Interactive 3D Graphics 2014 - University of Udine
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Second coding project

Goals of the project

You can choose between two kinds of projects. The first one is an extension of the web application developed in the first project. The second one consists in implementing any of the extensions to *three.js* listed at the page: https://github.com/mrdoob/three.js/wiki/TODO.

In the first case, the extended application should have the following additional capabilities:

- use lights and shaders to present the graphs in a more appealing way
- use animations to "grow" the graph, i.e. start with an empty graph and "grow" elements as the graph is created (the animation should last just a few seconds)
- visualise labels (of rows and/or columns, and numeric values on the axes, where applicable).

Requirements (in addition to the requirements of the first project)

- choose a suitable number and type of lights so that the graph is properly illuminated (**minimum 3 lights**)
- try to use materials in a consistent way; for example, if you choose metal-like materials, use different kind of metals for the different elements in the graph
- you need to provide two choices of materials for each graph in the menu, where one does not uses three.js materials (except the ShaderMaterial) and works with shaders written by you (your shader should take into account specular and Fresnel effects); the other one uses three.js materials with shadow mapping.

Suggestions

- for drawing labels, you can use various methods, from 3D text (TextGeometry object in three.js) to HTML elements drawn on top, or dynamically constructing textures from HTML canvas elements (see e.g. http://stemkoski.github.io/Three.js/Texture-From-Canvas.html). Choose the option that will give you the best results.
- you can re-implement highlighting by using a different shader, or by adding a light.

How to submit the project

- all relevant files should be zipped to a file named with your surnames and sent by email to roberto.ranon@uniud.it **by the date of the written exam you want to undertake**. The subject of the email must be "Interactive 3D graphics project 2 - Student1 surname - Student 2 surname"[1]

[1] If you choose any project that extends three.js, you are not required to submit your project by email. We will discuss and evaluate your project the day of the written exam.

- include also in the zip file a brief english description (in a **pdf** file) to report which of the required goals and constraints your application satisfies, or any other additional capabilities you have implemented. Also, describe in the pdf the shading equations that you have implemented in your shaders.
- code should be adequately commented (in english)

Grading policy

- a web application that full fills all goals and requirements, works reasonably well, and with reasonably readable and logical code will get a 30/30 mark
- each goal or requirement not fulfilled, or bug, or problem in the application will decrease the evaluation by 3/30. You cannot resubmit corrections
- additional capabilities could increase the mark (even above 30/30), but this will be considered on each case basis
- a delay of 1-3 days will decrease the mark by 3/30. Any further delay means you will have to do the full exam in any of the official dates (but remember that project must be submitted by that date in any case).