Computer Graphics
Topics for the Exam_01

Topics

• Coordinate systems
  o 2D Cartesian Coordinate
  o 3D Right-handed or Left-handed coordinate system
• Representation of Points and Vectors in 2d and 3d coordinates
• Representation of points and vectors in 2d and 3d homogenous coordinates

• Matrices
  o Matrix addition
  o Matrix Multiplication
  o Identity matrix
  o Matrix inverse
• Vectors
  o Vector length
  o Vector normalization
  o Inner product (Dot product)
  o Cross product
  o Angle between vectors

• **Transformations**
  o 2d and 3d translations
  o 2d and 3d rotations
  o 2d and 3d scale
  o 2d and 3d shear
  o Composite transforms
• **Window and Viewport**
• Mapping from window to viewport

• **Equation of lines and planes**
  • Equation of planes
  • Normal to planes
  • Finding equation of planes given 3 points
  • Finding equation of a plane given a point on the plane and plane normal
  • Parametric equations of lines
  • Finding distance of a point from a plane
  • Finding intersection of two planes
  • Finding intersection of a line and a plane
• **Composite matrix to make a vector to become an axis**
• **Composite matrix to rotate objects around a line or an axis in 3d by theta degrees**
• Composite matrix to make one coordinate system to coincide with the world coordinate system

• **Viewing in 3-dimensional space** • Steps to perform parallel projections in 3d space • Clipping against parallel view volume. • Steps to perform perspective projections in 3d space • Clipping against perspective view volume.