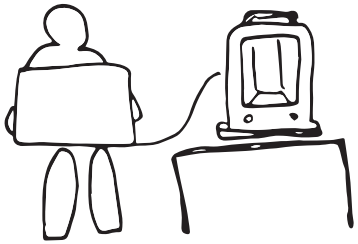
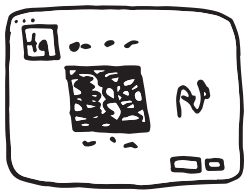
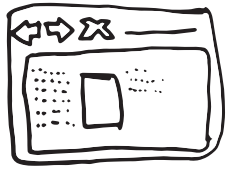
Finally, how are you going to control the machine? There are different kinds of software to stream machine code to machines with, how do you want yours to work?





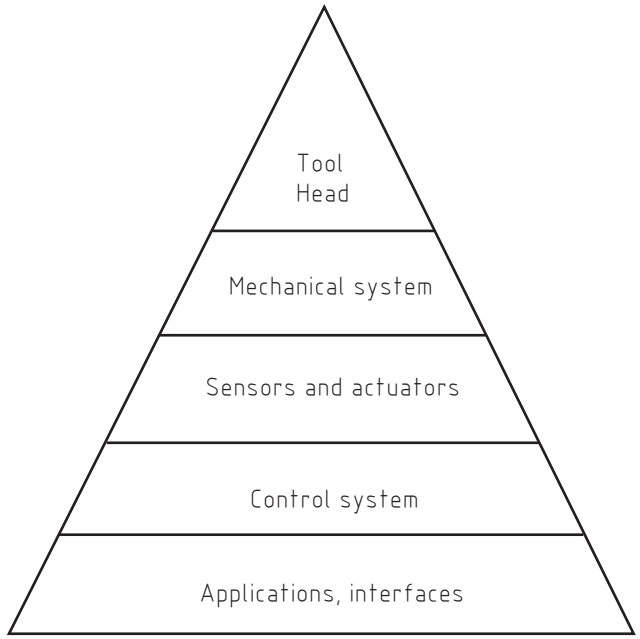
Maybe a drawing program interfaces directly to the machine

Maybe the machine is controlled from a browser...



Those were some tips for making your own machines, we hope they were helpful. Now go on, cook up some machines, and have fun!

I made my machine,
it is just right for me



making machines that make

http://mtm.cba.mit.edu http://pygestalt.org

Machines that make

So you want to make a machine!

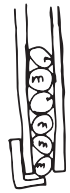
What does it do?

cut?

mill?

extrude?

burn?

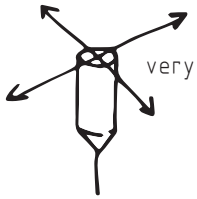


dispense candy?

Depending on what you want to move, you may need different methods...

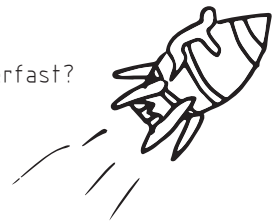
slow and steady?

lots of force?

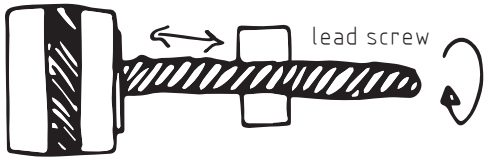


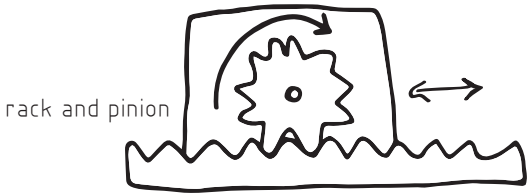
very precise?

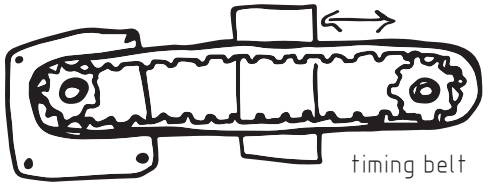
superfast?



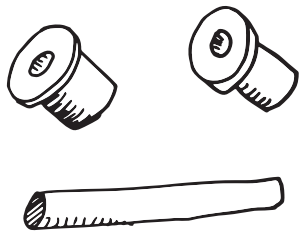
If you want to move something, you need to select an appropriate drive train, like:





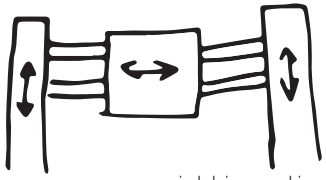


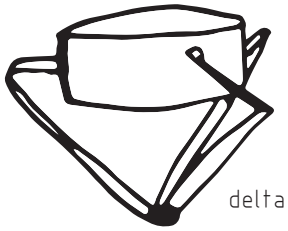
Different drive trains are better at different things, like timing belts are fast, racks and pinions are stiff, lead screws are strong. Some systems are cheaper, some are easier to assemble. These are all things to take into consideration for your machine! What kind of machines do you know of that use these different drive trains?

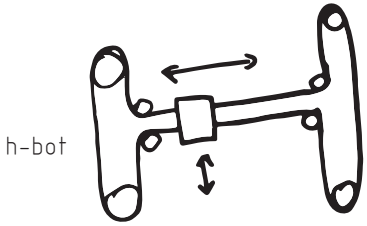


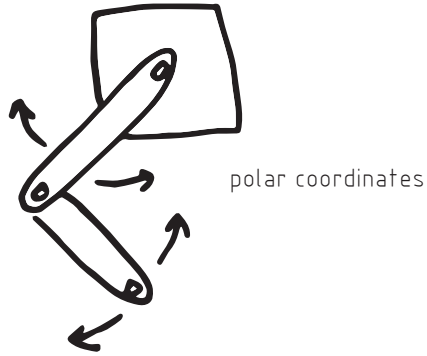
The drive train's motion needs to be restricted in the axes you want to move in. You can do this with guide shafts, tracks, cable guides, linkages, and many other ways.

Composing the motion you want the machine to make out of the different actuators is done using a kinematic model. There are many different kinds of machine kinematics; in some the position of the different actuators is independent, in some the position of one actuator depends on the position of another. This difference is called serial or parallel kinematics.



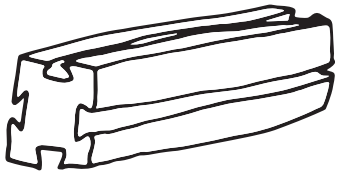


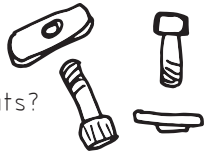




Depending on what kind of motion your machine is going to be making, different kinematics may be better. Do you want to make a lot of circles? Or are you going to me moving in a lot of straight lines?

A frame holds your machine together, and you could make one out of lots of different kinds of materials!

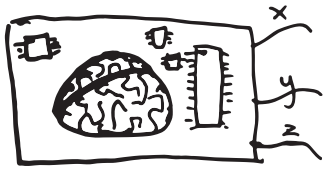


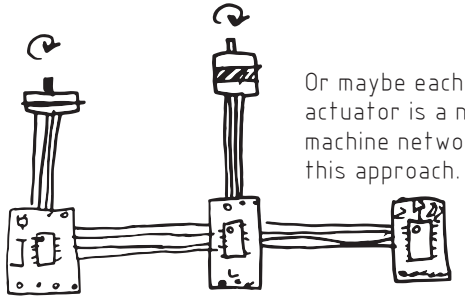


Laser cutting is fast, but not super precise. Aluminum extrusion is expensive, and you have to assemble each piece separately. How do you hold the frame together? Glue? Machine screws? T-slot nuts? All things to consider!

Now that you have the toolhead, the frame, and the mechanical system, you have to figure out how to actuate it all. The actuators need to interface with a control system which is going to tell them to move, and is going to coordinate when they move.

Maybe your control system is one electronic brain that interprets machine coordinates, (e.g. G-code).





Or maybe each sensor and actuator is a node on a machine network! We like this approach.