

IF THIS THEN THAT INTERGALACTIC RETRIEVER



premis →

- two motors at the top half to replicate a simple grabber machine (replacing the grabber with a strong magnet to 'grab')
- a customisable maze to navigate at the bottom half
- controlled with joystick

intro →

I wanted to use the arduino to make a game. I, however, did not have any knowledge of arduino before this school project and wanted to keep it simple. I started out first with looking at youtube, and found someone who made a grabber machine with the arduino. This was similar to what i wanted, though when the builder started talking about versions and the costs I starting thinking about a more simplified version. What if i made my own version of a mechanic that can be found in a lot of modern machines? I would only need to program two motors, one who makes the player go up and down and one who makes the player go left and right, and connect them to the joystick so that can be the remote.

It sounds a lot easier than it was, for me. The school project is about a month long but about two and a half weeks were spend on the coding and figuring out motors. In the end, the code I have is really simple and the iterations and try outs I went through to get there were not. I then focused on moving something with the motors, by using an elastic and lego wheels. It worked and still works as part of my end result, except it doesn't work together. While the motors work, I couldn't figure out how to move an object on both axis using the wheels and bands. It's why I would not say I'm altogether proud of it. It did teach me the basics of tech/hardware creation and designing something from nothing but an arduino so ultimately it has been a useful learning experience.

necessities →

software

arduino with cheapstepper library added

hardware

2x 5V step motor

2x (ULN2003) stepper driver board
(companion piece for the motors)

12x f/m cables

6x m/m cables

2x arduino uno

(or another board that allows for two motors → they each need to be connected using the 8 to 11 pins)

2x ULN2003 Stepper Motor Driver Board

materials

a lot of (thin) wood, metal rods, bouts, screws

figure saw//drill

double sided tape//strong (and fast) glue

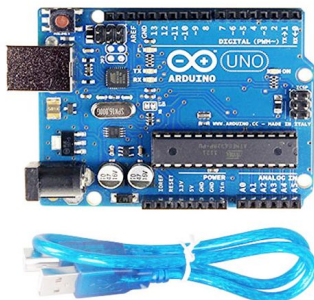


m/m cable [6]



f/m cable [12]

powerbank [1]

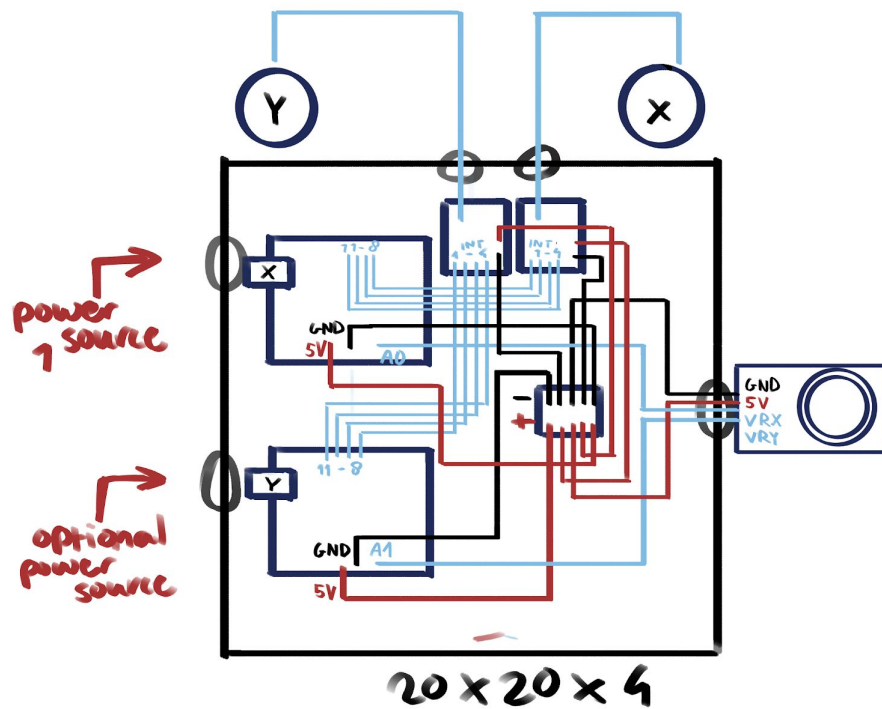
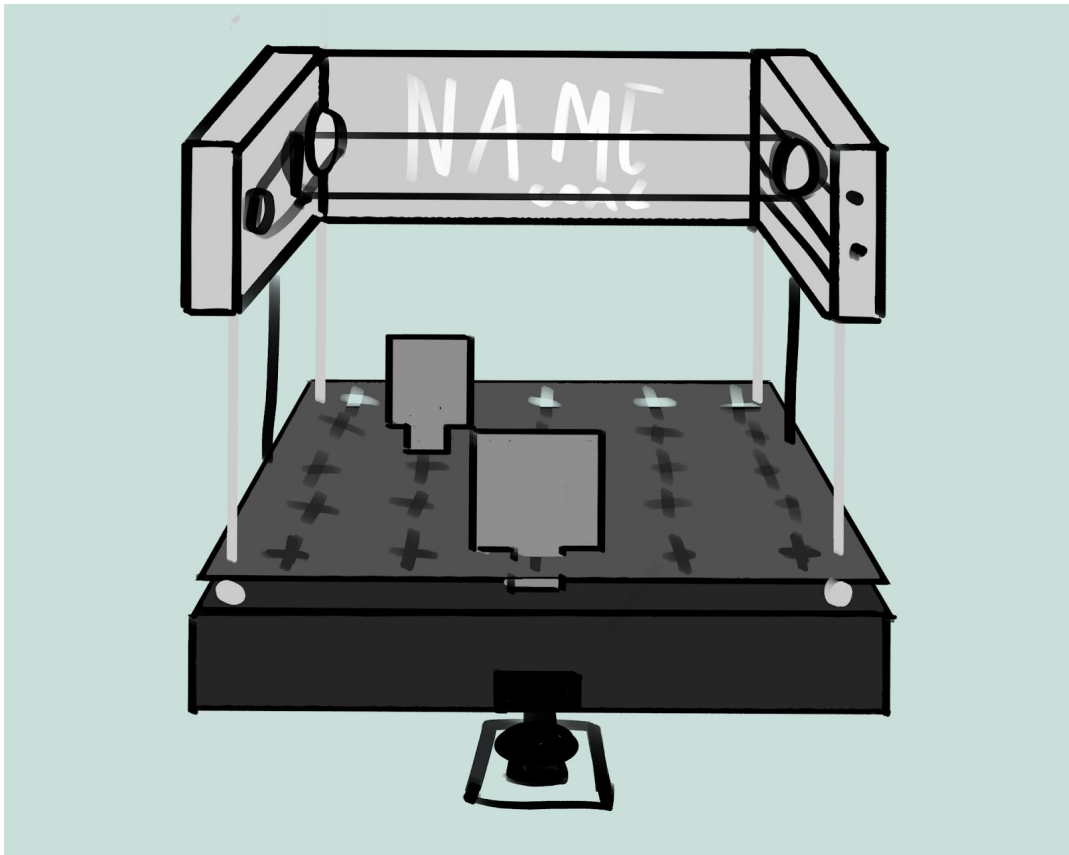


arduino uno [2]
powercable [2]



5V stepper motor [2]
driver board [2]

set up →



code →

for arduino 1 controlling motor x//up-down:

```
//including library for the motor(s)
#include <CheapStepper.h>

//creating each motor and direction variable
CheapStepper stepperX;
boolean moveClockwise = true;

//connecting the x and y of the joystick to pins
//that can be used to turn on motors
const int X_pin = A0;

// basis thats a bit VOID
void setup() {}

// the code for the motor x to go on in
//the right direction with the right position of the joystick
void loop()
{
  if (analogRead(X_pin) <= 25) {
    stepperX.step(moveClockwise);
  }
  if (analogRead(X_pin) >= 1000) {
    stepperX.step(!moveClockwise);
  }
}
```

for arduino 2 controlling motor y//left-right:

```
//including library for the motor(s)
#include <CheapStepper.h>

//creating each motor and direction variable
CheapStepper stepperY;
boolean moveClockwise = true;

//connecting the x and y of the joystick to pins
//that can be used to turn on motors
const int Y_pin = A1;

// basis thats a bit VOID
void setup() {}

// the code for the motor y to go on in
//the right direction with the right position of the joystick
void loop()
{
  if (analogRead(Y_pin) <= 25) {
    stepperY.step(moveClockwise);
  }
  if (analogRead(Y_pin) >= 1000) {
    stepperY.step(!moveClockwise);
  }
}
```

sources →

arduino coding reference - <https://www.arduino.cc/reference/en/>

grabber machine with arduino - https://youtu.be/M0Ja_UNz0Rg

connecting joystick - <https://youtu.be/MlDi0vO9Evq>

connecting joystick with different motor and driver -

<https://youtu.be/cYIL5gxRogM>

using cheapstepper library -

<http://anleitung.joy-it.net/wp-content/uploads/2016/09/SBC-Moto1-Magnus-1.pdf>

log →



10-12	START introduction project and first lecture! overwhelming and I have no idea where to start...
12-12	solder lesson test assignments with LED
13-12	idea found! sudden inspiration during late breakfast → premis completed
14-12	followed a simple tutorial hooking up the joystick with the arduino and serial monitored the values → idea: if loop needs the condition of the x or y pin being below or above a certain value.
17-12	second lecture learned about using motors and wrote the first (failed) iteration of code
20-12	more code iterations
26-12 // 12-12	christmas break
01-01	.. more iterations of code and tryouts that did not work I'm stuck
06-01	at a family dinner, where my uncle helped me with the wiring and somehow found the manual referencing a library and code that should work on the step motor which has been malfunctioning
07-01	third and last lecture asked for help and now I have functioning code! the code I have now is a lot simpler too.. but two motors apparently cannot function on one arduino
08-01	made an appointment for laser cutting the finer wooden pieces ordered/got more parts, including another arduino and step motor
09-01	got wheels for the motors and bands to move the object with both motors work perfectly
10-01	wiring done and soldered
11-01	build the base and organised all parts and wiring in it
12-01	build the upper left part so that the motor and a wheel connected to a suspended wooden panel can move an object attached to the band up and down
15-01	made and laser cut the grid panel
16-01	made the upper right panel with two metal rods for the second motor, which I moved to right side, to move along with made a lot of maze puzzle pieces to fit in the grid tested several bands but none are compatible → theme found: aliens reminiscent of the times with arcades painted and disassembled machine for travel
17-01	END presentation day! negative → I have to resit the project due to the motors and the left-right movement not working positive → I received compliments on my idea and on my theme