Review for Midterm
HL

On 2D Graphics

1. Line equation in 2D vector form.
2. Direction vector definition and calculation.
3. Meaning of lamda of a 2D line equation, and its values, such as 0, 1, and >0, <0 etc., corresponds to line segments.
4. Using vector form line equation to design 2D graphics applications, such as, screen savers and trees.
5. Screen saver equation and calculation.
6. Tree equation and calculation.
7. Transformation matrices for translation and rotation.
8. Composition of 2D transformations and its applications, for example, building 2D tree patterns.
9. OpenGL implementation.

On 3D Graphics

1. Line equation in 3D vector form.
2. World coordinate system vs. viewer coordinate system.
3. Concept of virtual camera.
4. world to view transformation matrix and calculation of each entry of the matrix.
5. Perspective projection and its calculation.
6. OpenGL implementation.

On Linear Decoration

1. Design of 2D pattern(s) to be moved in to 3D space, make sure they are in the right orientations and sizes;
2. Conduct linear decoration in the world coordinate system;

On 3D Shading Models

1. 3D line equations in vector form.
2. 3D plane equations in vector form, normal vector calculation, and plane equation calculation.
3. Single point light source and its ray equations.
4. Intersection(s) of ray equation with a plane equation.
5. Compute lamda for the intersection point of the ray and plane equations.

On I2C Sensor Input Device

1. Definition of I2C communication protocols.
2. Space-time diagrams for read/write operations.
3. Interpretation of I2C master and slave communication protocol.
4. I2C device address (slave address) and special purpose registers addresses.
5. Initialization and configuration for special purpose registers.

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