**Workshop on Aspects of virtual reality with google cardboard**

### \*Wednesday 10th January 2024 \*

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# Goal

To gain basic VR skills using A-Frame. This includes building basic visual effects for VR. This will work for Android and iOS phones using small VR headsets.

You must have a laptop or desktop.

# Background

This workshop uses either google-cardboard or small plastic VR headsets.

We will start with web-browser VR – such as webxr-api-emulator from the Mozilla Development Foundation

You can do everything here on your own machine. We will use a basic Ubuntu VM when needed.

# Tools and Topics

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| Tools | Topics / goals | Time | Exercises |
| Introduction | Overview – outline goals  Goal: Setting up google cardboard with glitch.com system | 10 minutes | Get VR headset working with glitch.  Change glitch images and see updates in google cardboard  Show forest scene |
| A-frame basics | Simple 3D a-frame examples  Goal: Work with glitch.com and google cardboard | 15 minutes | Static scene: Cube, sphere, cylinder  Basic solids  Position=”0 2 -2”  Platonic solids |
| A-frame basics |  | 15 minutes | EventListeners  Lifecycles  setAttributes  start animation |
| Foundations  Scenes | Use JavaScript, DOM, events, Web-Components | 15 minutes |  |
| Foundations  Cameras |  |  | Basic components exercise and some JavaScript timers for updating a-frame views |
| three.JS components | Goal: work with basics of geometries, materials, lights, models | 15 minutes | ThreeJS examples 1  Exercises for basic geometries, materials, views |
| A-frame / three.JS components | Goal: work with, models, shadows, and controls  Integrate A-Frame and three.js | 15 minutes | ThreeJS examples 2 with A-Frame  Examples of models, shadows, and controls |
| Entity component architecture (ECA) | Goal: use three.js and ECA over standard OO paradigm – giving a-frame | 15 minutes | JavaScript OO vs ECA  Example showing difficulty of OO but easier in ECA |
| A-frame and planets | Complex 3D a-frame example  Goal: work with complex a-frame detail and basic planetary math; illustrate ECA, geometries, controls, etc. | 20 minutes | Start with Three.JS planet example  Migrate to a-frame using ECA  Examine changes in the math and its immediate impact in the google cardboard |
| A-frame and animations | Goal: show how to do basic animation | 20 minutes | Example of basic animation |
| Conclusion | Goal: review our learning | 5 minutes |  |

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| A-frame basics  Static | Simple 3D a-frame examples  Goal: Work with glitch.com and google cardboard | 15 minutes | Static scene: Cube, sphere, cylinder  Basic solids  Position=”0 2 -2”  Platonic solids |

1. A-box – add rotation=”45 45 45” – show how to position and rotate
2. Colors – standard image for A-frame – shows some overlap
3. overLasVegas – sky
4. platonic solids – show more collisions

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| A-frame basics  Dynamic |  | 15 minutes | EventListeners  Lifecycles  setAttributes  start animation |

1. Platonic solids
   1. Inspector
   2. Show top view