects, smooth reflective surfaces. 2. Matte, flat paint, terrain 3. Glass, water, tint</p>
Shellon Lynch-Worrell	<p>In relation to lighting, list three material properties and give two examples of each.</p>	<p>- Specular Surfaces Eg. Mirror, shiny objects, smooth reflective surfaces</p> <p>- Diffuse Surfaces Eg. Matte, flat paint, terrain</p> <p>- Translucent Surfaces Eg. Glass, water, tint</p>
Daniel Ally	<p>What are the steps to enable depth buffering in openGL ?</p>	
Joel La Fleur	<p>What is the "Painter's Algorithm" and identify one potential problem while using this algorithm.</p>	<p>The painter's algorithm is one of the simplest solution to the visibility problem in 3D CG. It is the technique of painting distant parts of a scene before parts nearer. A difficulty encountered with this algorithm is Zredundant painting.</p>

Shelroy Thomas	Explain the difference between the stencil and depth buffers. (5 mks)	<p>Depth buffer stores a depth value for each pixel, depth is usually measured in terms of distance to the eye, so pixels with larger depth-buffer values are overwritten by pixels with smaller values</p> <p>Stencil buffer A stencil buffer is a per pixel buffer, and works on integer values, usually with a depth of one byte per pixel. ... In the simplest case, the stencil buffer is used to limit the area of rendering (stenciling). Stencil buffer It is very similar in behaviour to a depth-buffer - like depth testing, stencil testing is a true/false test, and there are similar settings to control the stencil test (pass if greater/less/equal). But instead of writing a depth to it, it will usually have pre-defined values written to it, or be incremented/decremented when pixels are drawn, as used in stencil shadow algorithms.</p>
Hemroy Grant	Why does jaggies occur?	Jaggies occur because the output device (monitor and/or printer) is not high enough in resolution to represent smooth lines. (Jaggies are the stair step edges of a shape/ object on screen.)
Aditya Persaud	Provide three reasons why adding shadow in CG is important.	<ol style="list-style-type: none"> 1. Shadows provide visual cues about the spatial relationships between the different components in a scene ` 2. 2. Additional information and views of objects Improved "realism" ` 3. Lighting environment cues Anchors: Without shadows objects seem to float/hover
Levar Simon	What is Perspective Projection? List one advantage and one disadvantage of Perspective Projection.	
Brandon Narine	What are particle systems? List 4 properties of particle systems.	<p>A particle system is a technique in game physics, motion graphics, and computer graphics that uses a large number of very small sprites, 3D models, or other graphic objects to simulate certain kinds of "fuzzy" phenomena, which are otherwise very hard to reproduce with conventional rendering techniques - usually highly chaotic systems, natural phenomena, or processes caused by chemical reactions.</p> <p>Properties: Position</p>

		<p>Velocity (speed and direction)</p> <p>Color</p> <p>Lifetime</p> <p>Age</p> <p>Shape</p> <p>Size</p> <p>Transparency</p>
Kevin Craigwell	Explain, why would you put pollution in a 3D scene.	Pollution is added in 3D scenes to make the image look real, cause without it the image would look fake.
Rishal Singh	What are shadows and why should they be added to a scene?	<p>A shadow is an area where the full intensity of light is cut off by one or more object and should be added to a scene since;</p> <ol style="list-style-type: none"> 1. Shadows provide visual cues about the spatial relationships between the different components in a scene ` 2. Additional information and views of objects. Improved "realism" 3. Lighting environment cues Anchors: Without shadows objects seem to float/hover
Dinesh Kissoon	What are the steps required to add light to your scene?	<ol style="list-style-type: none"> 1. Define normal vectors for each vertex of all the objects. These normals determine the orientation of the object relative to the light sources 2. Create, select, and position one or more light sources. 3. Create and select a lighting model, which defines the level of global ambient light and the effective location of the viewpoint (for the purposes of lighting calculations) 4. Define material properties for the objects in the scene
Kim Chong	What is anti aliasing? And list it's pros and cons.	
Samuel Klien	What are atmospheric effects and why put any in a 3D scene?	
Yolanda Darrell	What is the visibility problem in CG? Describe two (2) solutions for dealing with the visibility problem in 3D graphics.	<p>The issue of deciding visibility between two objects</p> <ol style="list-style-type: none"> 1) The painter's algorithm- also known as a priority fill, is one of the simplest solutions to the visibility problem in 3D CG } the technique of painting distant parts of a scene before parts nearer (covering distant parts) 2) Z-culling-is early pixel elimination based on depth, When using a z-buffer, a pixel can be culled (discarded) as soon as its depth is

		known, which makes it possible to skip the entire process of lighting and texturing a pixel that would not be visible anyway
Brandon Tulsie	<p>Given $P = (3, 7, 45)$ near = 10, far = 100</p> <p>determine whatever or not P is within the frustum using the formula: $z' = ((far + near) / (far - near)) + 1/z ((-2 \times far \times near) / (far - near))$</p>	$(100 + 10) / (100 - 10) + 1/45 ((-2 \times 100 \times 10) / (100 - 10))$ $= (110/90) + 1/45(-2000/90)$ $= 1.222 + 0.022(-22.222)$ $= 0.733116$ Note this is with 3 significant figures after the point
Andray Yagvalk	<p>Briefly explain the following mapping techniques and give one example each for which they can be applied.</p> <p>a - Texture Mapping b - Environmental Mapping c - Bump Mapping</p>	<p>Texture mapping: Texture mapping is a graphic design process in which a 2D image called a texture map, is wrapped around a three-dimensional 3D object to simulate a real world object. EXAMPLES: Surface of wood, grass, bricks etc.</p> <p>Environmental mapping: aka as reflective mapping: use to approximating the appearance of a reflective surface by means of a precomputed texture image. EXAMPLE: used to generate shipy and mirror like surfaces. Metallic Objects</p> <p>Bump Mapping: is a technique in computer graphics for simulating bumps and wrinkles on the surface of an object. EXAMPLE: Surface of an orange, human skin, tree trunk, etc</p>
Roylon Venture	Contrast between the Frame Buffer and the Accumulation Buffer?	The Frame Buffer is a combination of all the buffers to form the final image to be displayed on the screen whereas the accumulation buffer is used for accumulating a series of images into a final composite image.
Floyd Kisson	In your own words explain collision detection.	Collision detection is the computational problem of detecting the intersection of two or more objects. While collision detection is most often associated with its use in video games and other physical simulations, it also has applications in robotics
Orlando Grant	List the pros and cons of Orthographic Projection in CG.	Pros: Preserves both distances and angles ◦

		<p>Shapes preserved °</p> <p>Can be used for measurements Building plans Manuals</p> <p>Cons: Cannot see what object really looks like because many surfaces hidden from view °</p> <p>Often we add the isometric</p>
Shomari Williams	Explain the concept of projection space and explain its relevance to computer graphics	
Krishna Hardat	Explain the difference between ambient light source and point source	

Marcellous bhagwandeem	list 3 or more types of shadows that can be found in a scene and briefly explain using situations it can be useful	<p>No Shadow (invisible shadow) When there is so much light that no shadow exist (ambient light)</p> <p>Single Point Shadow Causes by one light (USING A SPOT light on a theater so get the crowds attention to one aspect)</p> <p>Multi-point Shadow More than one light source causes this shadow (can be used at a circus to cast multiple shadows to help in the amusement of the audience)</p> <p>Simple Shadow Shadow falling on a plane (used in drawing or paints to make the image look more realistic)</p> <p>Not So Simple Shadows Shadows falling on the surface of one or more objects with one or more light source (can be used in games with multiple light source and various objects along path or during game play)</p>
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Shellon Lynch	In relation to lighting, list three material properties and give two examples of each.	<ul style="list-style-type: none">- Specular Surfaces Eg. Mirror, shiny objects, smooth reflective surfaces- Diffuse Surfaces Eg. Matte, flat paint, terrain- Translucent Surfaces Eg. Glass, water, tint
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