Cheatography

Computer Graphics 3 Cheat Sheet

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UNIT 3

PART A	
three primary geometric elements	Vertex (Point), Edge (Line), Polygon (Face)
Quadric Surface	defined by second-degree equations
polygon table	data structure storing lists of geometric and attribute data (to store connectivity information)
Plane equation	Ax+By+Cz+D=0; x,y,z → components of normal vector <0 inside; >0 outside
polygon meshes	Triangle and Quadrilateral Meshes
spline	defined by a set of polynomial functions

Plane Equations in Rendering Pipeline

Back-Face Culling:	substitute viewport into plane equation (sign determines direction of plan for clipping)
Inside-Outside Testing & Depth:	if a point is inside a polygon; calculate depth of any point

Meshes

Polygon Meshes	**Quadratic (or Parametric) Surfaces**
made of triang-les/quads	equations/control points
Modelling Accuracy	
Approximate, depends on number of polygons	High precision, smooth surfaces
Resource Requirements	
Needs more memory for high detail	Compact repres-entation, fewer parameters
Rendering Efficiency	
Very efficient, directly supported by GPUs	Not directly renderable, must be converted to meshes
Ray surface intersection	
Advantages	
fast; basic algebraic math; computation time predictable; universal for any shape	exact represent-ation; compact storage; analytical precision
Disadvantages	
approximation error; memory performance trade-off	computational cost; specializ-ation required

Polygon meshes = standard for real-time rendering (fast, GPU-friendly)
Quadratic surfaces = better for design accuracy, but used as pre-processing before conversion to polygons

B-Spline and Bézier

B-Spline	**Bézier**
local control	global control
single compact representation	needs many separate curves

B-Splines are flexible, efficient (faster updates, less recomputation) and manage-able.

Polygon tables

Geometric (Vertex) Table	Avoids duplication
Attribute Table	Stores properties (color, texture, reflectivity)
Surface (Polygon) Table	Stores faces using vertex indices (geometry + attrib-utes)

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