CISC 3620 SP25 Midterm Sample Questions

Short Response Questions:

- What is the primary focus of computer graphics?
- Describe the main difference between 2D and 3D graphics.
- Identify the four major areas of computer graphics applications noted in class and provide a brief description and example of each.
- Explain the role of a graphics processing unit (GPU).
- What is the purpose of a frame buffer in computer graphics?
- What are the two main types of 2D graphics? Define them, explain how they differ, and give an example of each.
- Define raster graphics and provide an example of its use.
- What are vector graphics, and how do they differ from raster graphics?
- List the six major components of a computer graphics system.
- What is the difference between absolute and relative positioning in terms of input devices? Give an example of an input device for each.
- What are the two main types of input devices mentioned in computer graphics systems?
- What is the difference between the CPU and GPU in a graphics system?
- Describe the difference between absolute and relative position input devices.
- How does anti-aliasing contribute to image quality?
- Explain the difference between noninterlaced and interlaced display systems in terms of how they refresh pixels on a screen.
- What advantages does a PNG have over a GIF?
- What is the purpose of a graphics API?
- Explain the difference between additive and subtractive color models.
- What is the color gamut of a device?
- Briefly explain the role of the vertex shader in the graphics pipeline.
- List and define the five steps of a standard 3D graphics pipeline.
- What are the three necessary components that are needed to display in Three.js? Define them.
- In the following Phong shading model, identify these seven terms: **kd, Id, ks, Is, α, ka, Ia**

$$I = k_d I_d \, \mathbf{l} \cdot \mathbf{n} + k_s I_s (\mathbf{v} \cdot \mathbf{r})^{\alpha} + k_a I_a$$

- What are the components that make up a 3D object in Three.js?
- What are the two types of cameras in Three.js and how do they differ from one another?
- List the four attributes of the Perspective Camera in Three.js and what they represent.
- What are the three main components of the Phong shading model, and how do they contribute to the appearance of a surface in 3D graphics?

- Create a translation matrix to move a point 3 units along the x-axis and 7 units along the negative y-axis.
- Create a 4x4 matrix to scale a point by 3 in the x dimension and 0.2 in the z dimension.
- What are the five types of lights in Three.js that we discussed in class? Briefly describe each.
- How do we apply a texture to a material in Three.js?
- What is texture tiling, and how can it improve the appearance of textures in a 3D scene?
- What is shadow mapping and how does it work?
- How does Percentage-Closer Filtering (PCF) help improve shadow quality?
- Explain the difference between castShadow and receiveShadow properties in Three.js.
- Explain the role of UV mapping in applying textures to 3D geometries.

Multiple Choice Questions:

- Which of the following best describes raster graphics?

  a) Graphics made up of lines and curves
  b) Graphics represented by pixels
  c) Graphics created using algorithms
  d) Graphics that cannot be resized

- What is the primary advantage of using vector graphics?

  a) They are easier to use than raster graphics
  b) They are resolution-independent
  c) They are faster to render
  d) They are always color accurate

- The conversion of geometric entities to pixel colors and locations in the frame buffer is known as:

  a) Rendering
  b) Ray tracing
  c) Rasterization
  d) Texture mapping

- Which of the following is not a common input device?

  a) Keyboard
  b) Mouse
  c) Monitor
  d) Joystick

- The color model that involves the mixing of light is called:

  a) Subtractive
  b) Additive
  c) Reflective
  d) Inverted

- How many colors can be displayed using an 8-bit RGB color model?

  a) 256
  b) 65536
  c) 16777216
  d) 1024

- A digital image displayed with a grid of pixels is known as:

  a) Vector image
  b) Raster image
  c) Geometric image
  d) Z-buffer image

- To define color in a raster image, which color model is typically used?

  a) CMYK
  b) HSL
  c) RGB
  d) YUV

- What RGB value represents the color black?

  a) (255, 255, 255)
  b) (0, 0, 0)
  c) (128, 128, 128)
  d) (255, 0, 0)

- How can the color white be described in terms of RGB values?

  a) (0, 0, 0)
  b) (255, 255, 0)
  c) (255, 255, 255)
  d) (128, 128, 128)

- Which of the following RGB values represents a shade of gray?

  a) (255, 128, 0)
  b) (0, 0, 255)
  c) (128, 128, 128)
  d) (0, 255, 0)

- Which of these techniques is a process where geometry that's not visible from the camera is discarded to save processing time?

  a) Culling
  b) Clipping
  c) Filtering
  d) Sampling

- Which of the following transformations is NOT a linear transformation?

  a) Scaling
  b) Rotation
  c) Translation
  d) None of the above

- Which of the following formats is specifically designed for vector graphics?

  a) WebP
  b) PNG
  c) SVG
  d) GIF

- What does the term 'anti-aliasing' refer to?

  a) Adjusting brightness in images
  b) Reducing jagged edges in graphics
  c) Compression of image files
  d) Creating textures for 3D models

- Which component determines the color of pixels on a computer screen?

  a) Memory
  b) Graphics Processing Unit (GPU)
  c) Central Processing Unit (CPU)
  d) Input devices

- Which material in Three.js would you use for a surface that should reflect light and appear shiny?

  a) MeshBasicMaterial
  b) MeshNormalMaterial
  c) MeshPhongMaterial
  d) MeshLambertMaterial

- What does the dot product of two vectors indicate when it equals zero?

  a) The vectors are equal
  b) The vectors are orthogonal (perpendicular)
  c) The vectors point in the same direction
  d) The vectors point in opposite directions

- In a graphics pipeline, rasterization is the process of:

  a) Mapping 3D coordinates to 2D space
  b) Converting images from raster to vector
  c) Breaking down 3D objects into pixels
  d) Transforming model data into vertex data

- In Three.js, how do you set the background color of a scene?

  a) scene.color = "blue";
  b) scene.background = new THREE.Color("blue");
  c) scene.setBackgroundColor("blue");
  d) scene.addBackground("blue");

- How does ambient light affect a scene?

  a) It creates sharp shadows
  b) It adds light without direction or intensity
  c) It reflects off surfaces
  d) It creates a focal point

- Which of the following describes a characteristic of raster graphics?

  a) They use geometric shapes like lines and circles.
  b) They are resolution-independent.
  c) They are made up of a grid of pixels.
  d) They require less memory than vector graphics for complex images.

- What is the primary disadvantage of using Supersampling Anti-Aliasing (SSAA)?

  a) It is the cheapest method
  b) It is computationally intensive and can heavily load the GPU
  c) It is only effective on high-resolution displays
  d) It cannot smooth edges effectively

- FXAA stands for:

  a) Fast Analysis Anti-Aliasing
  b) Fast Approximate Anti-Aliasing
  c) Fine Adjustment Anti-Aliasing
  d) Full Anti-Aliasing Extension

- Multi-Sample Anti-Aliasing (MSAA) primarily samples multiple points:

  a) Throughout the entire pixel
  b) Only at the edges of polygons
  c) Across all subpixels
  d) At random positions in the image

- CSAA improves on MSAA by:

  a) Reducing the number of color samples while increasing coverage samples
  b) Allowing for higher resolution color samples without increasing memory usage
  c) Increasing the number of coverage samples without significantly increasing the number of color/depth samples
  d) Eliminating color samples altogether