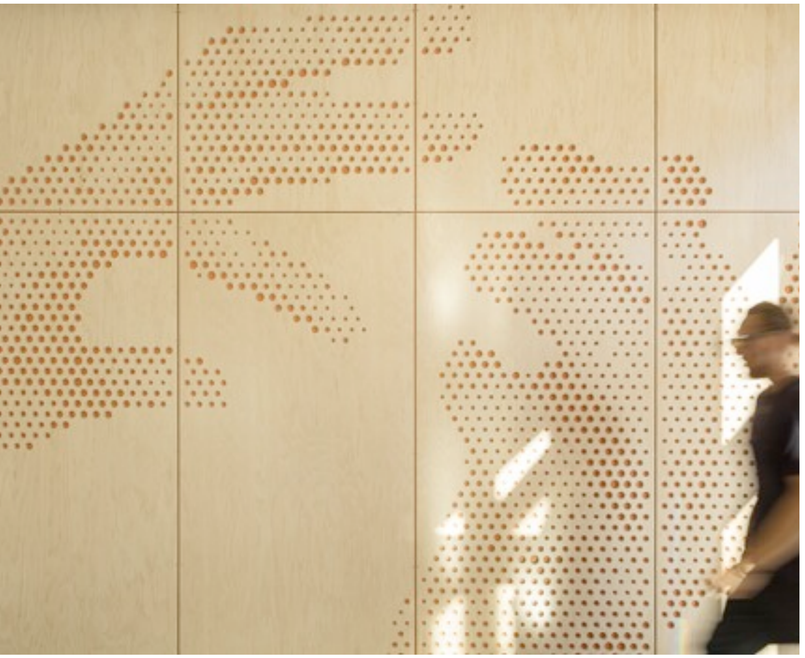
CS181DT Class 5: Digital fabrication



CNC milled wood wall boards showing hands, UC Berkeley Jacobs Hall

Compostable Lamp from 3D printed orange peels by Krill Design

Laser-cut puzzle from Nervous System

Class 5 agenda

- PM2: Sensory Cardboard crit
- Mini lecture: CAD-CAM process
- Break
- PM3 details; more on laser cutting
- Vector graphics studio

Announcements

- Most assignments will be graded by the end of the weekend
- Please don’t use ChatGPT to generate any of your write ups
- The best way to get a check plus is to turn in a “polished” assignment
  - Very thoughtful reflection, clear you spent a lot of time and effort and care, above and beyond
  - If you wanted a check plus on everything, the assignments would take way longer than I want you to spend on them: focus on your learning, not your grades
- CS181DT will probably be offered again next semester: tell your friends!! Be a TA!

PM2 Crit

PM2 art walk

Squishy • Revolting • Animated

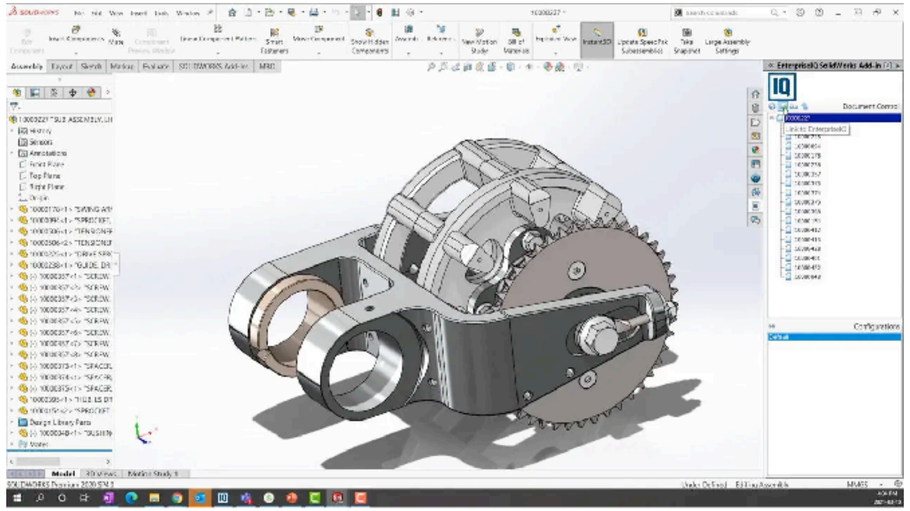
- (2 min) **Phase I:** Place your cardboard on the table. Optional: write anything you'd like others to know (your vision, how to interact, etc.) on the post-its by your piece(s). Don't write your name.
- (15 min) **Phase II**: Walk around the room looking at your classmates' pieces. Give out at least **8** index cards of anonymous feedback. Each cardboard piece should at least have 2 index cards of feedback! Mention (1) how you think this piece is capturing the prompt (2) one thing you like and any other comments or questions.
- (5 min) **Phase III**: Take time to read your feedback. If you'd like to respond to any comments to the whole class, now's your chance.

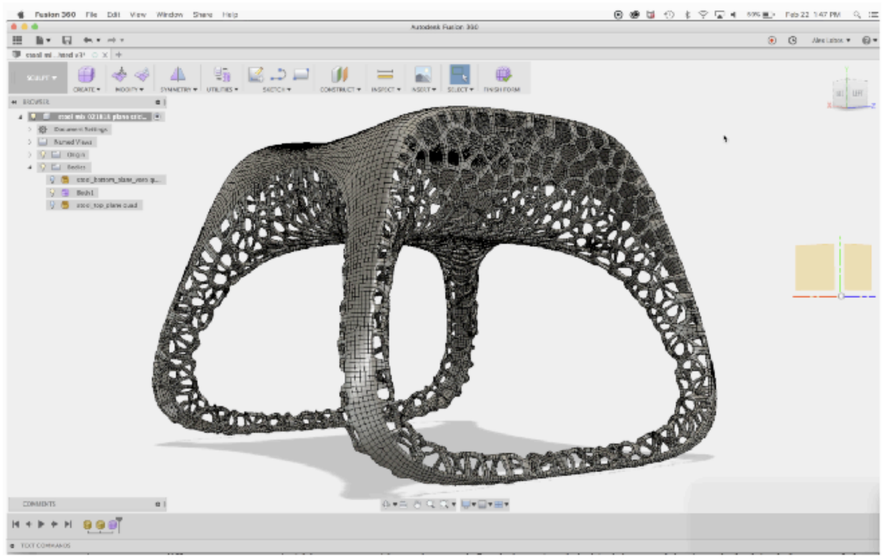
Digital Fabrication

Most things around you are digitally fabricated

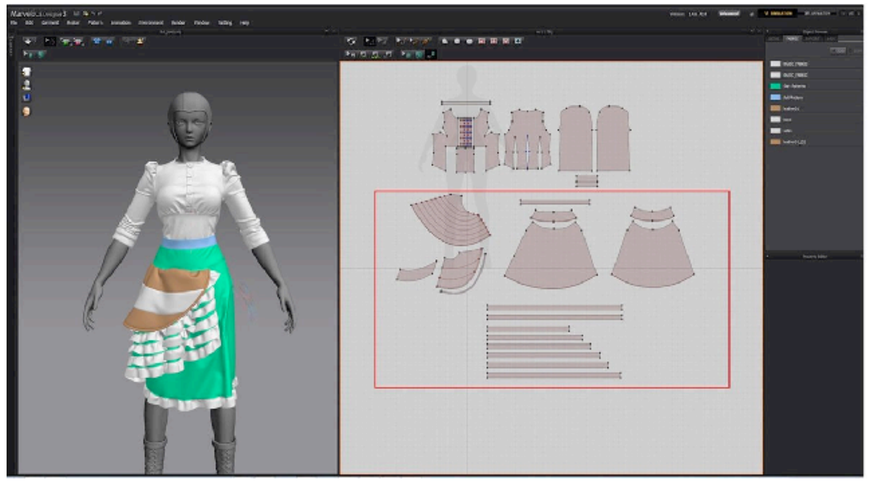
- But designed by humans, usually on computer software: computer-aided design (CAD)

CAD abstracts design from manufacturing

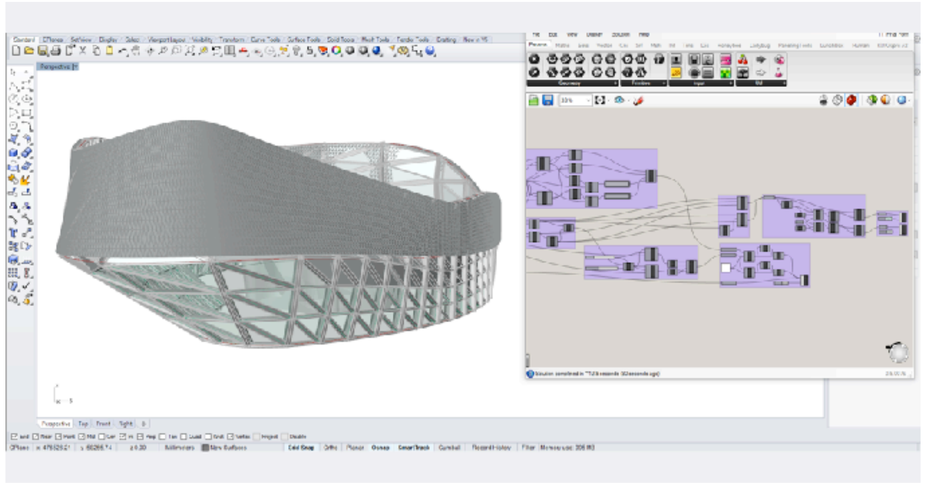




Solidworks, Fusion360 (3D models)



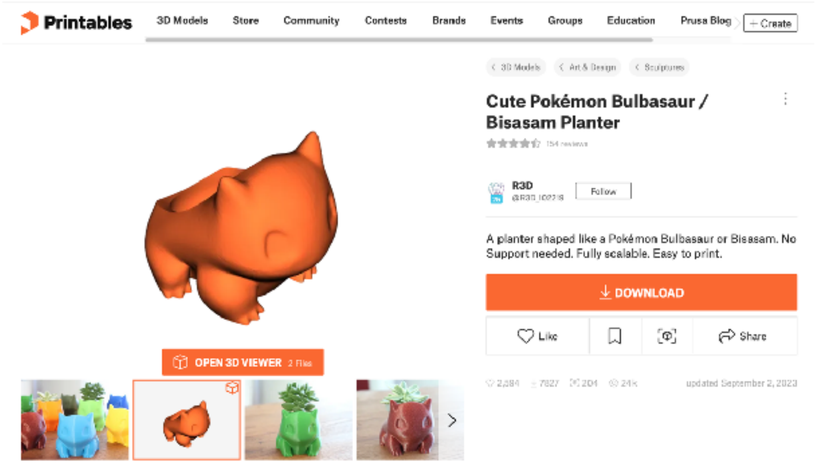
Marvelous Designer (fashion)

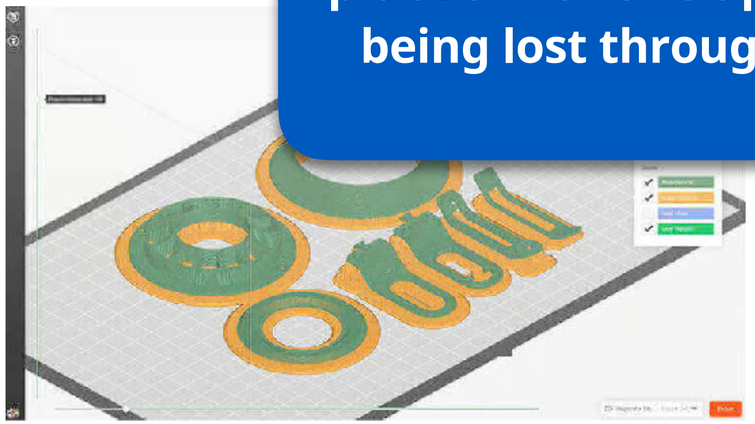


Grasshopper (architecture, generative art)

CAD -> CAM cycle

What are some advantages and pitfalls with this approach? What's being lost through abstraction?





Design a software representation of what we want to make

Computer-aided design (CAD)

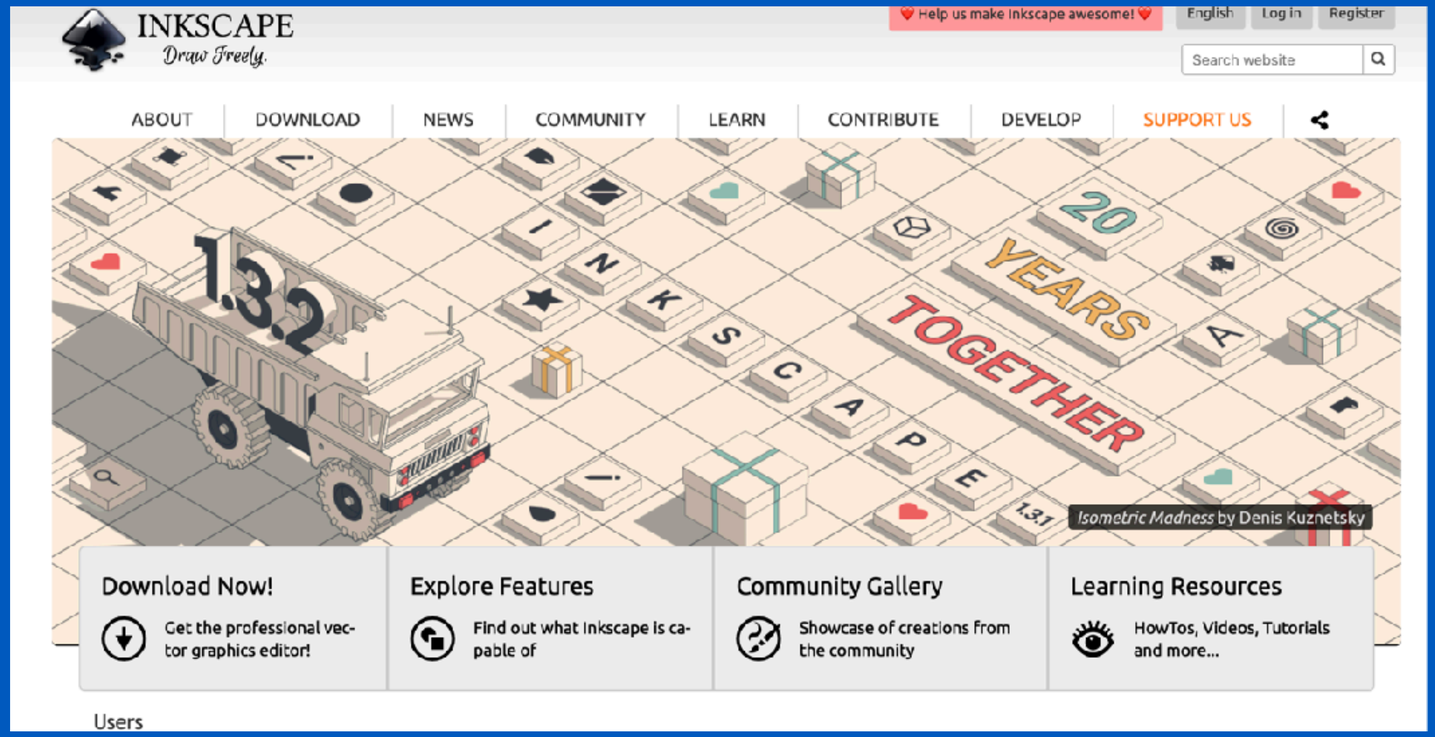
Turn our software representation into machine paths

Computer-aided manufacturing (CAM)

The machine will do the actual "making", humans do the "design"

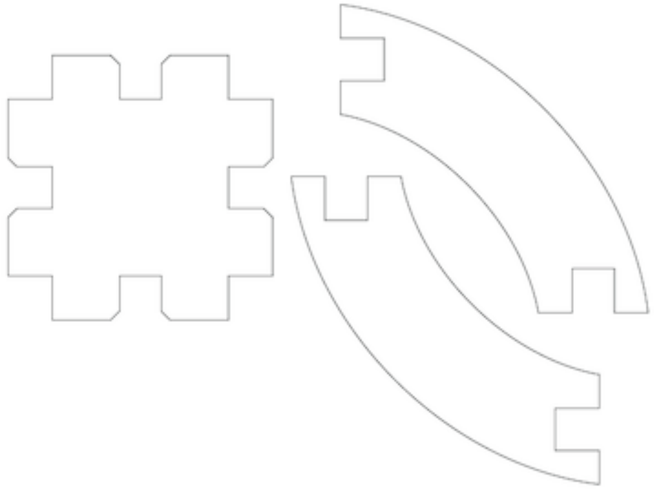
Making no longer requires physical skill (the machine will do it), but just design skill

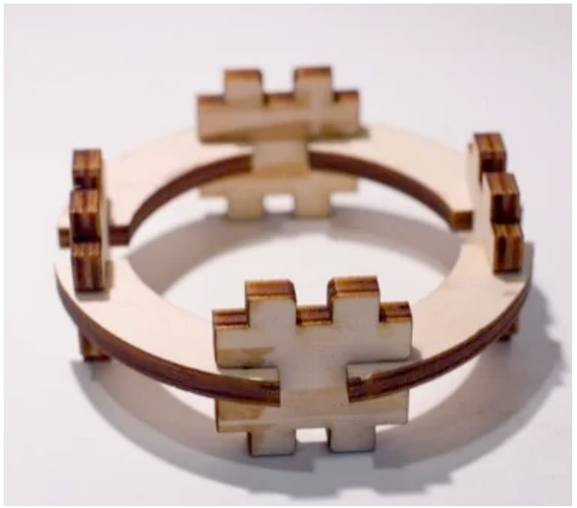
Break

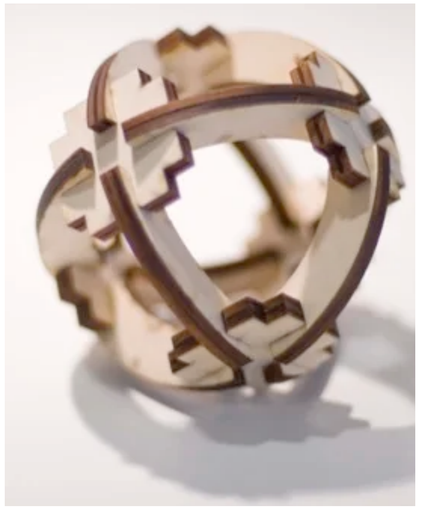


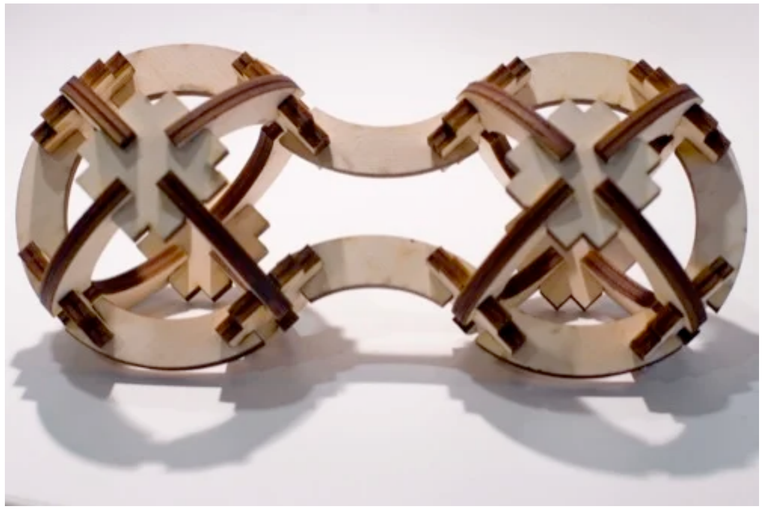
But also, download **Inkscape** or another vector art program

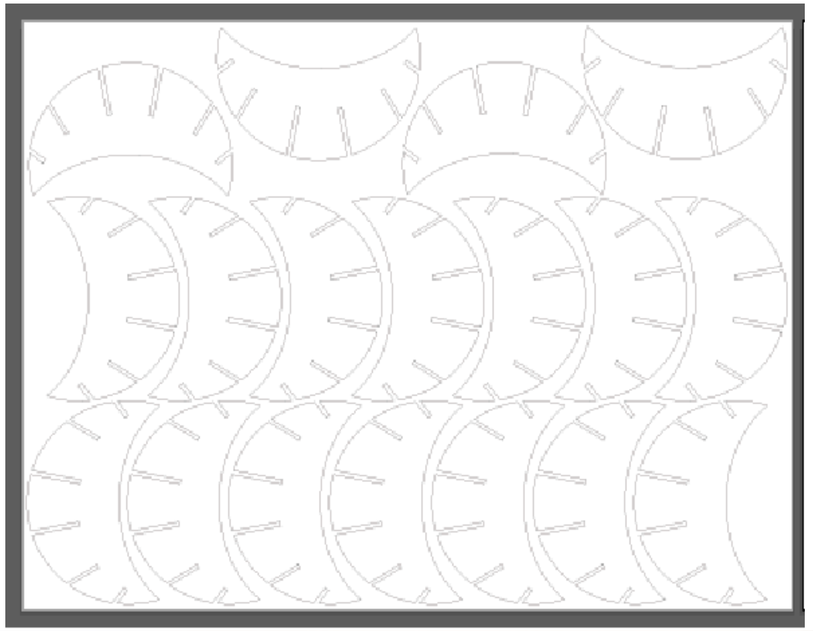
PM3: Press Fit Kit

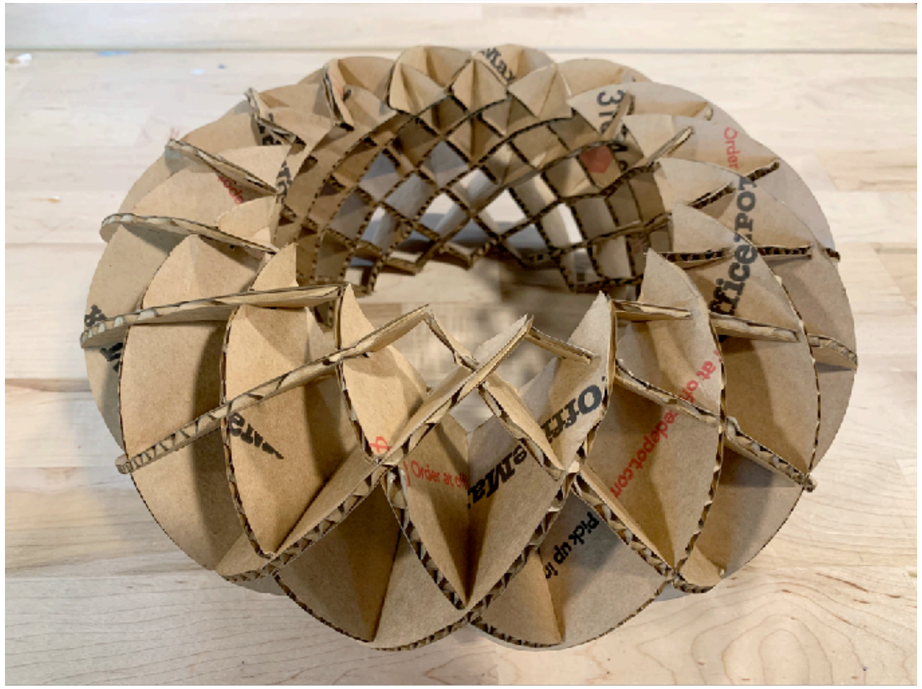










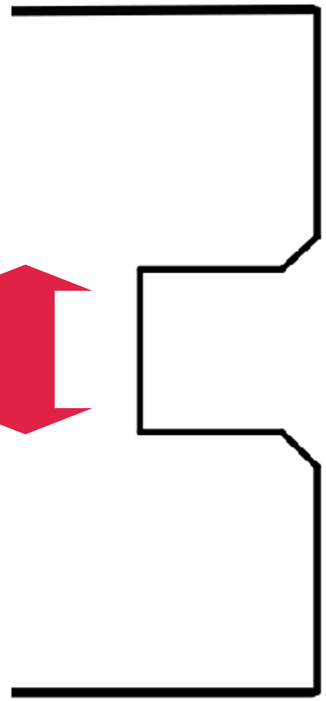


By Hannah Nursalim, https://hcnursalim.github.io/assignment1.html

By Kellie Dunn, https://kelliead.github.io/assignment1.html

Designing accurate press fits: measure twice

Thickness of material



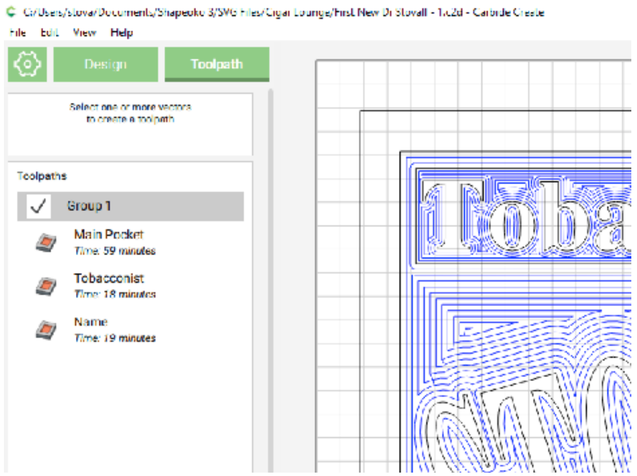
45° notches (chamfer) to help guide the material in

Cutting from 12 x 17.5 birch plywood: make sure your design fits in less space than that!

Studio: More on Laser Cutting

Use a vector program (Inkscape, illlustrator) to draw shapes we want cut

Computer-aided design (CAD)



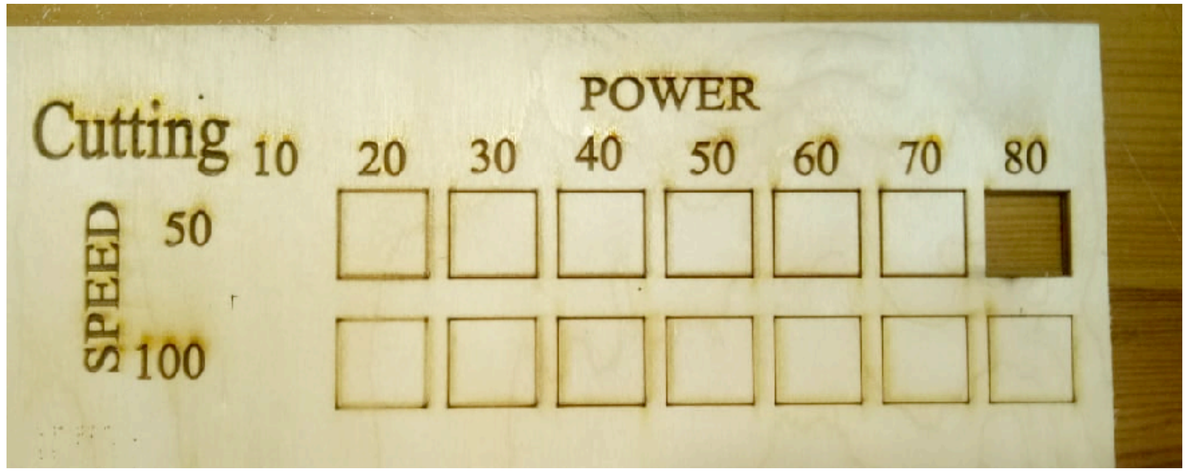
Convert design to toolpaths on the laser cutter, which converts it to motor movements. Also specify cut settings

Computer-aided manufacturing (CAM)

Cut the piece & don't start a fire

Laser Cutting terminology/settings

Cutting vs engraging/scoring

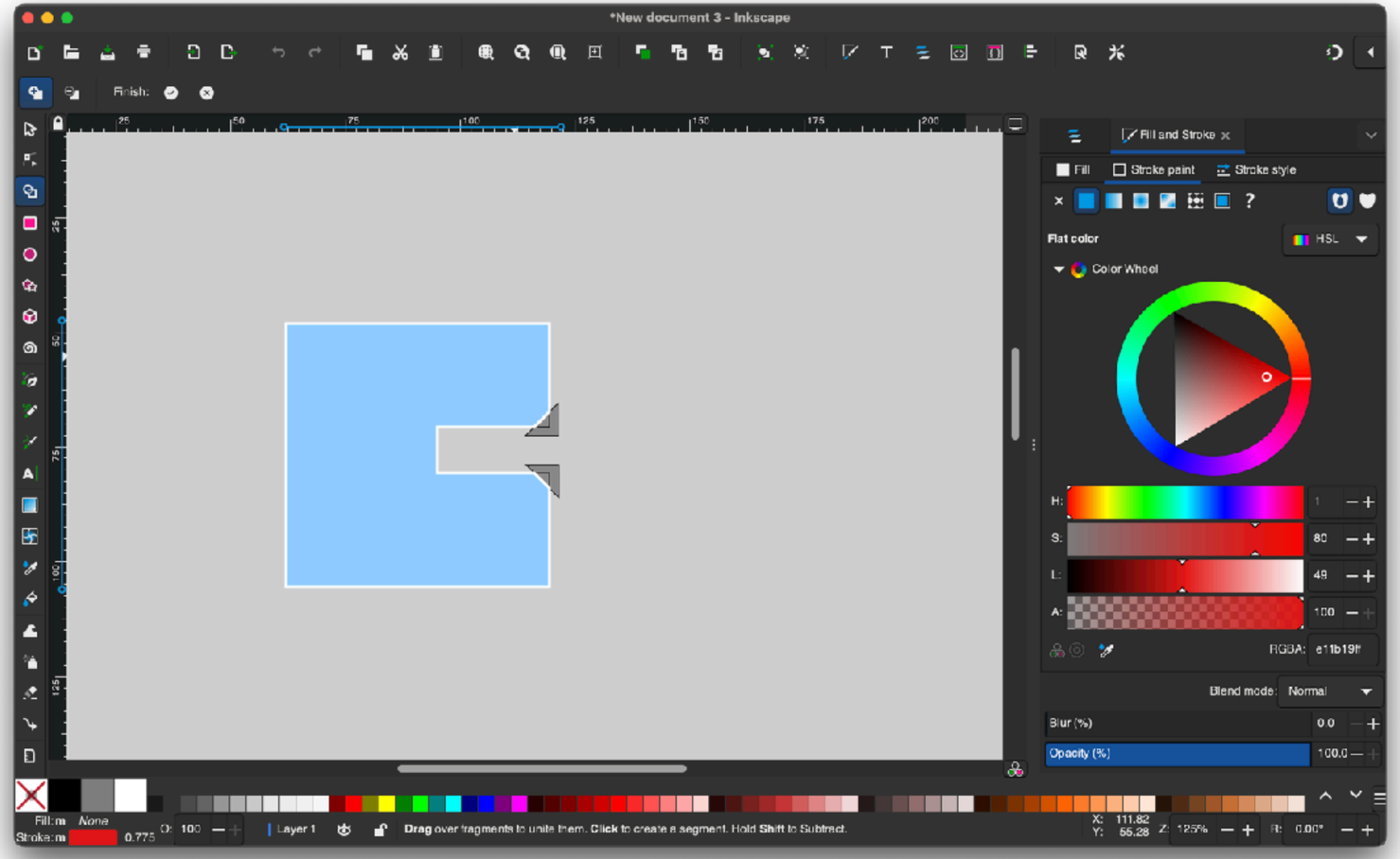


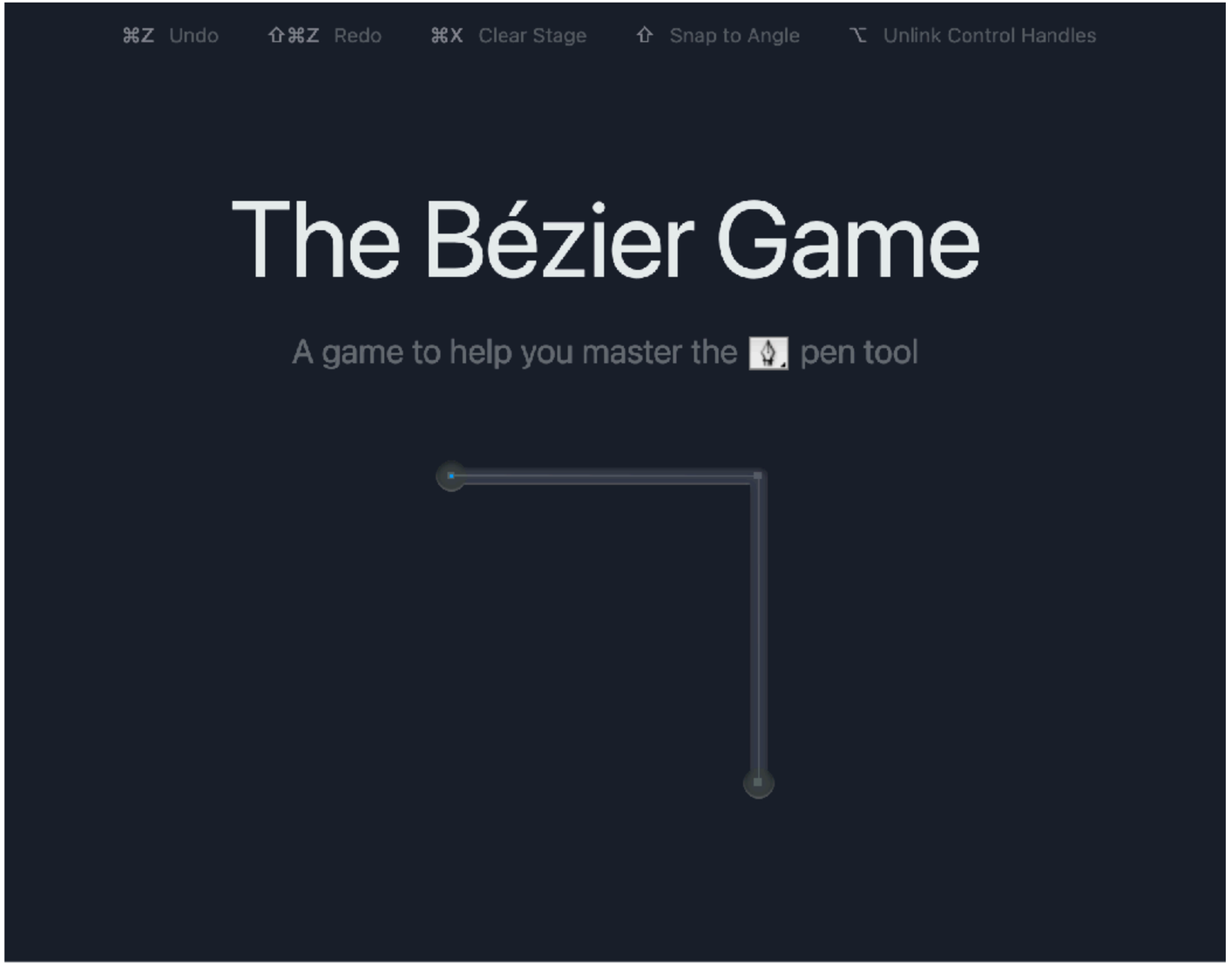
Power & speed

Kerf

How much material is actually removed by the cut

Vector graphics tutorial (in Inkscape)





https://bezier.method.ac/

Class 5 recap

- TODOs:
  - By **Thursday's** class:
    - P1 milestone: storyboards
    - Zipcrit from Cassidy
    - Do the HMC Makerspace general and 3D printing/laser cutter training (make.hmc.edu) -> we'll be touring the space and seeing a laser cutter demo for most of class
  - PM3 is due in 2.5 weeks (after Project 1), but that's to give everyone ample time to use the laser cutter - *get started early!*