

Simulation



The Dust Bowl phenomena



Black hole from Interstellar

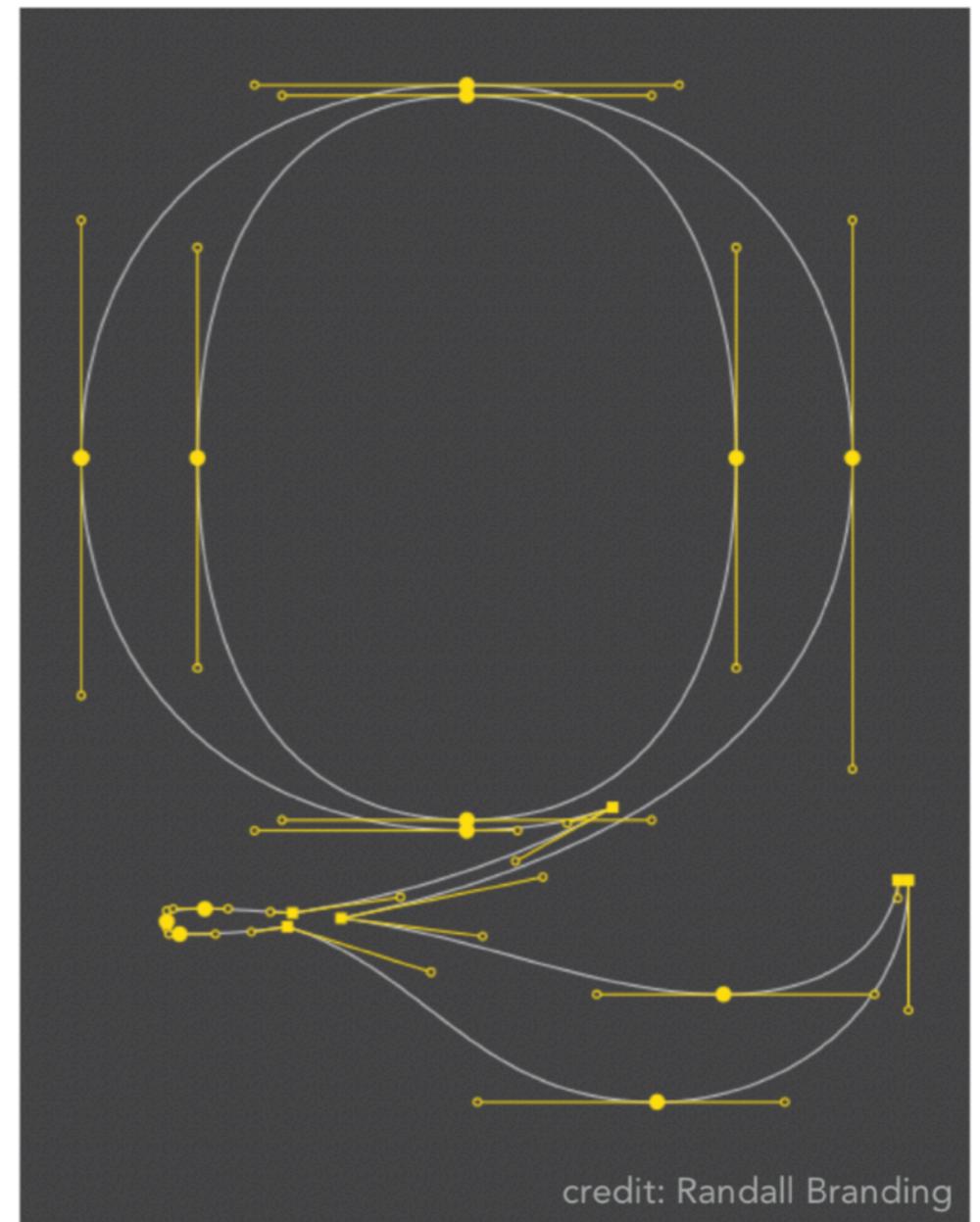
Graphical User Interfaces



Typography

The Quick Brown
Fox Jumps Over
The Lazy Dog

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 01234567890



credit: Randall Branding

The font Baskerville

Why Study Computer Graphics?

- **Fundamental Intellectual Challenges**
 - Creates and interacts with realistic virtual world
 - Requires understanding of all aspects of physical world
 - New computing methods, displays, technologies

Why Study Computer Graphics?

- Technical Challenges
 - Math of (perspective) projections, curves, surfaces
 - Physics of lighting and shading
 - Representing / operating shapes in 3D
 - Animation / simulation
 - ~~3D graphics software programming and hardware~~

Why Study Computer Graphics?

- Forget about the previous reasons

**Computer Graphics
is
AWESOME!**

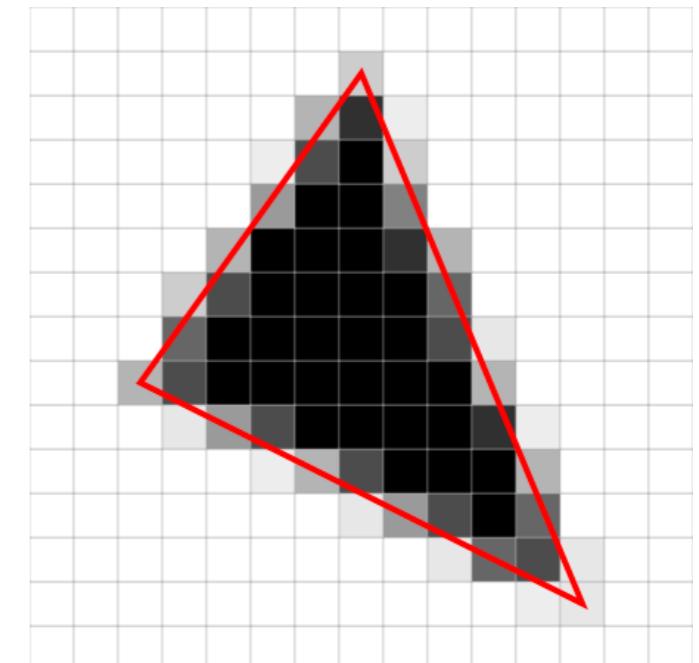
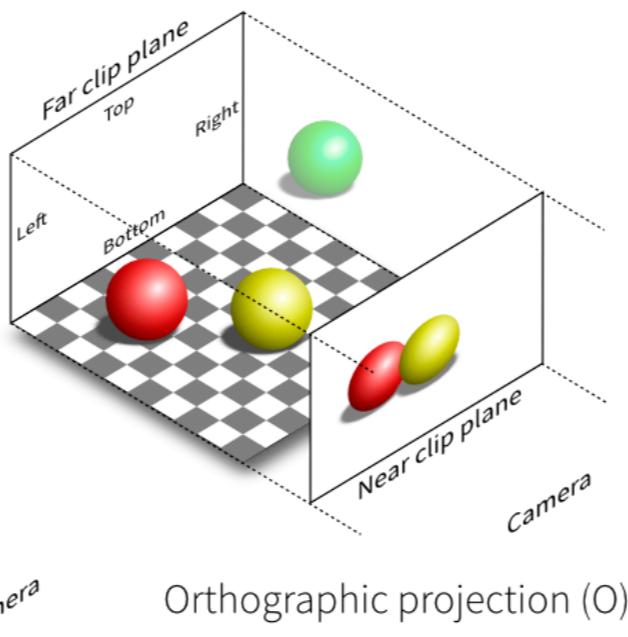
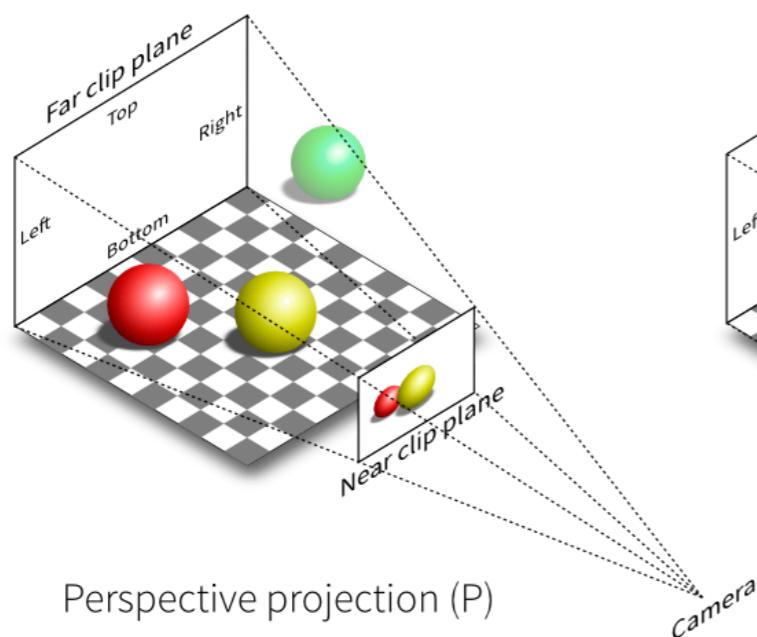
Questions?

Today's Topics

- What is Computer Graphics?
- Why study Computer Graphics?
- Course Topics (mainly 4 parts)
 - Rasterization
 - Curves and Meshes
 - Ray Tracing
 - Animation / Simulation
- Course Logistics

Rasterization

- Project **geometry primitives** (3D triangles / polygons) onto the screen
- Break projected primitives into **fragments** (pixels)
- Gold standard in Video Games (Real-time Applications)

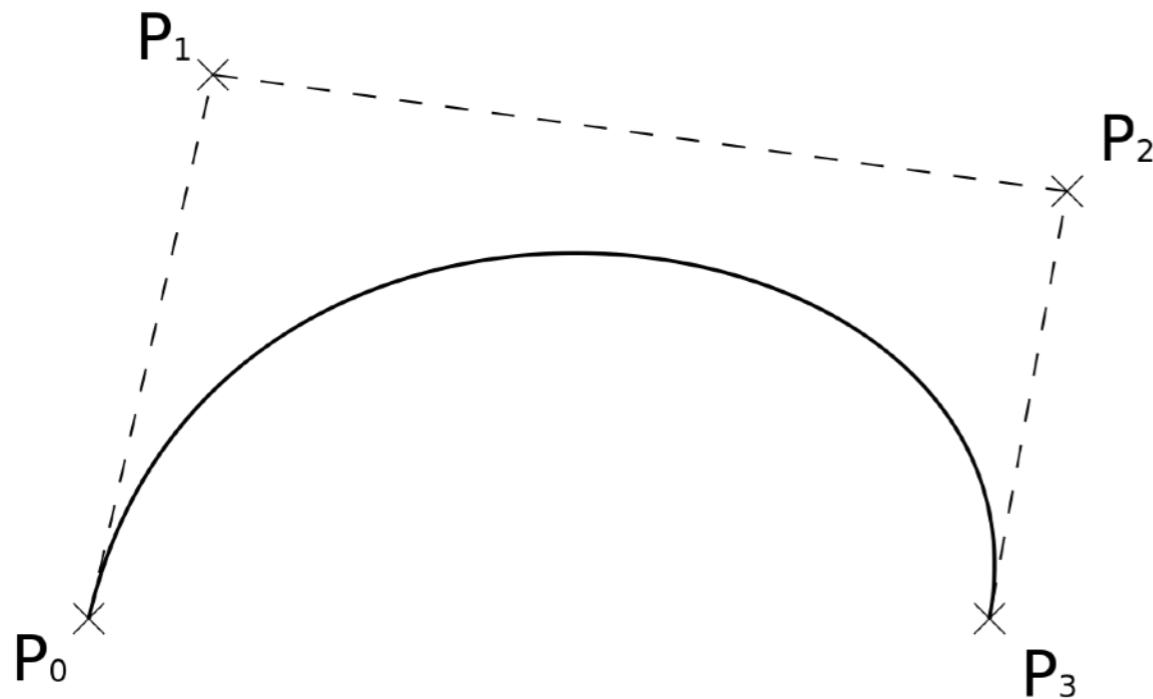


<http://vispy.org/modern-gl.html>

[https://commons.wikimedia.org/wiki/
File:Rasterisation-triangle_example.svg](https://commons.wikimedia.org/wiki/File:Rasterisation-triangle_example.svg)

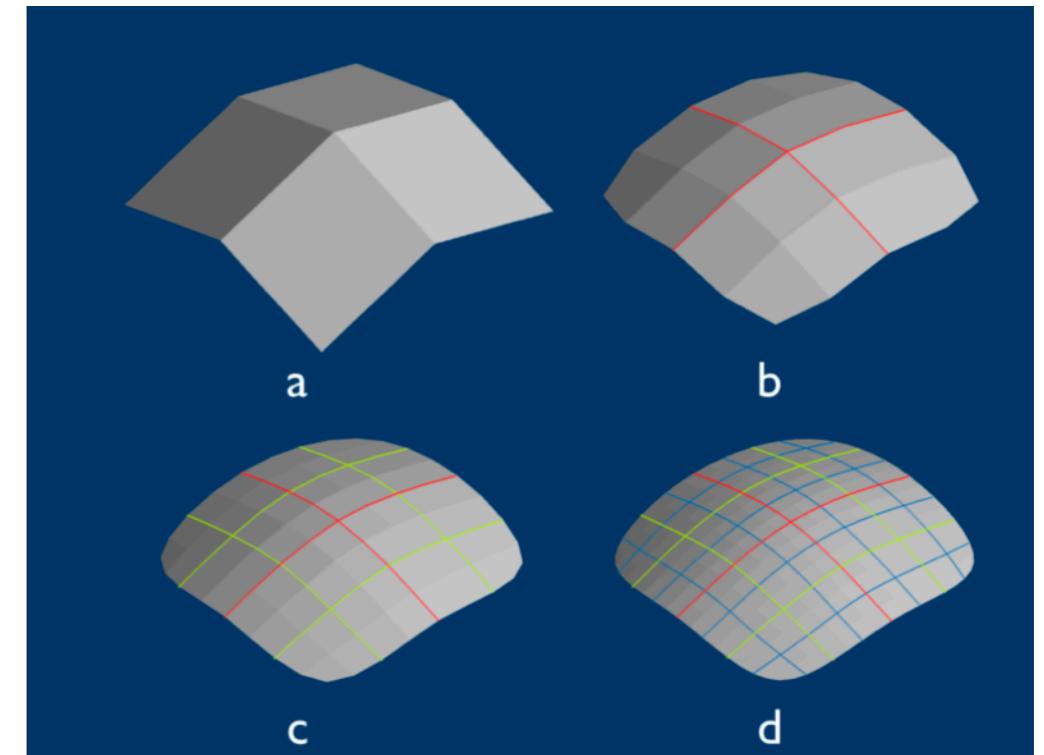
Curves and Meshes

- How to represent geometry in Computer Graphics



Bezier Curve

https://en.wikipedia.org/wiki/B%C3%A9zier_curve



Catmull-Clark subdivision

https://commons.wikimedia.org/wiki/File:Catmull-Clark_subdivision_of_4_planes.png