JSinSA 2014

3D PROGRAMMING WITH JAVASCRIPT

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THREE.JS
CANNON.JS

YEOMAN.JS
GRUNT.JS
BOWER.JS

AGENDA

Modern Browsers

WebGL

Standard JavaScript Projects

Introducing Three.js

Practical Three.js

MODERN BROWSERS

CANVAS

Exposes canvas element

2D canvas library

WebGL 3D library

CANVAS CONTEXTS

2D Context

- Draw Text
- Draw Lines
- Draw Arcs
- Draw Rectangles
- Etc…

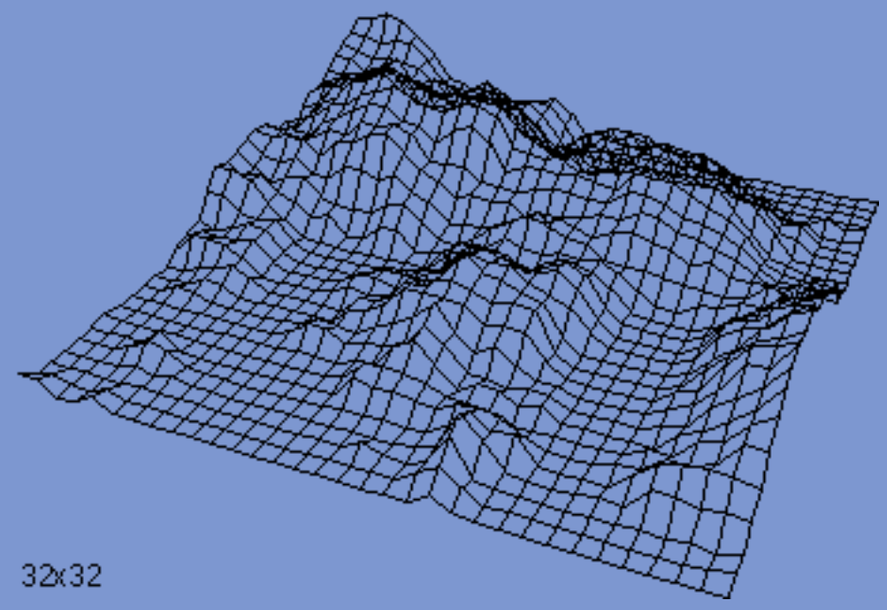
CANVAS CONTEXTS

3D Context WebGL

Draw complex objects

Any geometry

Point of view



SUPPORTED BROWSERS

v6+
iAd 4.2+

v4+
Mobile v4+

v9+
Mobile v25+

v11+
Phone 8.1

v11+
Mobile 12 (Android)

MODERN BROWSERS

CANVAS 2D

LET’S TAKE A LOOK

WEB GL

Leverages off the existing HTML canvas

JavaScript exclusive API

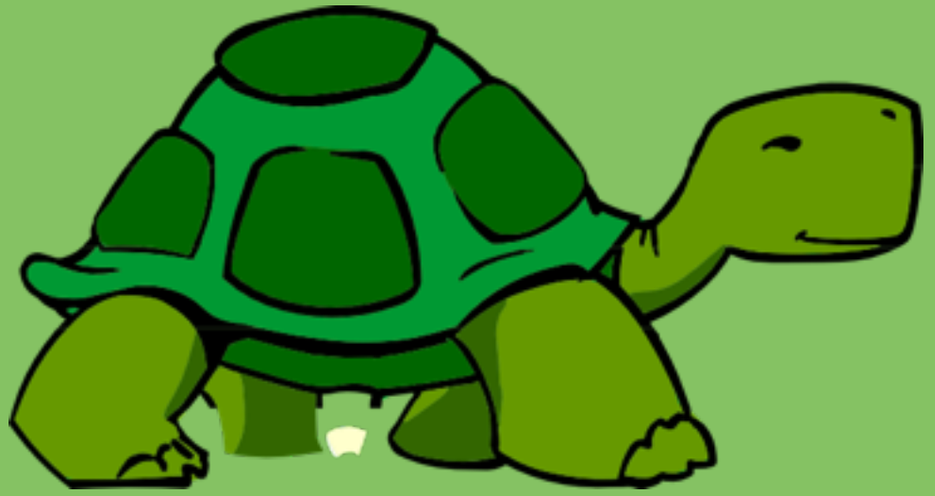
Based on OpenGL ES (Embedded Systems) 2.0

Cross Platform

Web GL is free

WEB GL
GRAPHICS HARDWARE ACCELERATION

VS



GPU

CPU

WHAT'S IN THE BOX?

Vertex Shader Position Calculator

Fragment Shader Colour Chooser

RAW WEB GL CODE

Settings! So many settings…

So much mathematics…

Too much plumbing, not enough fun…

LET’S TAKE A LOOK

SETTING UP A JS PROJECT

YEOMAN

GRUNT

BOWER

ADVANTAGES

Useful boiler plate project templates.

Standard project structure.

Standardised way to build your project.

Real-time builds and notifications of errors.

Real-time deployments for testing.

Easy way to manage dependencies.

SETTING UP A JS PROJECT

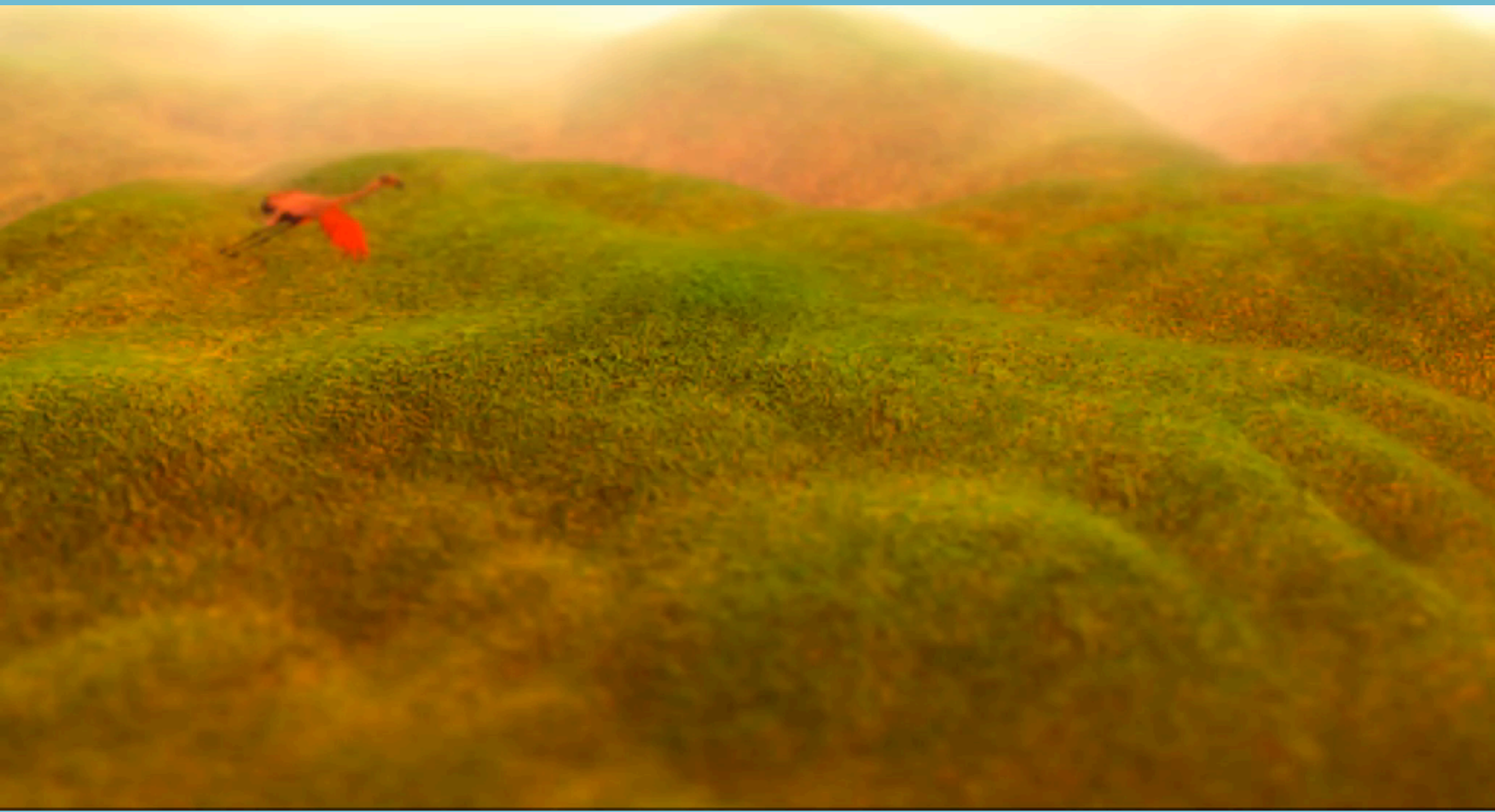
LET'S TAKE A LOOK

Three.js

Too cool for a logo

threejs.org/examples

THREE JS



PLAIN
WEB GL

```
var box = {
    Verticies: [
          1.0,  1.0, -1.0,
          1.0, -1.0, -1.0,
         -1.0,  1.0, -1.0,
         -1.0, -1.0, -1.0
. . .and ±112 more lines
```

THREE.JS

```
var box = new THREE.CubeGeometry(1,1,1)
```

THREE JS

RENDERER

SCENES

CAMERAS

OBJECTS

GEOMETRY & MESH

TEXTURES & MATERIALS

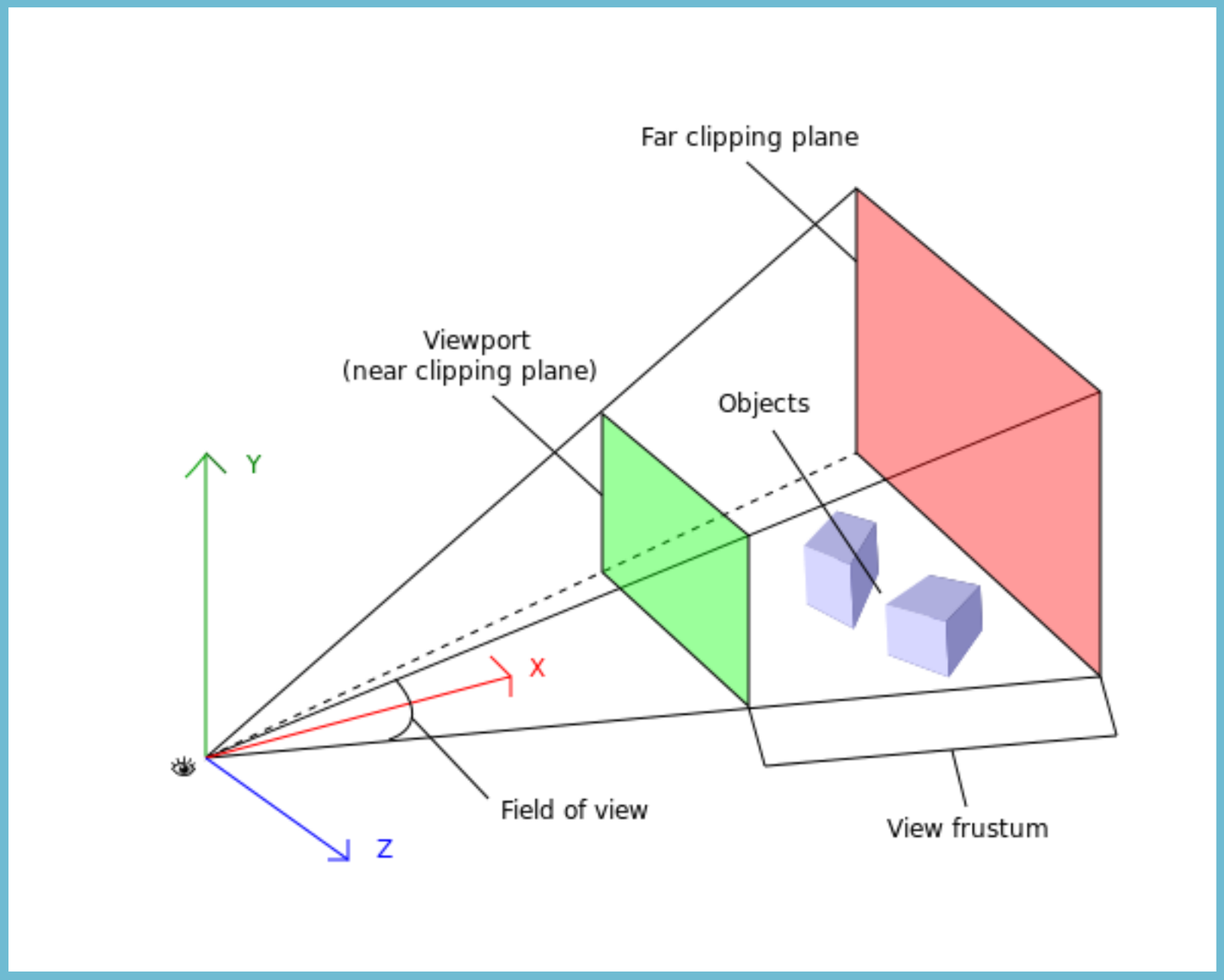
CONTROLS

PHYSICS

SCENE

CAMERA

CAMERA


Far clipping plane
Viewport
(near clipping plane)
Objects
Y
X
Z
Field of view
View frustum

CAMERA

NOPE

CONTROLS

MOUSE

KEYBOARD

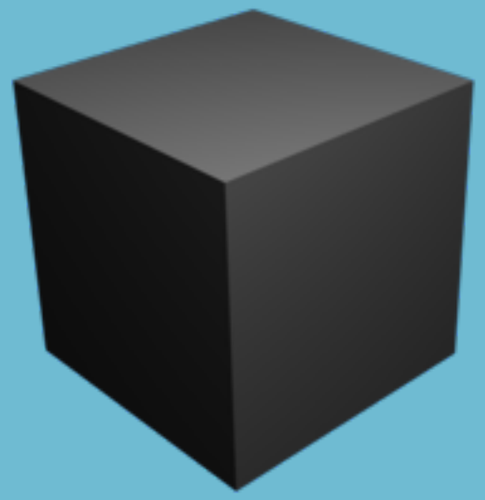
. . .

OTHERS

CONTROLS

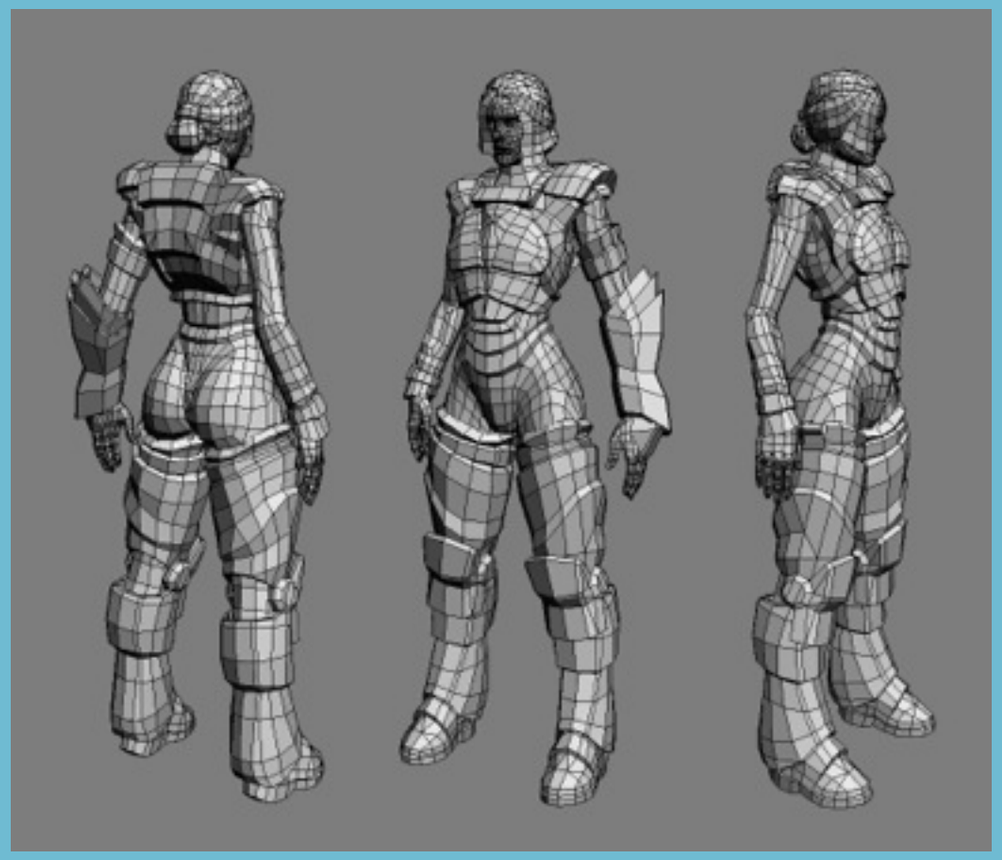
JSinSA
Rishal Hurbans
(W, A, S, D = Move, SPACE = Jump, MOUSE = Look around)

OBJECTS



OBJECTS

MESH



GEOMETRY

TEXTURE

OBJECTS

MESH

OBJECTS

MESH - TOOLS

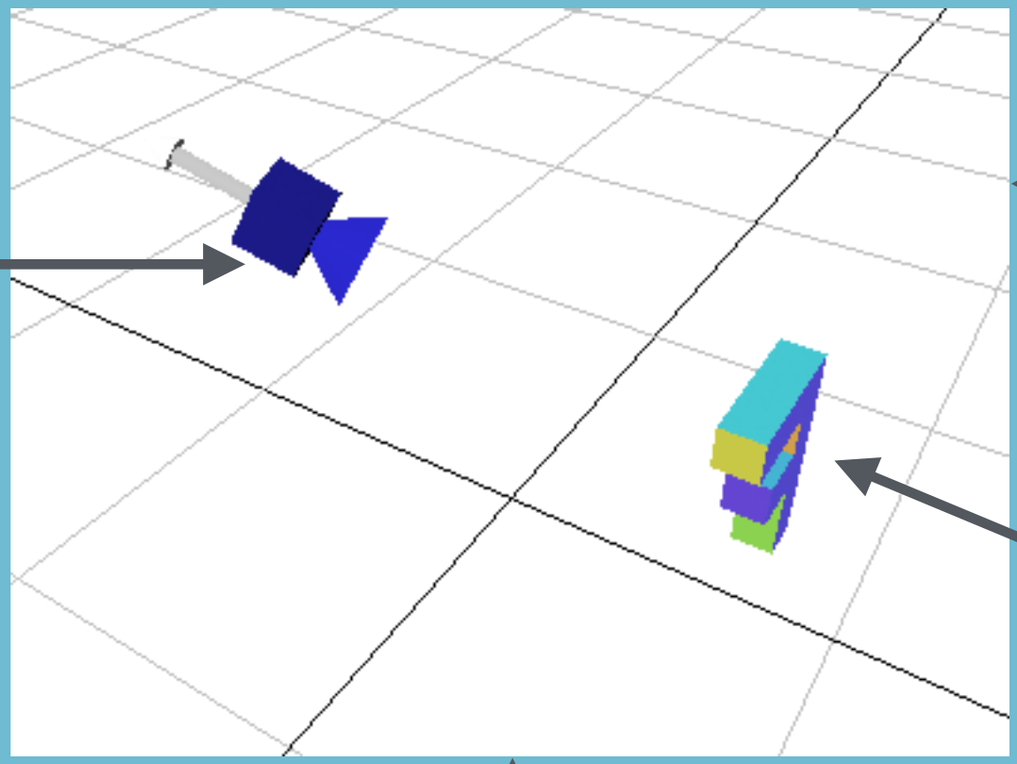
blender

RENDERER

SCENE

CAMERA

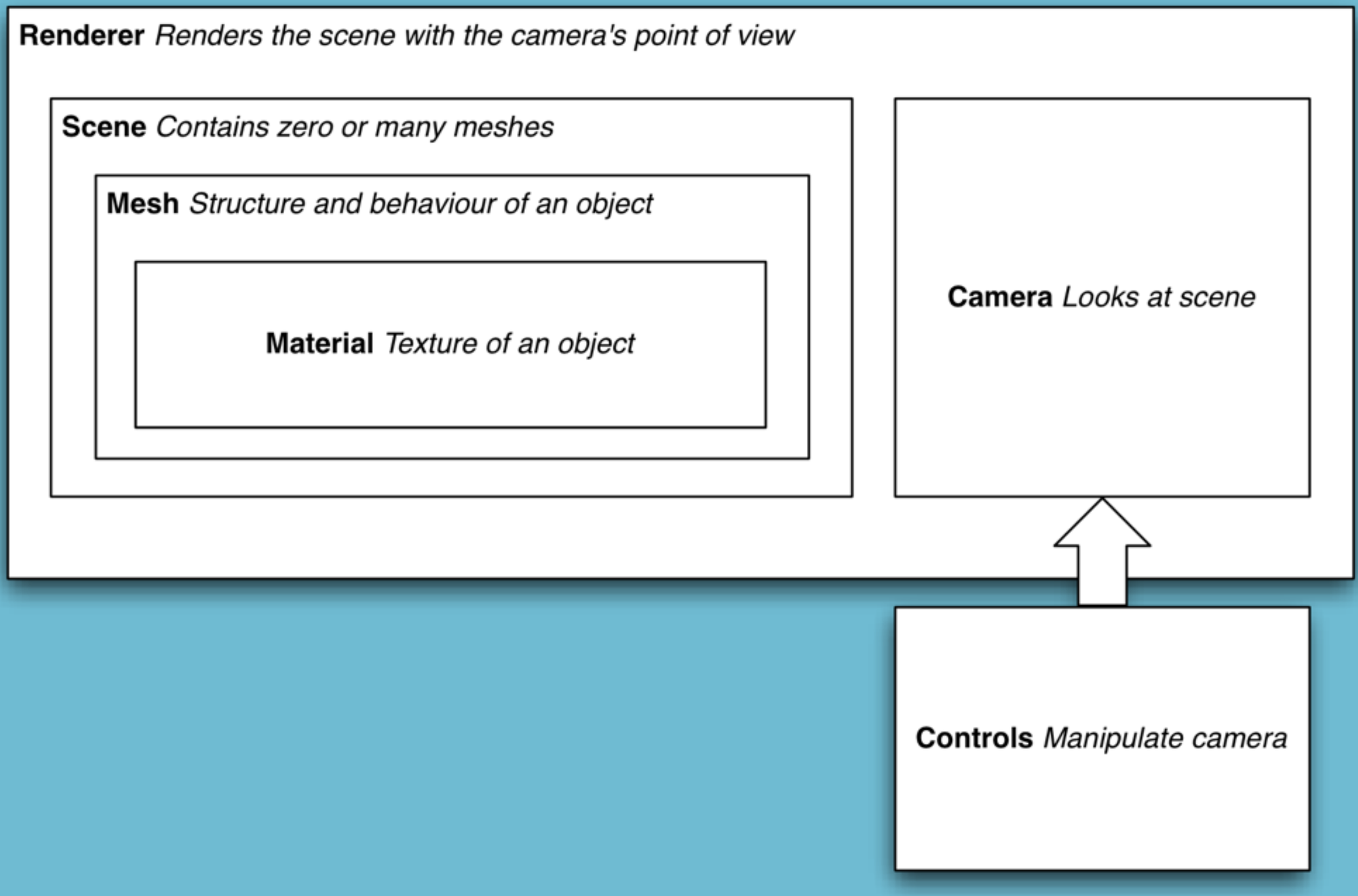
CAMERA



SCENE

MESH

RENDERER


Renderer *Renders the scene with the camera's point of view*
Scene *Contains zero or many meshes*
Mesh *Structure and behaviour of an object*
Material *Texture of an object*
Camera *Looks at scene*
Controls *Manipulate camera*

LET’S TAKE A LOOK

CANNON JS

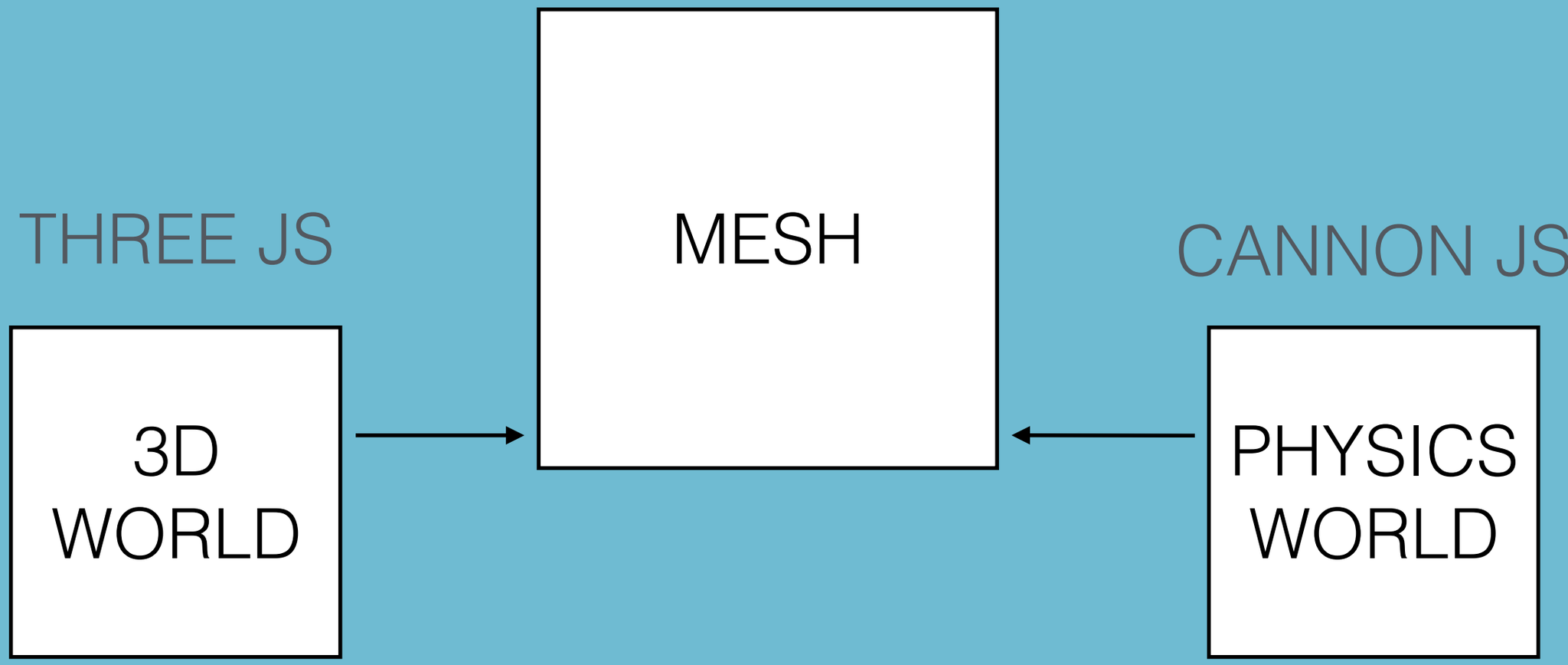
PHYSICS

CANNON JS

PHYSICS

THREE JS

CANNON JS



LET’S TAKE A LOOK

WHEN IS IT USEFUL?

AREAS

Game Development

Interactive Applications

ADVANTAGES

Develop once - run (almost) anywhere

TRY IT OUT

WHAT WILL I NEED?

- MODERN BROWSER
- TEXT EDITOR
- YEOMAN - RECOMMENDED
- AT LEAST KNOWING THAT JAVASCRIPT IS NOT JAVA
- SOME CREATIVITY

GET MORE INFO

REFERENCES

THREEJS.COM

CANNONJS.COM

W3C DOCS

THREE JS

prolificidea.com/js3d.html

PROLIFICIDEA.COM

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entelect
everything is possible