

Carnegie Mellon University
Department of Mechanical Engineering

24-632 and 39-601 Additive Manufacturing Process and Product Development
Fall Semester 2022

Team Design Project

Project Part 2 of 3: Prototype Product Due Wednesday November 9, 2022:

For this part of the project, design teams will create a 3-D printed prototype of their primary product idea from Part 1 of the project. They will test out their product's appeal to consumers on thingiverse, pinshape, and shapeways. Each team will write a short report on their findings, to be handed in on the due date above.

The **6 page maximum** report (1.5 line spacing, times 12 point font) including figures will consist of final sections:

- 1) Product Choices:** 1) Identify a primary and secondary (back-up) product from Part 1 of this project that your team is moving ahead with from this point forward. IF you have decided to pursue a completely new idea, you must give a justification for why you have discarded your original product ideas (and you will still need primary and secondary products for this part of the project). 2) Briefly describe your Primary and Secondary products 3) Provide a CAD rendition (3-D image) of your Primary product and at least a detailed sketch of your secondary product

- 2) Market Analysis #1:** 1) Upload your primary product design to thingiverse.com and pinshape.com and provide **at least 3 days' worth** of data on its popularity on that site. 2) Give the identifier for your product on the thingiverse and pinshape sites so I can find it. Note that this version of your design should be representative of your idea, but not a final version (because it may be hard to sell on shapeways if you offer it for free on these sites). 3) Interpret the data from this market analysis. For instance, does the product seem popular? How does it compare to other products? Are there any user comments that are helpful, etc.?

- 3) Market Analysis #2:** 1) Upload your primary product design to shapeways.com and provide **at least 3 days' worth** of data on its popularity on that site. 2) Give the identifier for your product on the shapeways site so I can find it. Note that this version of your design should be representative of your idea, but does not have to be a final version – you are just trying to get market data for now. 3) Obtain an estimate of build cost from shapeways and report that cost. 4) Interpret the data from this market analysis.

4) Market Analysis #3: Survey other web sites and other resources, looking for products that are similar to yours or in the same product class. In particular, look at non-AM-fabricated versions of your product such as those produced by injection molding. Describe how your product compares to products available in the broader market.

5) Printed Primary Product: Provide a 3-D printed version of your primary product – from either the Dremel, Form 2 or FDM machines. If there are any issues with printing of your product then note them in the report. Conclude whether your product is appropriate for successful, consistent production via AM.

Note: You can also provide market analyses and a printed product for your secondary (fall-back) product. This is a good idea if you are still not sure which idea really is the best.

6) Analysis Summary, Next Steps:

Sum up your findings from this part of the project. 1) What are your biggest challenges from this point on (e.g. is it reducing product cost, print quality, increasing appeal, etc.). 2) What are your team's plans for final refinements of your product design?