

Project 2: Remixing 3D Designs

ENGR 11A – Fall 2024

Assigned: Tuesday, September 10

Due: Tuesday, September 17, 9:35am

1 Project goals

- Learn to **remix** 3D files into novel 3D prints.
- Choose a public 3D model to import into a CAD tool (Tinkercad *and* Autodesk Fusion, formerly Fusion360) and add a new feature to it, or combine two different products together to allow a new use.
- By mastering this workflow, you will be able to remix public 3D files and combine them with CAD tools to solve design challenges.

2 Guidelines

2.1 Design research and planning

1. Find 1–3 public 3D models to remix: add a new feature or repurpose something
 - <https://thangs.com/>
 - <https://3d.nih.gov/>
2. Make a plan: Sketch out an idea on paper (document this in your lab notes!)

2.2 Tinkercad remix

3. Use Tinkercad to realize your design into something you can 3D print. Starting with a public 3D model, draw, subtract, or add elements from another model to make something new.
4. Optimize your design for 3D printing in PLA on a Prusa MINI+.
5. Slice your 3D design in Prusa Slicer and 3D print it on a Prusa MINI+ 3D printer in PLA.
6. As you proceed through the project, feel free to share tips, tricks, and questions about Tinkercad and your design process on Slack.

2.3 Fusion remix

7. Once your Tinkercad remix is printing, move onto Autodesk Fusion
8. Repeat the workflow from above. If you want to replicate your remix design idea, that's fine. If you want to start again and make a different remix, you can do that too.
9. Optimize your design for 3D printing in PLA on a Prusa MINI+.
10. Slice your 3D design in Prusa Slicer and 3D print it on a Prusa MINI+ 3D printer in PLA.
11. As you proceed through the project, feel free to share tips, tricks, and questions about Fusion and your design process on Slack.

2.4 Documentation

12. For each design, take a photo of your paper sketch, a screenshot (or more) of your design in CAD, a screenshot of your slicing setup in Prusa Slicer, and a photo (or photo series) of your resulting 3D print.
13. Post a reflection on your personal website about the outcome of your design along with your process and workflow documentation. Focus your reflections on how each step of your design process, from concept to sketching, to CAD, to CAM, influenced your resulting 3D output. Include as much detail about your 3D print settings as possible.
 - Did it achieve your goal?
 - How could you optimize your design further?
 - What settings or design elements would you change in the future to improve it?Do this for both your Tinkercad and Fusion models.
14. To submit your assignment, share a link to your personal website reflection on the Slack #homework channel.

3 Resources

- Tinkercad tutorials: <https://www.tinkercad.com/learn/designs?collectionId=0SZ5W2BL1W5N51F>
- How to remix a part from Thingiverse: <https://www.youtube.com/watch?v=Ep7Qq0FdiRI>
- Convert STL mesh to a solid body in Fusion 360: <https://www.youtube.com/watch?v=tVGtG-Uj1Yg>
- Simplify a mesh using MeshLab: <https://www.youtube.com/watch?v=PWM6EGVVNQU>
- Prusa Slicer walkthrough: <https://www.youtube.com/watch?v=0zCo9x4QwPY>
- Fusion training resources: <https://help.autodesk.com/view/fusion360/ENU/courses/>

4 Grading

Adherence to guidelines	30%
Class participation	20%
Write-up quality	40%
Website/3D print quality	10%