




Three.js

Brait Öispuu

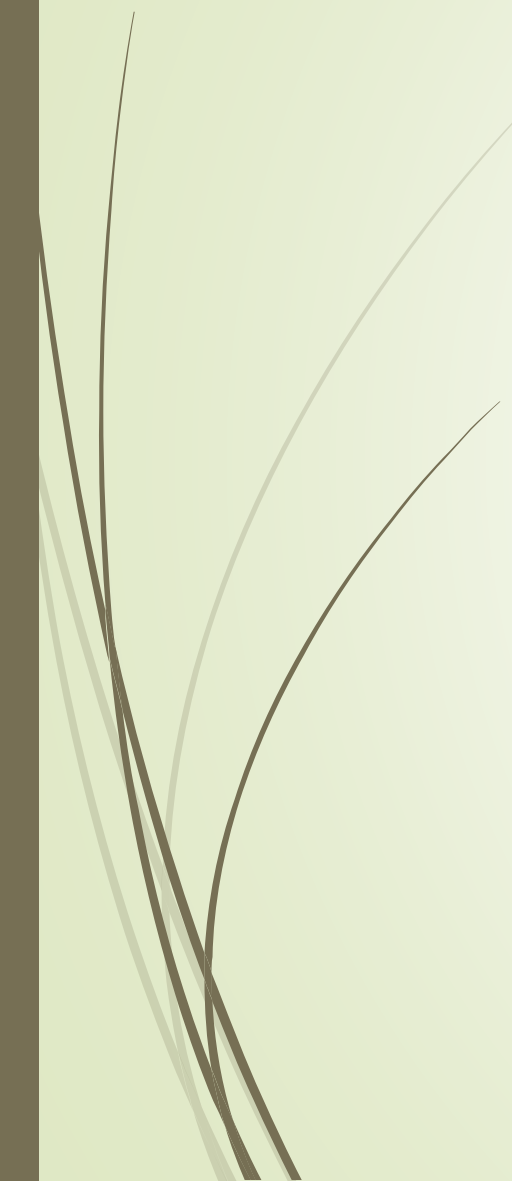


Three what?

- ▶ Three.js is a JavaScript library that helps us create 3D computer graphics using WebGL
 - ▶ WebGL is a js API for rendering 3D graphics in a browser without plug-ins
- 



Lights, camera, action!

- ▶ Three.js
 - ▶ Script tags
 - ▶ Scene
 - ▶ Camera
 - ▶ Renderer
- 



Scene

- ▶ As is
- ▶ Can add fog
 - ▶ Linear growth with distance
 - ▶ Exponential growth with distance



Camera

- ▶ PerspectiveCamera
- ▶ Field of view
- ▶ Aspect ratio
 - ▶ Width divided by height
- ▶ Near and far clipping plane
 - ▶ When to render something
- ▶ Different kinds
 - ▶ CubeCamera
 - ▶ OrthographicCamera
 - ▶ StereoCamera



Renderer

- Different kinds
 - WebGLRenderer
 - Others usually as fallbacks
- Size
 - Innerwidth, innerheight
- Resolution
 - updateStyle



Lights, camera, actors?

- Geometry
 - Size
 - Shape
- Material
 - Color
 - Characteristics
- Objects
 - Mesh
 - A mix of the two
 - Position



Action!

- ▶ function render()
- ▶ 60 fps
- ▶ requestAnimationFrame
 - ▶ An optimized setInterval
- ▶ Everything you change goes in here!



Lines!

- ▶ There are new materials for achieving this
 - ▶ LineBasicMaterial
 - ▶ LineDashedMaterial
- ▶ Geometry is different too
 - ▶ Push vertices



Step up

- Updating
 - Use functions inside render()
 - Change positions
 - Change color
 - Create randomness



Geometry

- ▶ Being outperformed by BufferGeometry
 - ▶ Stores all data in buffers
 - ▶ Reduces cost of passing everything to the GPU
 - ▶ Harder to manipulate, work with attribute buffers
 - ▶ Best for static solutions



Geometry (2)



- ▶ Box
- ▶ Circle
- ▶ Cone
- ▶ Cylinder
- ▶ Dodecahedron
- ▶ Edges
- ▶ Extrude
- ▶ Icosahedron
- ▶ Lathe
- ▶ Ochtahedron
- ▶ Parametric
- ▶ Plane
- ▶ Polyhedron
- ▶ Ring
- ▶ Shape
- ▶ Sphere
- ▶ Tetrahedron
- ▶ Text
- ▶ Torus
- ▶ TorusKnot
- ▶ Tube
- ▶ TubeBuffer
- ▶ Wireframe



Material



- LineBasicMaterial
- LineDashedMaterial
- Material
- MeshBasicMaterial
- MeshDepthMaterial
- MeshLambertMaterial
- MeshNormalMaterial
- MeshPhongMaterial
- MeshPhysicalMaterial
- MeshStandardMaterial
- MeshToonMaterial
- MultiMaterial
- PointsMaterial
- RawShaderMaterial
- ShaderMaterial
- ShadowMaterial
- SpriteMaterial



Material (2)

- ▶ LineBasicMaterial, LineDashedMaterial
 - ▶ Wireframe-style geometries
- ▶ Material
 - ▶ Abstract base class
- ▶ MeshBasic
 - ▶ Not affected by lights
- ▶ MultiMaterial
 - ▶ Different materials by face

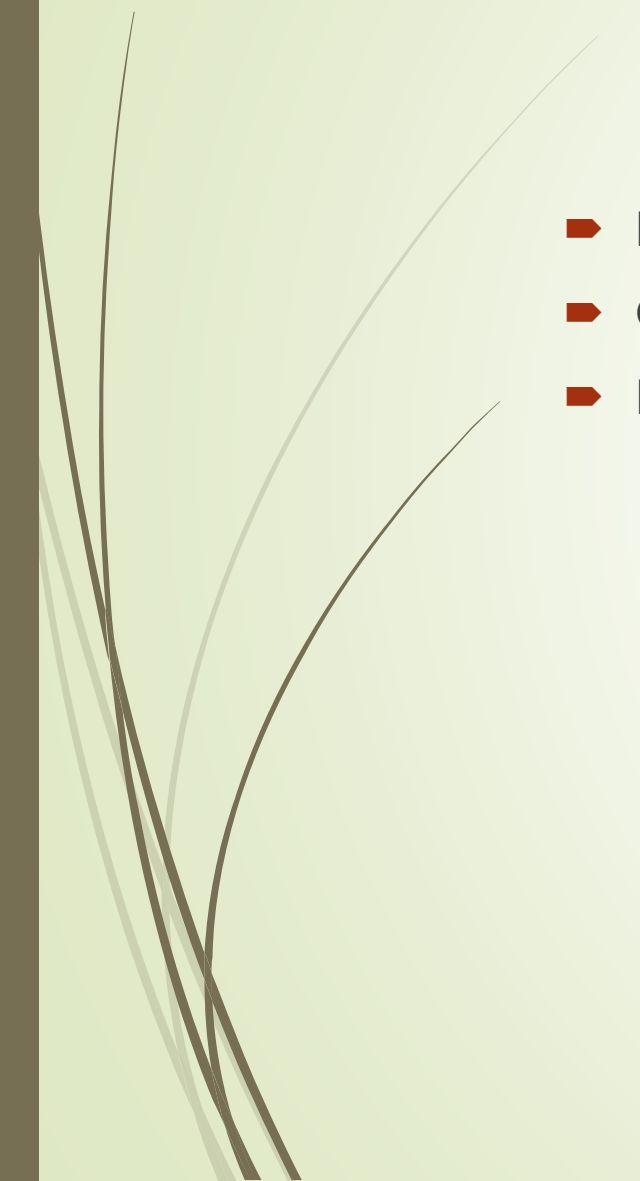


Let there be light!

- ▶ A lot of different kinds
- ▶ AmbientLight
 - ▶ Global light, no direction, no shadows
- ▶ DirectionalLight – Sunshine!
- ▶ HemisphereLight – The sky!
- ▶ PointLight – A lightbulb
- ▶ RectAreaLight – A window
- ▶ SpotLight
 - ▶ One point, one direction, but emitted along a cone



Shadows!

- ▶ Enable shadows in the renderer
 - ▶ CastShadow
 - ▶ ReceiveShadow
- 



That's it for the basics!

