Computer Graphics

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Intro to Three.js

- Three.js is a javascript library on top of WebGL
- Go to http://webglreport.com/?v=1
  - to check the webgl status on your browser on your hardware
- Go to https://threejs.org/ for
  - showcases, documentation and examples

Tasks in this Lab

- Set up a Three.js development environment
- Run the starter code
- Modify the starter code to add
  - more shapes
  - a basic animation

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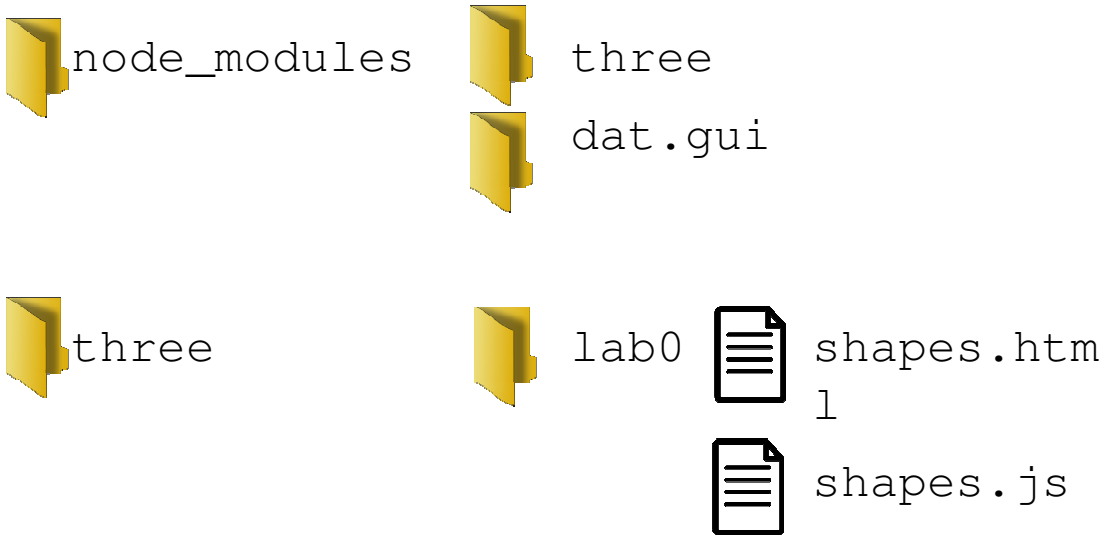
Set up Three.js

- Our webpage must load three.js
  - The labs also needs dat.gui.js for simple sliders and input fields
- Recommended to install these files locally
  - Go to https://nodejs.org/ and download the installer (e.g., the LTS version)
  - This will allow you to install the package manager ***npm***
  - You can now issue in your working directory the commands

```
npm install three
npm install --save dat.gui
```

Directory Structure for Three.js Labs

- `npm` will create a node_modules directory
- `npm list` will show what is installed and in what version



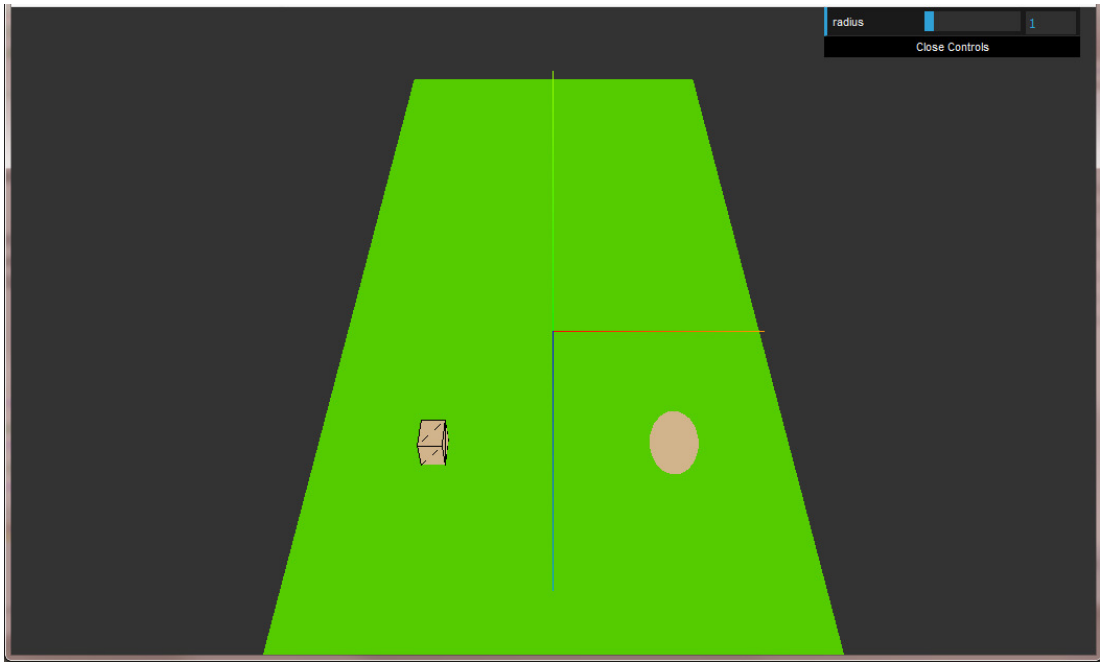
Lab Environment

- The VDI environment has firefox installed but the server has very limited graphics
  - Will work for this lab but will not run WebGL2
- A workaround is to use remote apps

  https://engineering.uottawa.ca/it/remote-apps
  - Remote apps runs on a different server with Tesla GPUs and enables hardware support
  - One remote app is firefox
- *Best solution: Use your own laptop*

Starter Code

- Running the starter code should show a green plane, a sphere and a box shown both solid and as wireframe
- There is a dat.gui input as well



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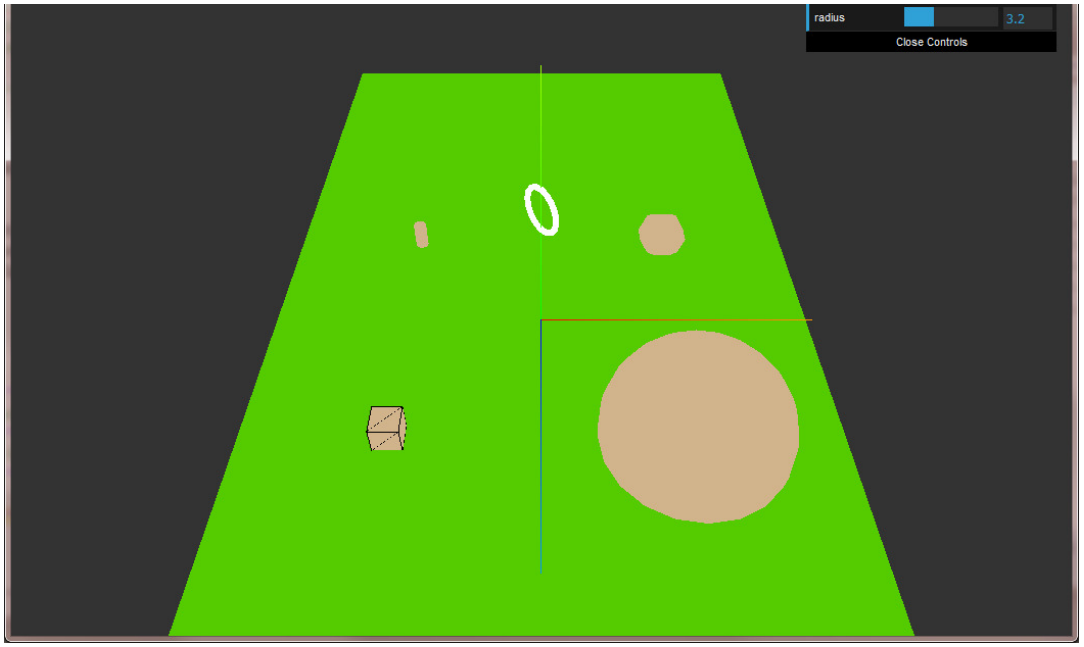
Tasks

- Add three more shapes:
  - a cylinder and dodecahedron in the corners
  - a spinning torus above the origin
- See the specific instructions in the comments of the code
- Look up the details of the commands at https://threejs.org/docs/index.html

Expected Result

- Look at the code for animation and resizing
- Check out the parameters to the geometries
- Play around with camera parameters



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Summary

- All content is organized in a scene
  - Object3D is the base class for most objects
  - Objects for basic shapes are available
  - Objects can be grouped
- Math package included
  - See Matrix4 for more details
  - Local transformation changes shape position and orientation of objects