HCI: 3D Editor for large sculptures made from plastic bottles + 3D print

Objective
Write a 3D editing software that allows users to create large sculptures by combining 3D print with recycled plastic bottles. The key idea is to 3D print only the connectors between bottles, while most of the volume and structural strength of the sculpture stems from the bottles. Sculptures should be several meters high and ideally should be engineered to hold a human weight. Thus, the overarching objective of your project is to scale 3D printing to very large scale by combining 3D printing with ready-made objects.

Software to write & required skills
You will write a software system that (1) allows users to transform existing 3D models into mesh structures representing the recyclable bottles. Your software will also generate the 3D
printed connectors between them. (2) A 3D editor using which users can design bottle-based sculptures from scratch.

You should have **experience in 3D modeling and computer graphics**. You will learn about different tessellation algorithms. We have a 3D editor codebase written in coffeescript (compiles to javascript) that could possibly be used for the project.

To get you started: 3D printed connectors that connect multiple recycled water bottles strong enough to hold a human weight.

**References to get you started**
- Find the article "Zometool Shape Approximation" using Google Scholar and read it
- Google for the open source software tool “MeshLab” and play with it
- Come talk to us

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