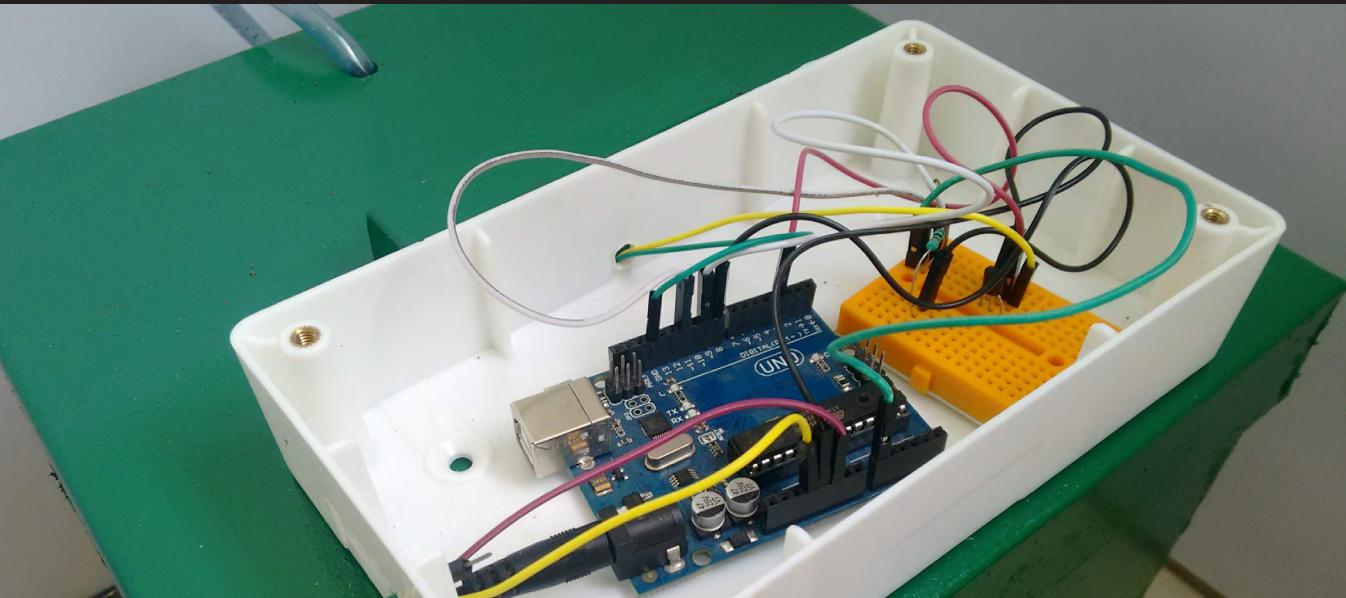


# Eureka

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## Automated Watering Assistant



# Why Automate Watering?



Conserves Water

Convience of automating  
mundane tasks



# Existing Products



## IKEA PS FEJÖ Self-watering Planter

This product relieves the user of watering their plants every day by using a mechanism which involves using threads to suck water from the bottom of the pot to the soil because of the lower content of water in the soil.

### Advantages:

Caster wheels make it easy to move

Reasonable cost (\$20)

Made of recyclable material

Water gauge indicates the water level

### Disadvantages:

Not ideal for the outdoor environment

No effective way to drain excess water



## GrowOya

This product is a terracotta pot that can be buried into the soil and filled with water about once a week. The water inside slowly seeps out through the walls to water the plants at the roots.

### Advantages:

Saves water and time

Reduces weed growth

Plants get how much water they need

Material and development process is not hazardous to the environment

### Disadvantages:

Expensive (\$25 for 1 small product which is sufficient for 2 feet diameter)

Difficult to install

Breaks at temperatures below zero if left in the soil



## Rainbird Drip-Irrigation System

This product controls water flow to a set of plants through a pipe laid across the area that has to be watered. This method allows water to seep into the soil, providing sub-surface watering.

### Advantages:

Saves water compared to usual watering

Better growth of plants

Does not require digging

One time set-up

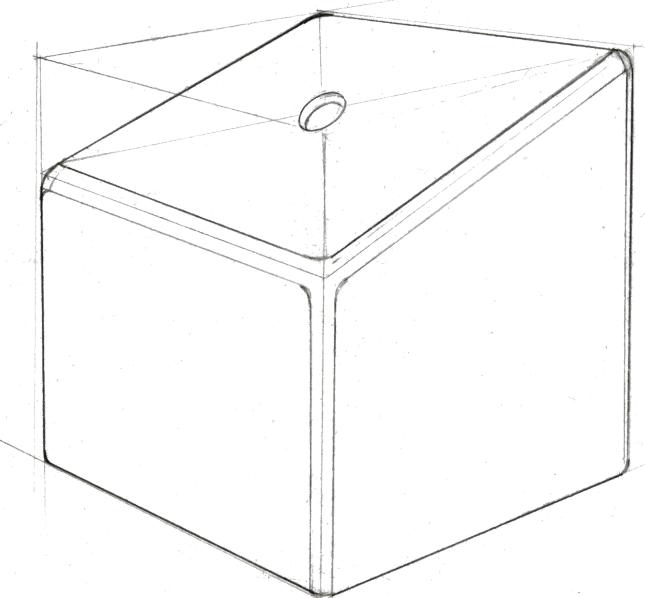
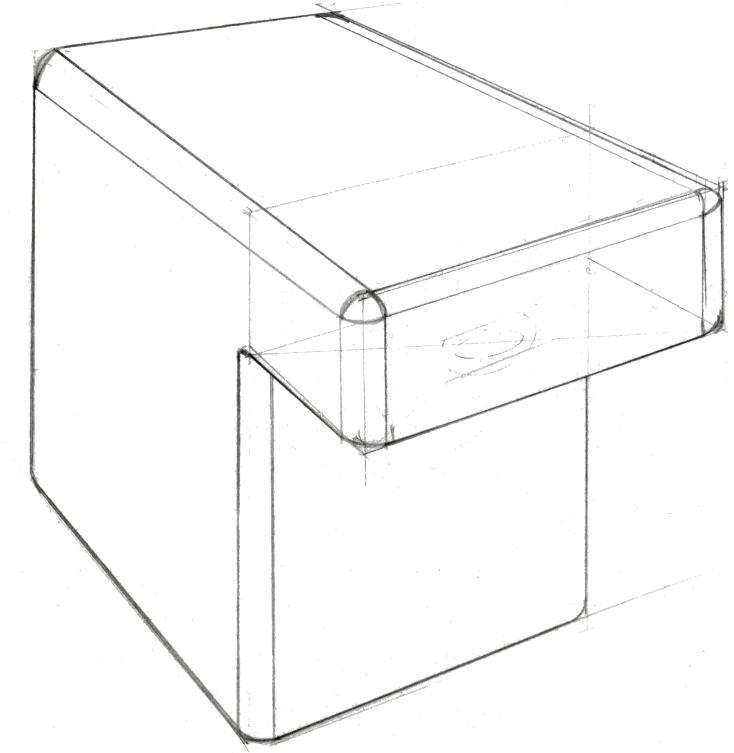
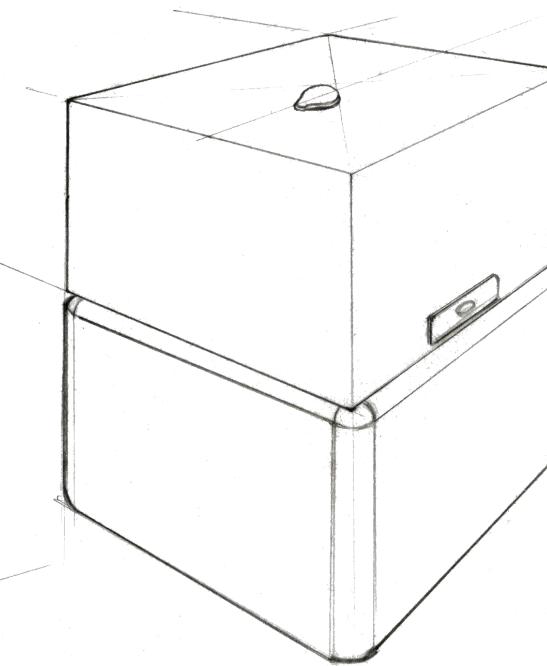
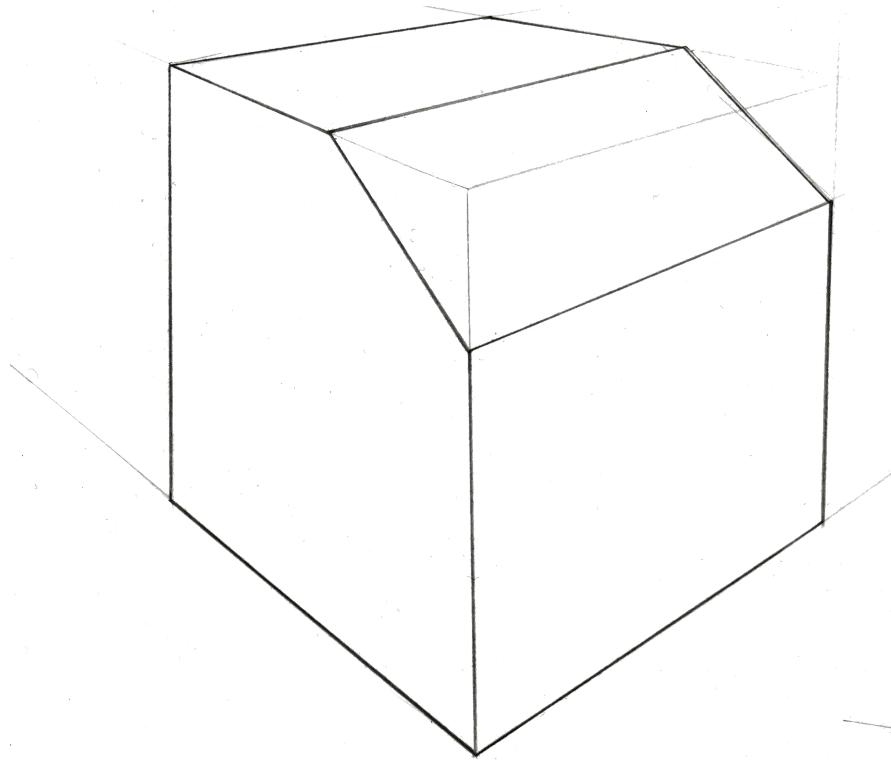
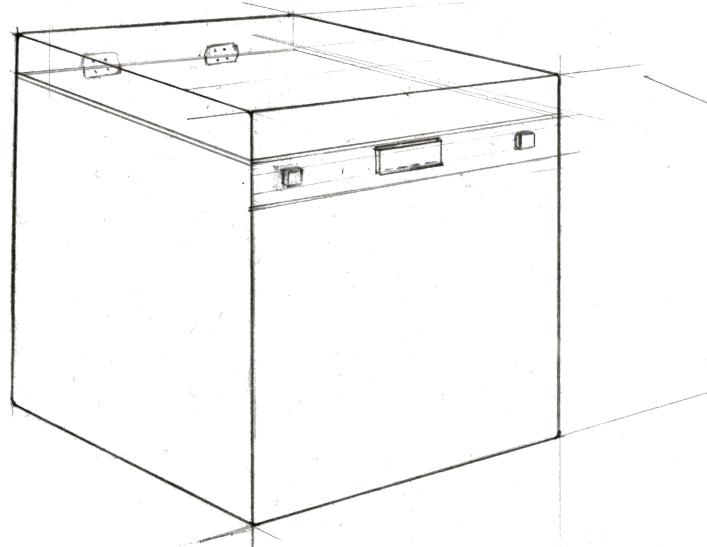
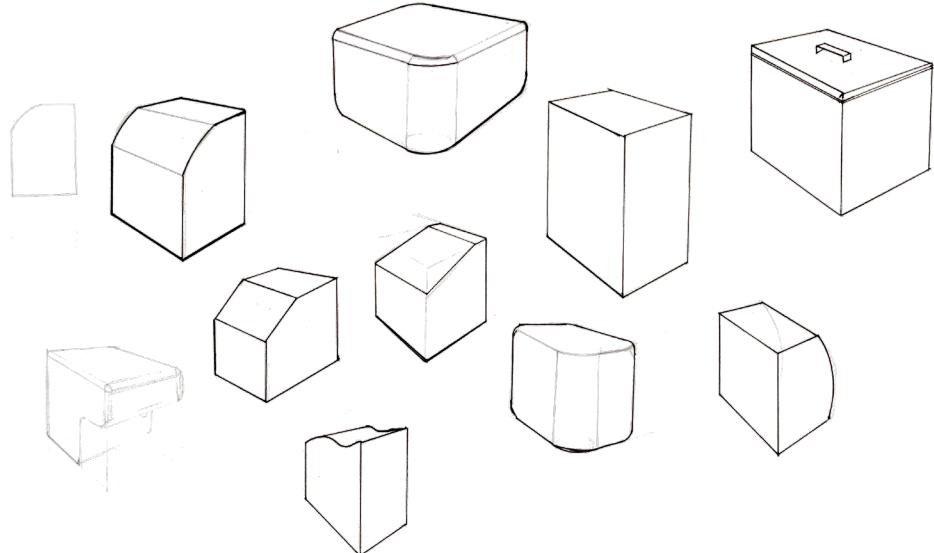
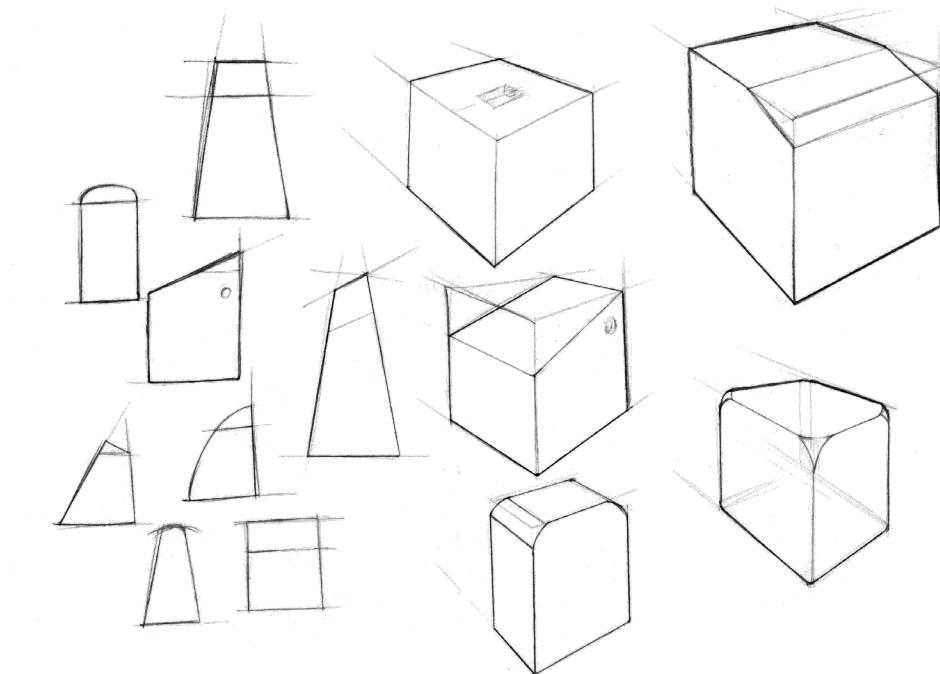
### Disadvantages:

Requires a constant pressurized water supply

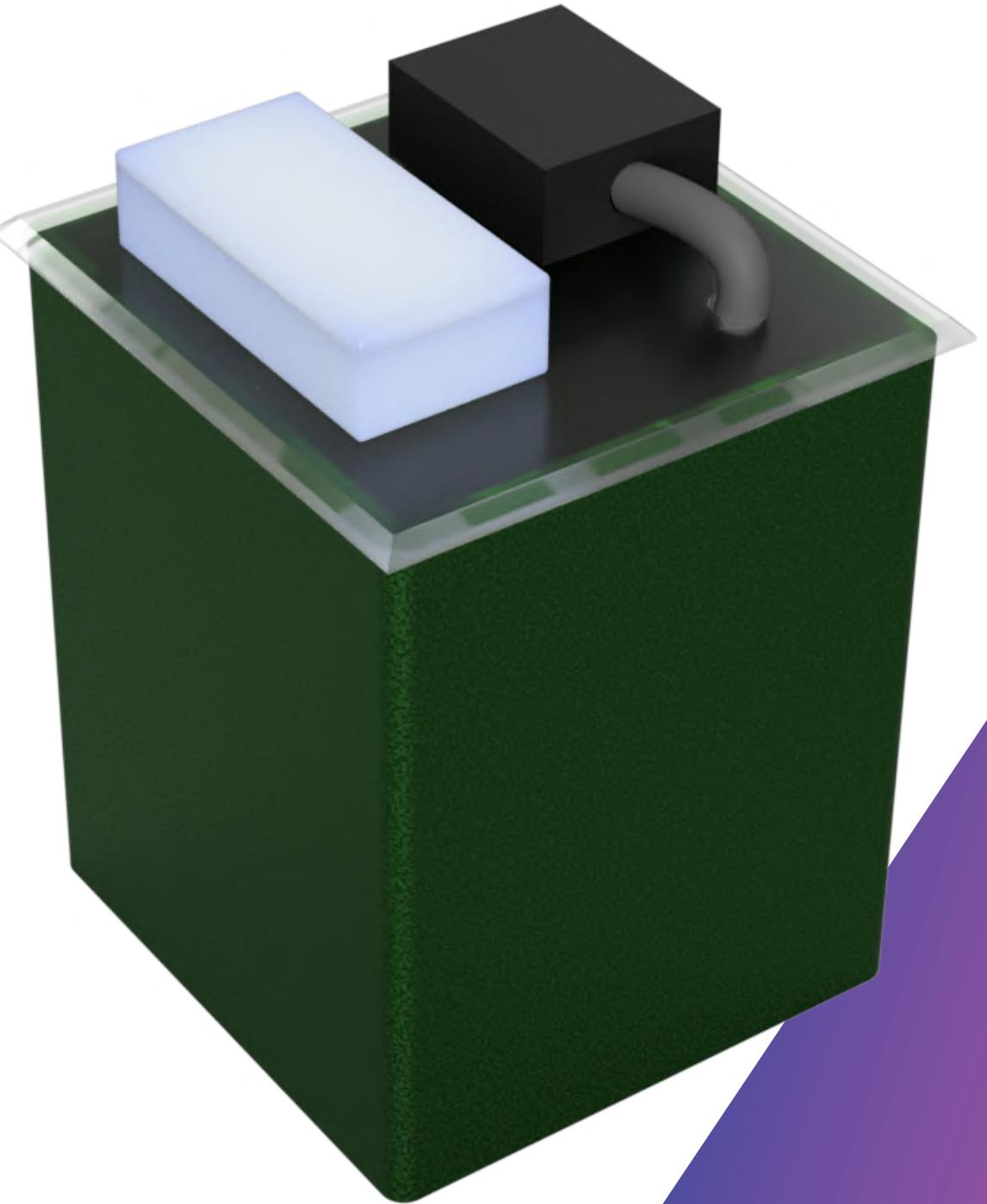
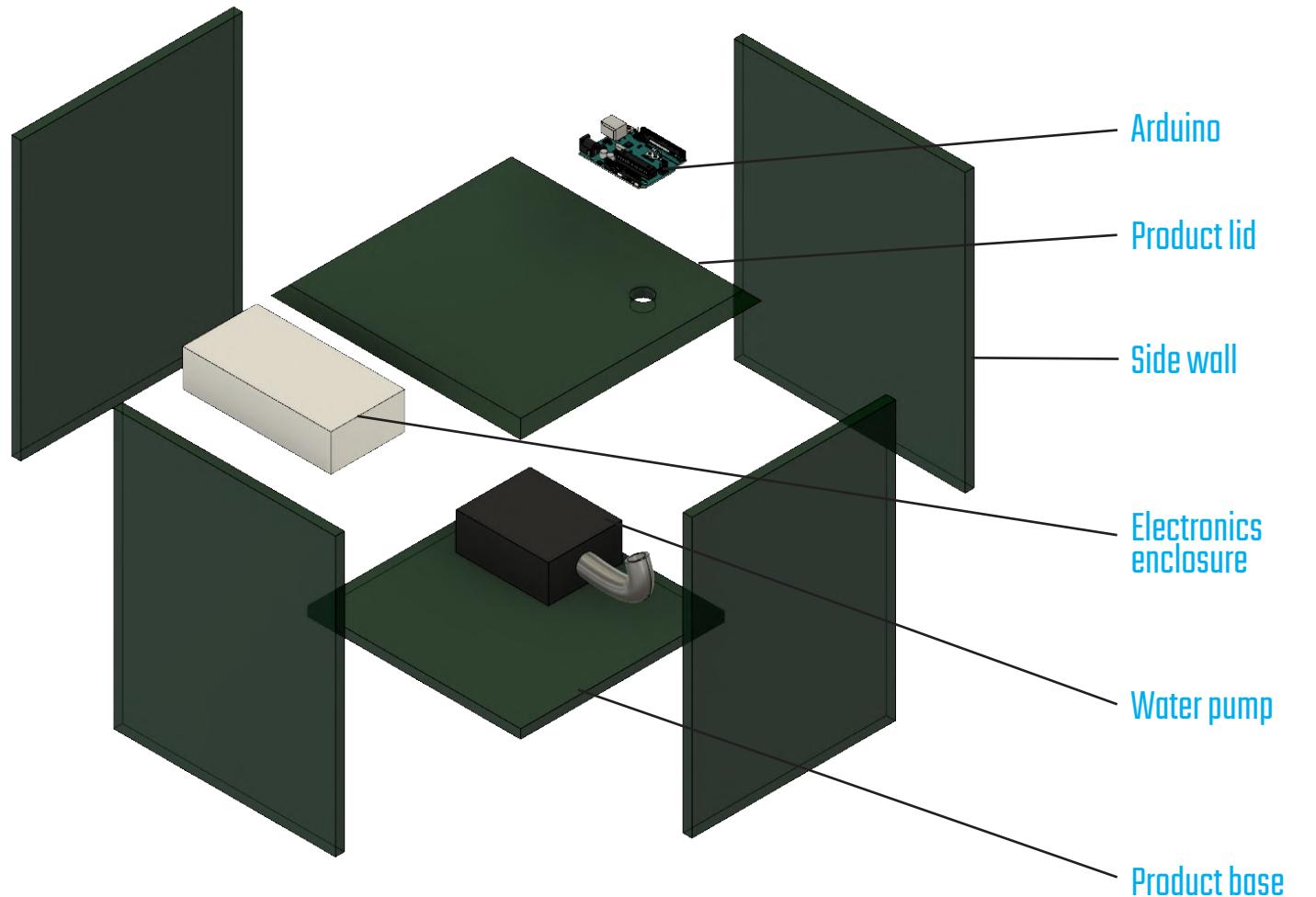
Expensive (\$130 for an area of up to 75 square feet)

User set watering frequency, not based on soil humidity

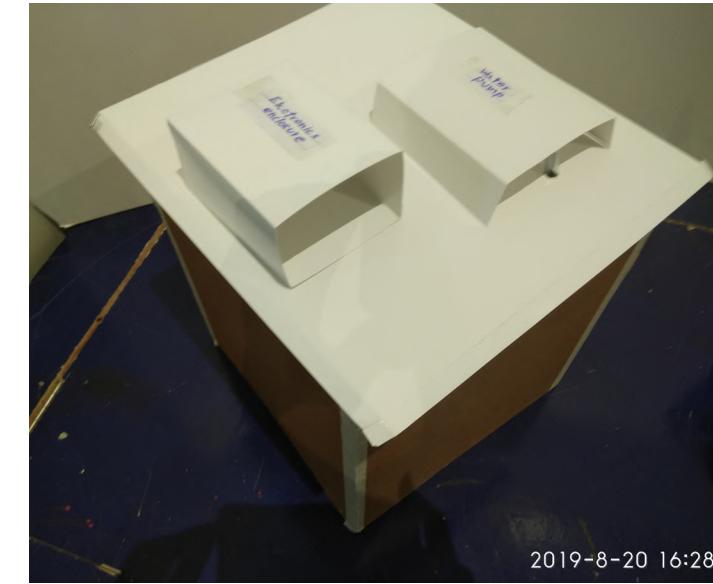
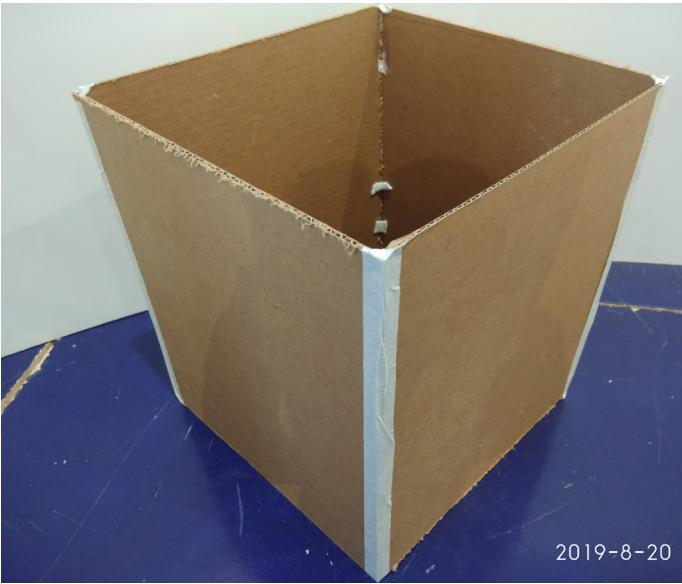
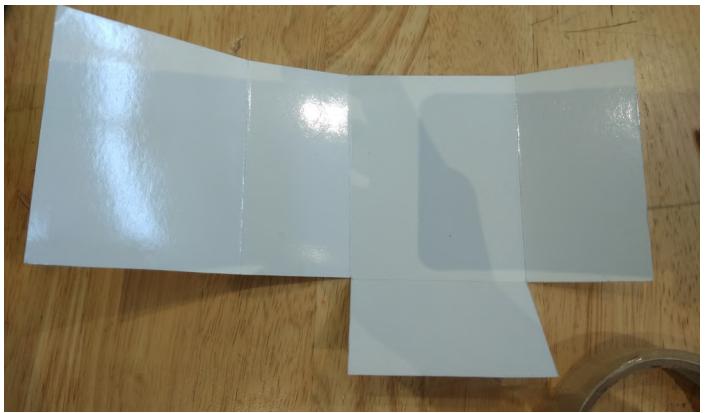
# Sketch Ideation



# Product Visualization



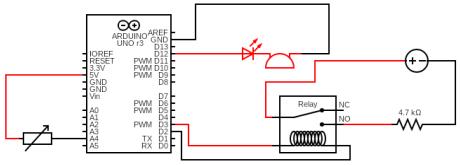
# Prototyping



# Material Exploration

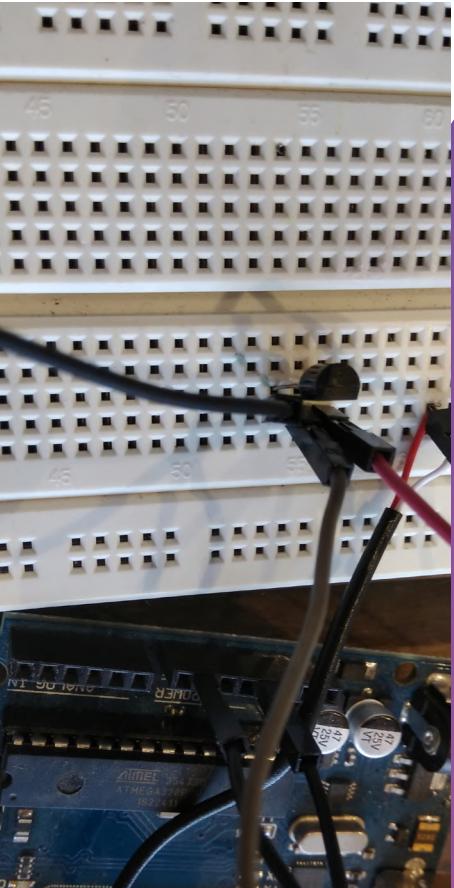
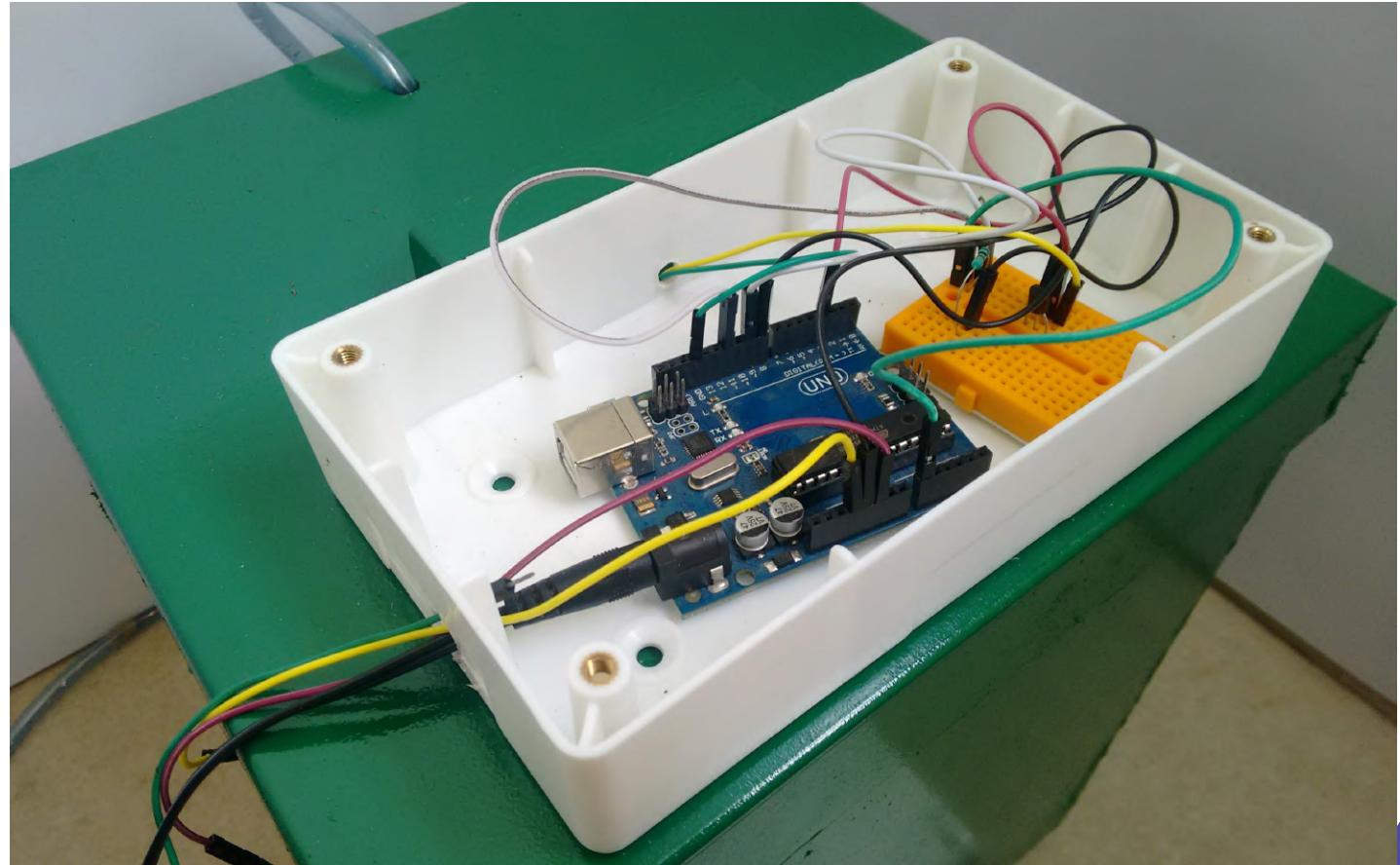
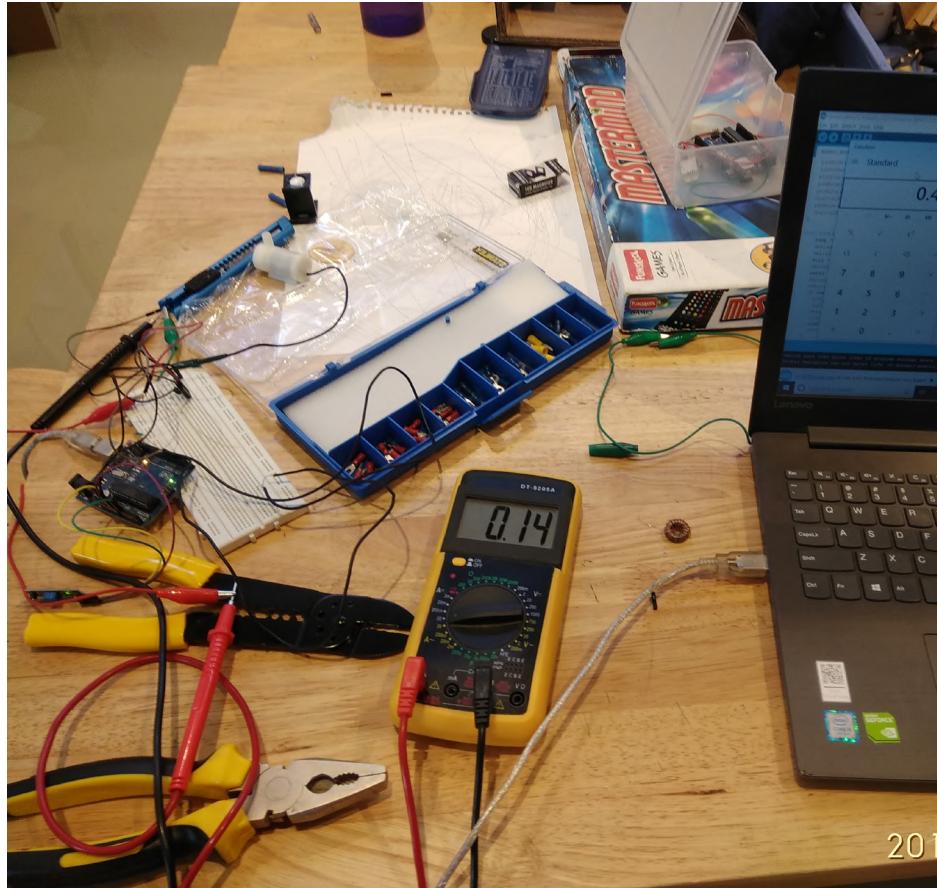
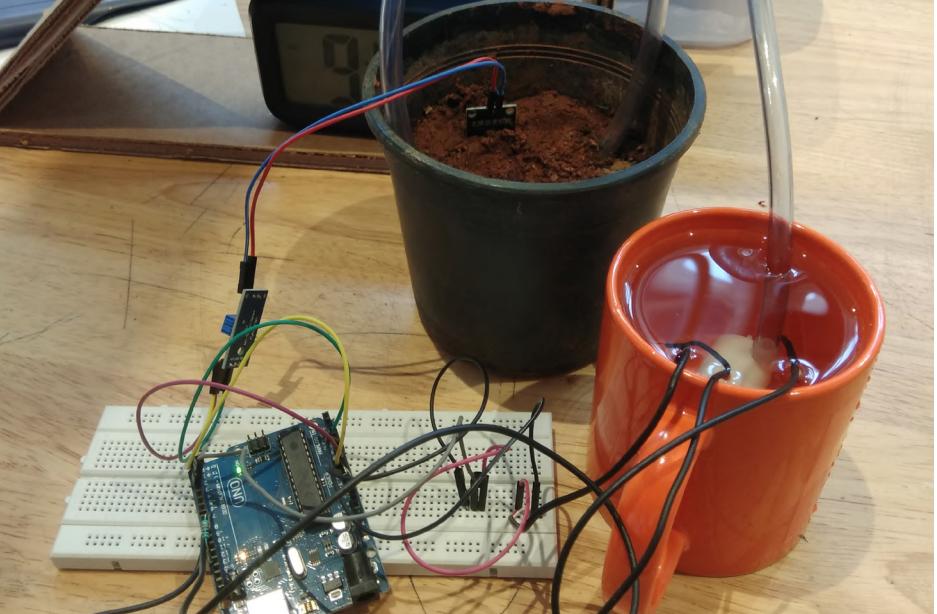


# Electronic Prototyping



Sensor sketch | Arduino 1.8.9 (Windows Store 1.8.21.0)  
File Edit Sketch Tools Help  
sensor\_sketch  
COM9  
void loop() {  
 temp = dht.readTemperature();  
 Serial.print(temp);  
 Serial.print(" ");  
 soil = analogRead(A0);  
 Serial.println(soil);  
 water = digitalRead(9);  
 Serial.println(water);  
 delay(1000);  
 if (water == 0) { //Warn user if tank is empty  
 digitalWrite(11,HIGH); //Switch on LED  
 digitalWrite(12,HIGH); //Switch on buzzer  
 delay(1000); //Buzz for 1 second  
 digitalWrite(12,LOW); //Switch off buzzer  
 enabled = 0; //Disable water pump  
 }  
 if (soil < 500) { //If soil humidity is low  
 if (enabled == 1){ //If water is in the tank  
 digitalWrite(3,HIGH); //Switch on water pump  
 delay(2000); //Keep pump on for 2 seconds  
 digitalWrite(3,LOW); //Switch off water pump  
 }  
 }  
}  
Done uploading.  
Sketch uses 5130 bytes (15%) of program storage space. Maximum is 32256 bytes.  
Global variables use 228 bytes (11%) of dynamic memory, leaving 18228 bytes free.  
36

The screenshot shows the Arduino IDE interface with the uploaded sketch named "sensor\_sketch". The code reads temperature from a DHT22 sensor, soil moisture from an analog pin (A0), and checks a digital pin (9) for water level. If water is detected, it turns on an LED and a buzzer. If soil moisture is low and water is present, it turns on a water pump for 2 seconds. The serial monitor shows the output of the sensors and the state of the water pump.



# Finishing



# VeBike

**Enabling enthusiasts and DIY builders to  
make their own electric bike**



# Who is it for?



Mark Martinsen



New York, USA

Environmentalist



Energetic

World Traveller



Entrepreneur

Video Blogger

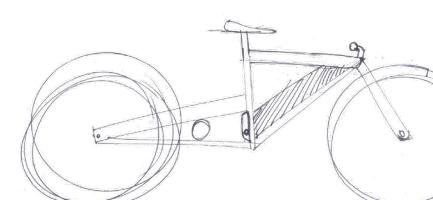
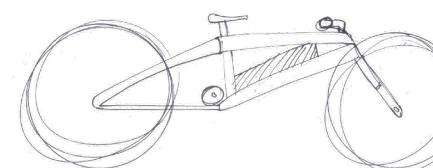
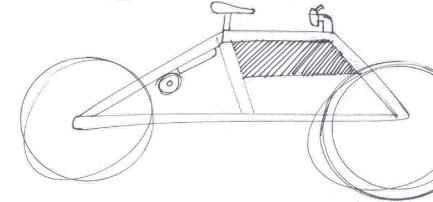
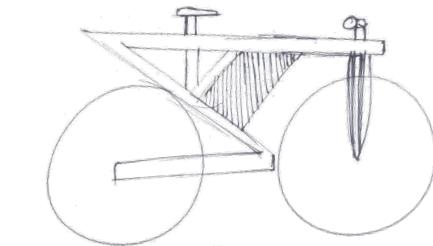
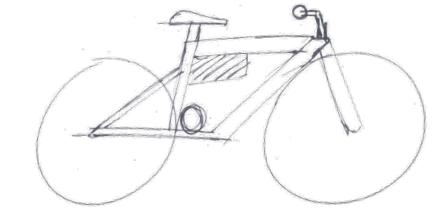
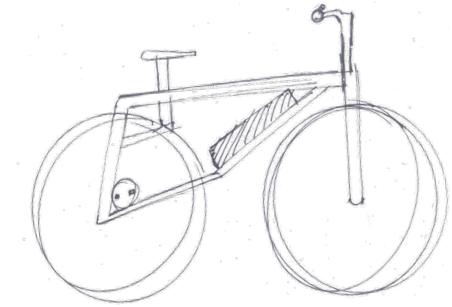
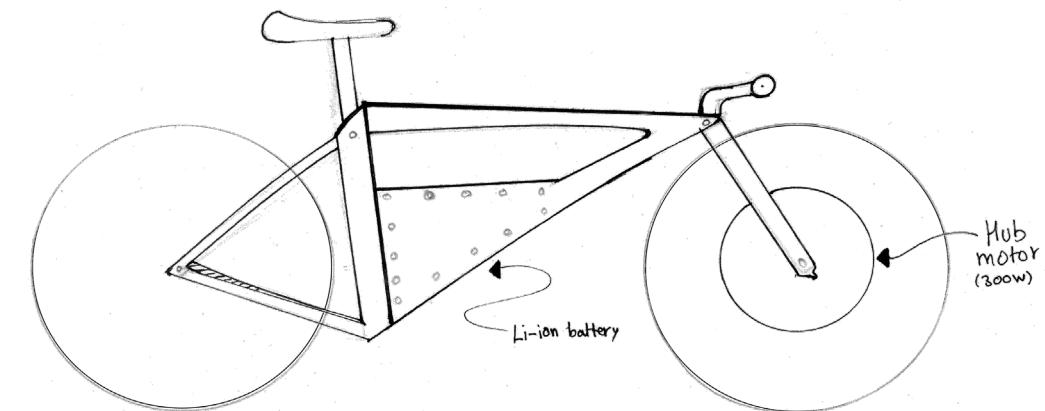
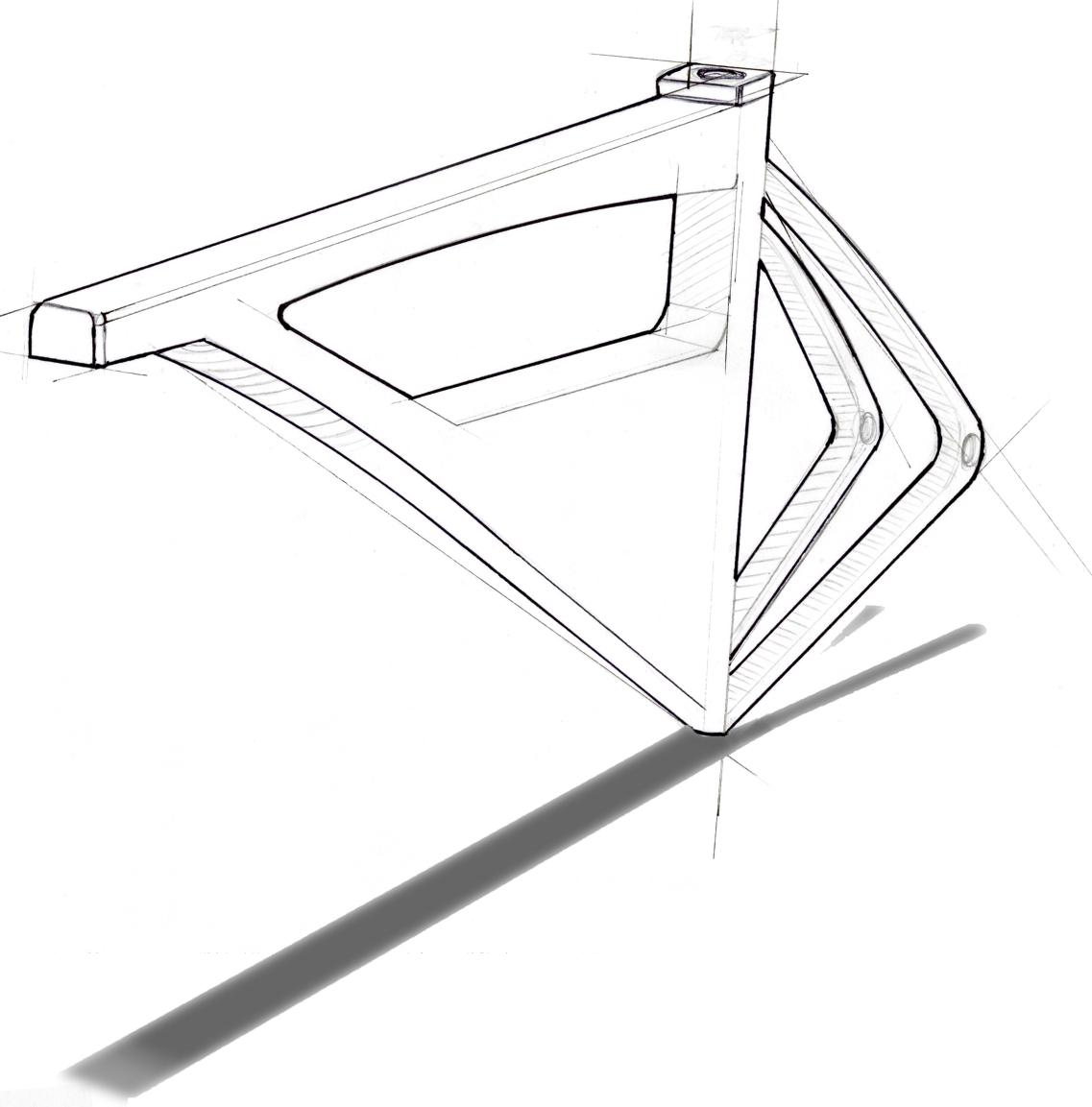
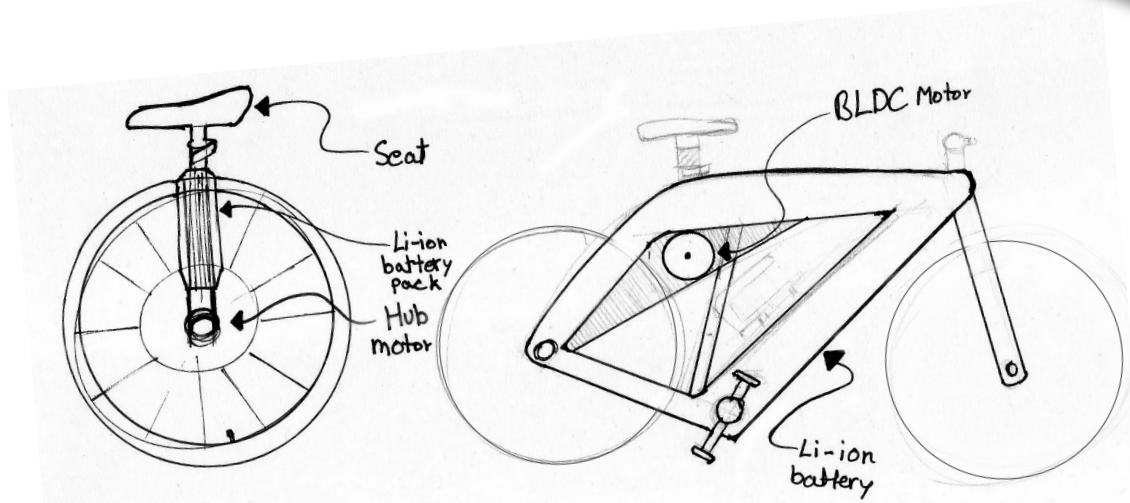
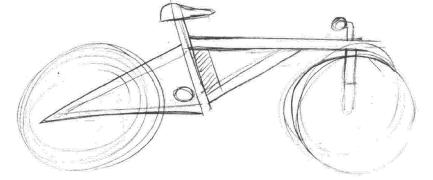
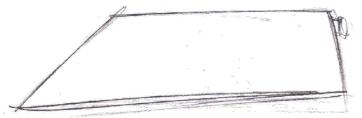
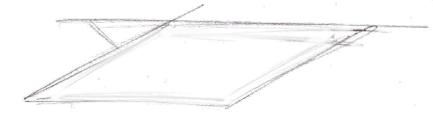
Mark wants to upgrade his bike by  
making his own e-Bike



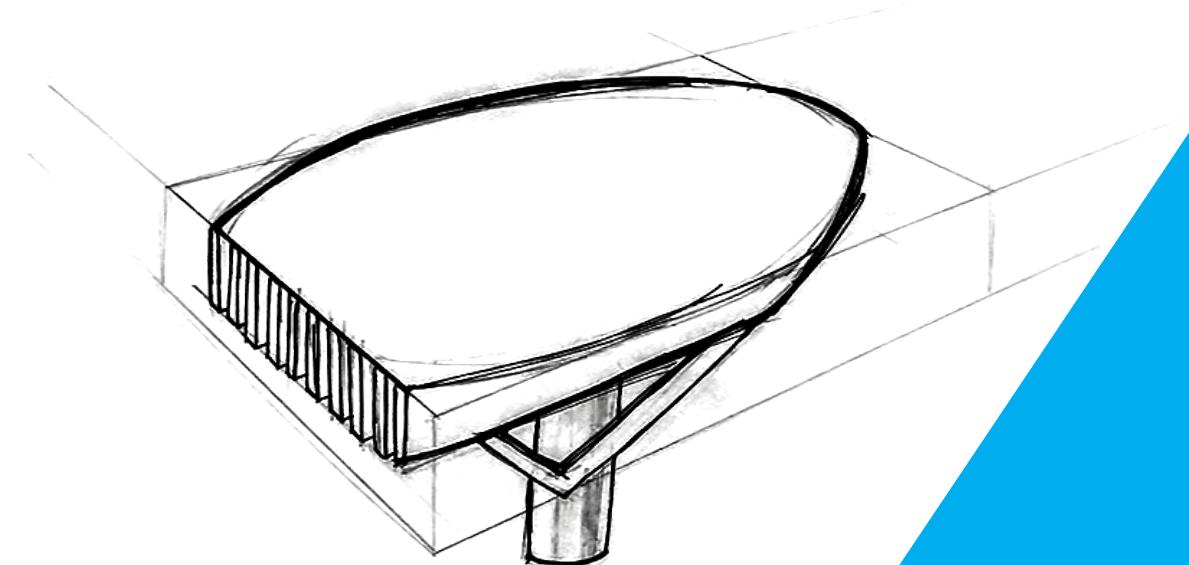
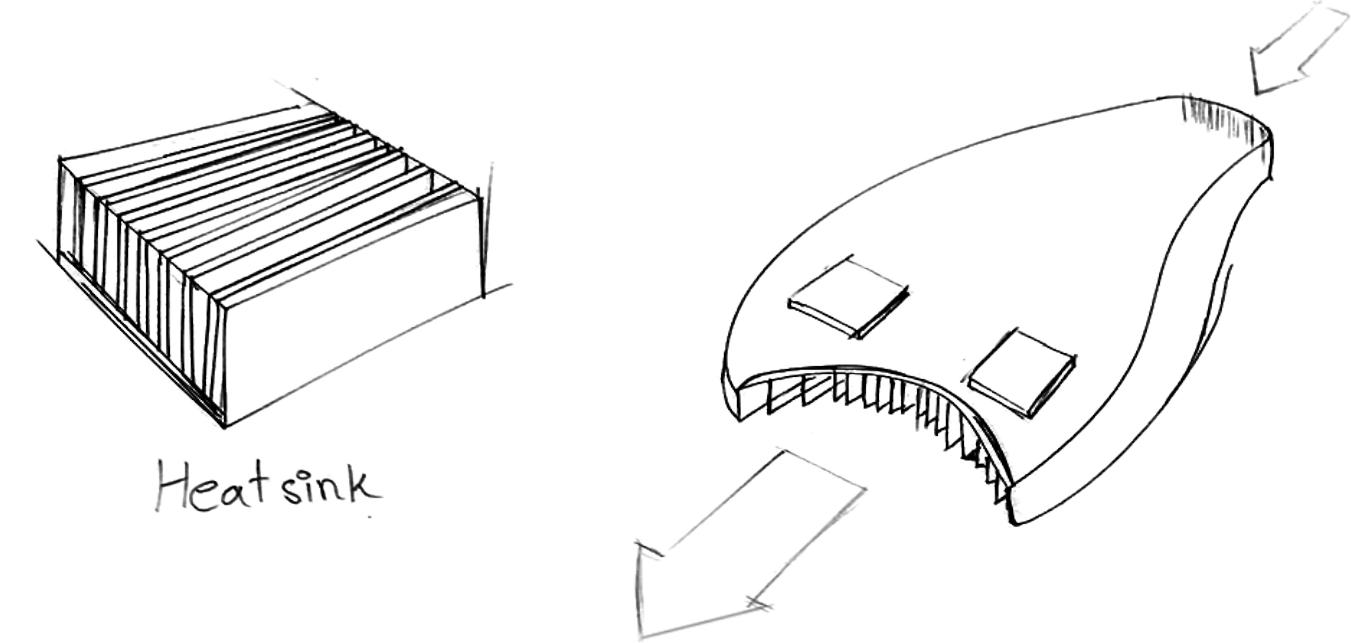
# Inspiration



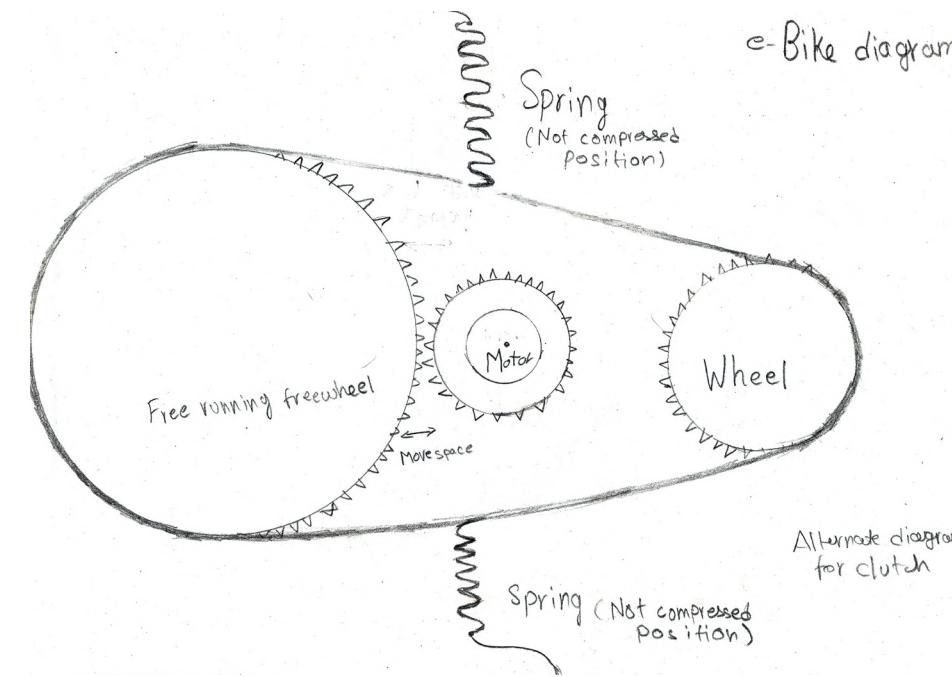
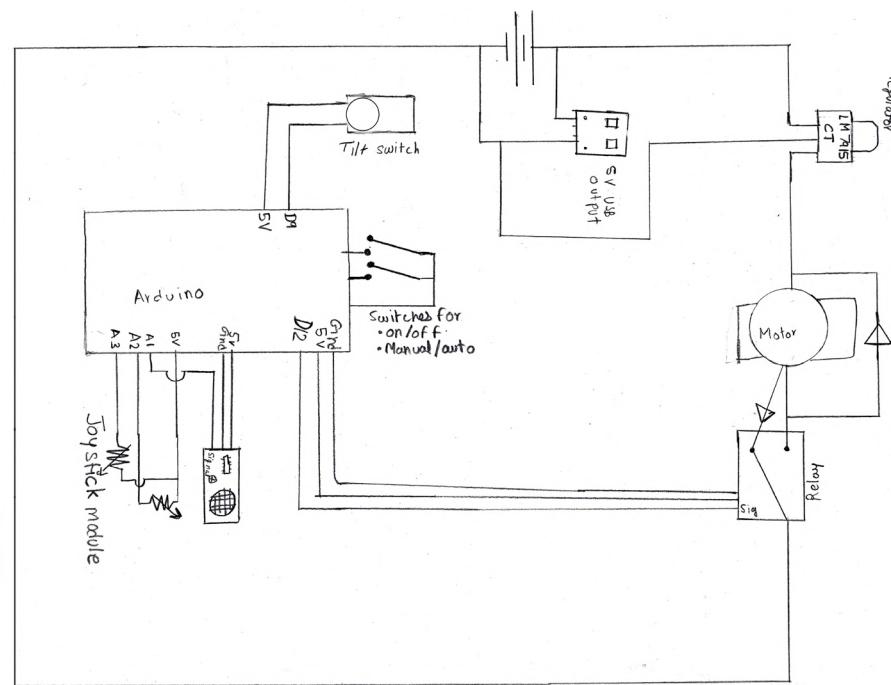
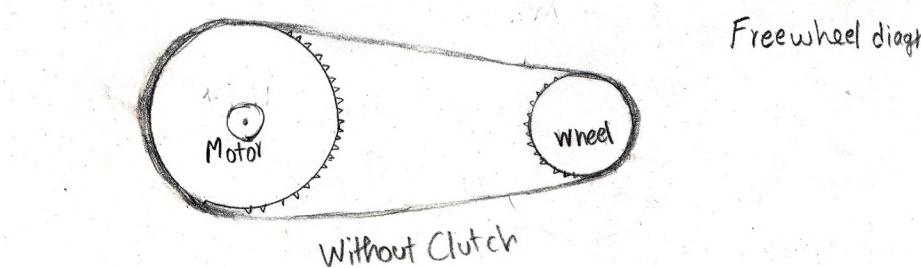
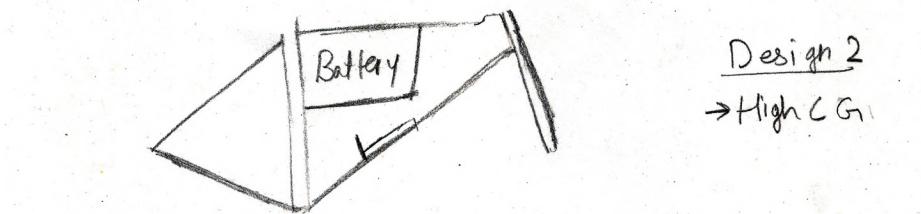
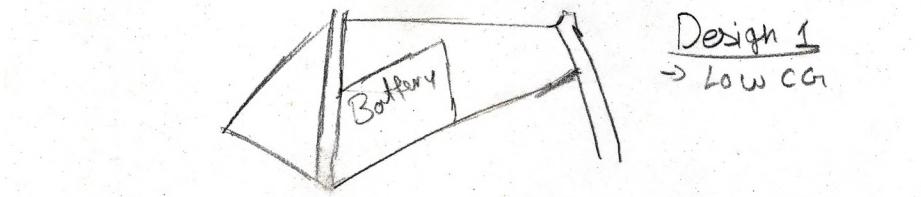
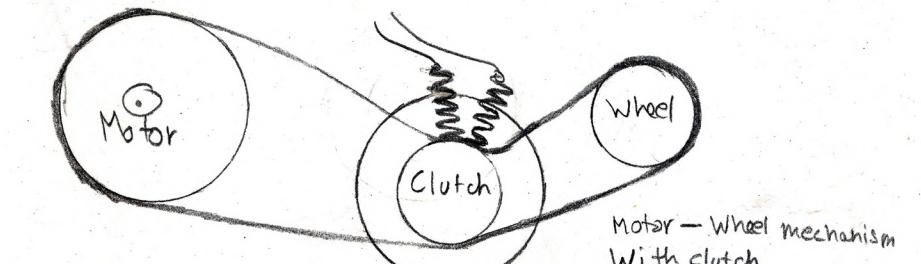
# Sketch Ideation



# Seat Design

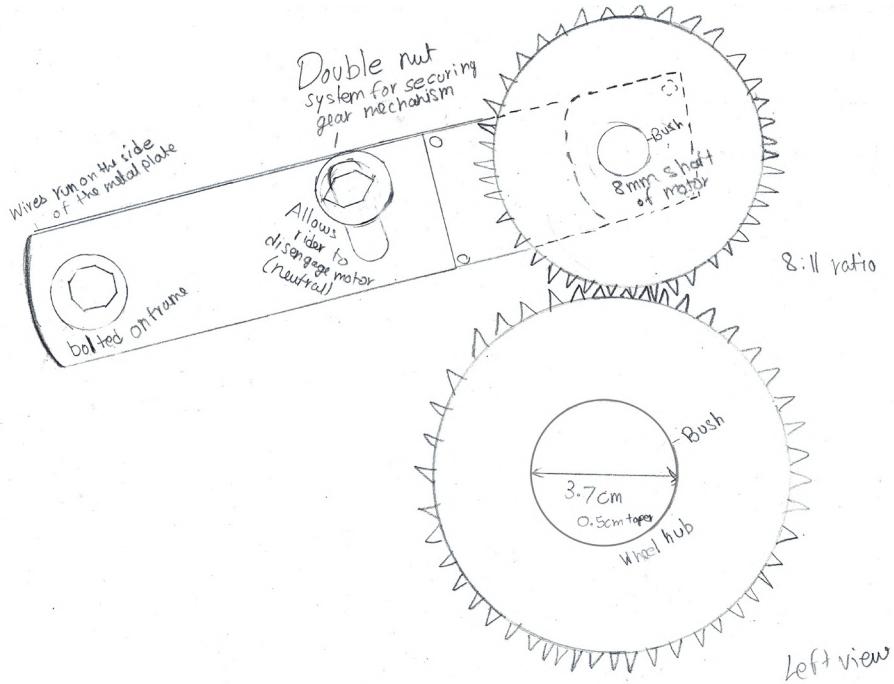


# Engineering the Bike

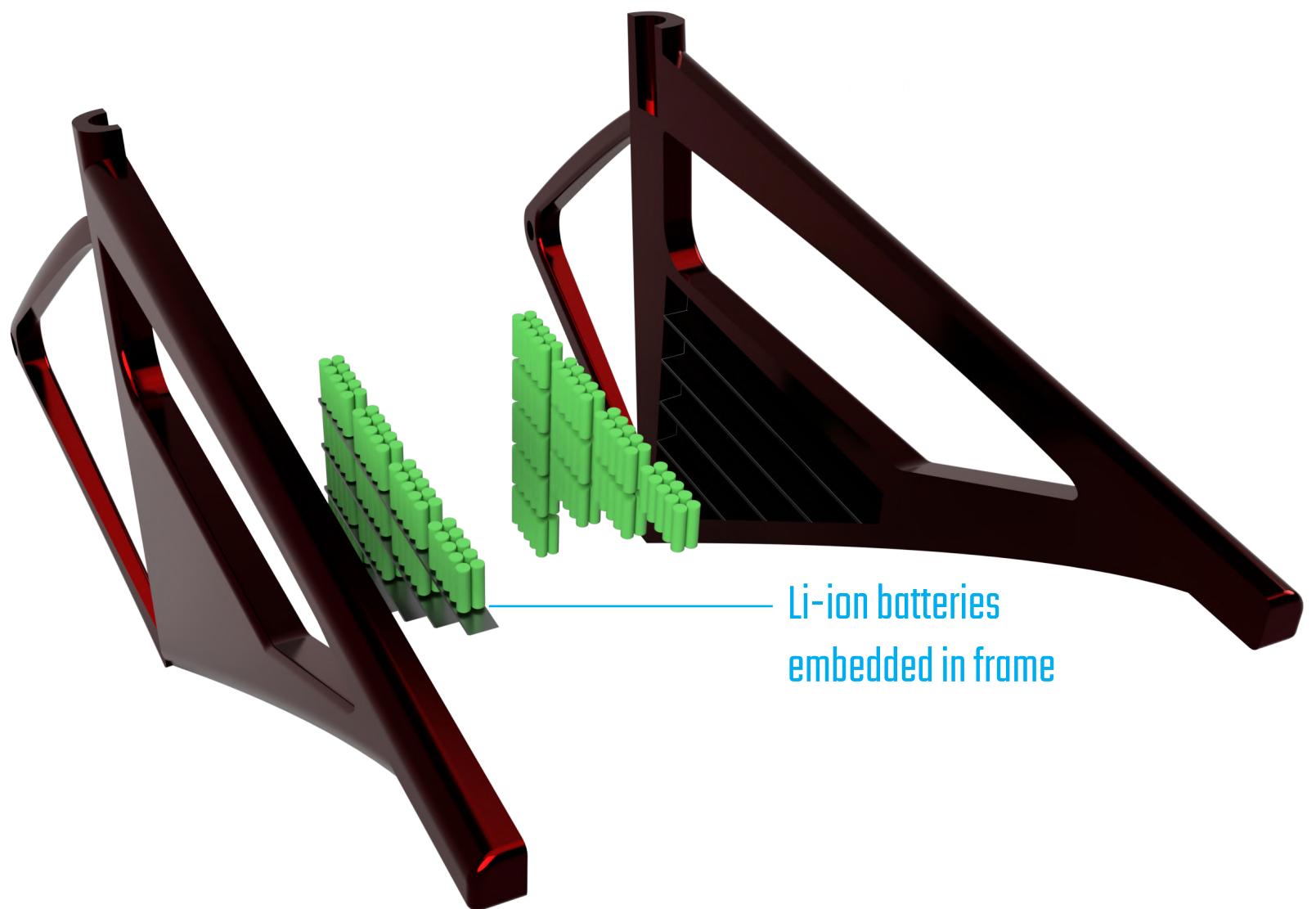


# How it Works

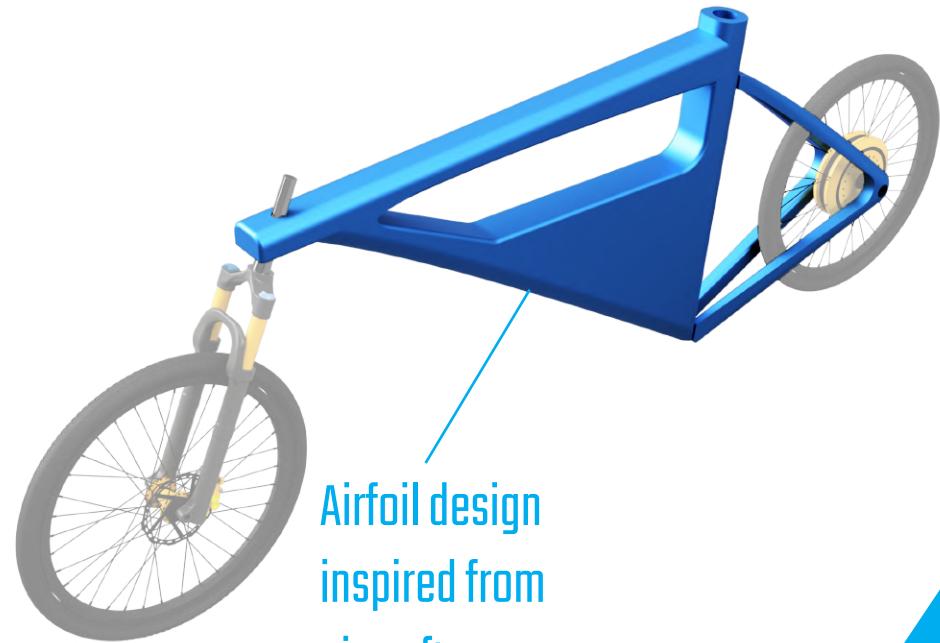
- A 200W DC motor powers the rear wheel, connected through gears with a 8:11 gear ratio
- Two 7Ah 12 Volt Batteries power the bike
- An Arduino is used to take sensor input, and joystick input to control the motor through a motor driver



# Design Features

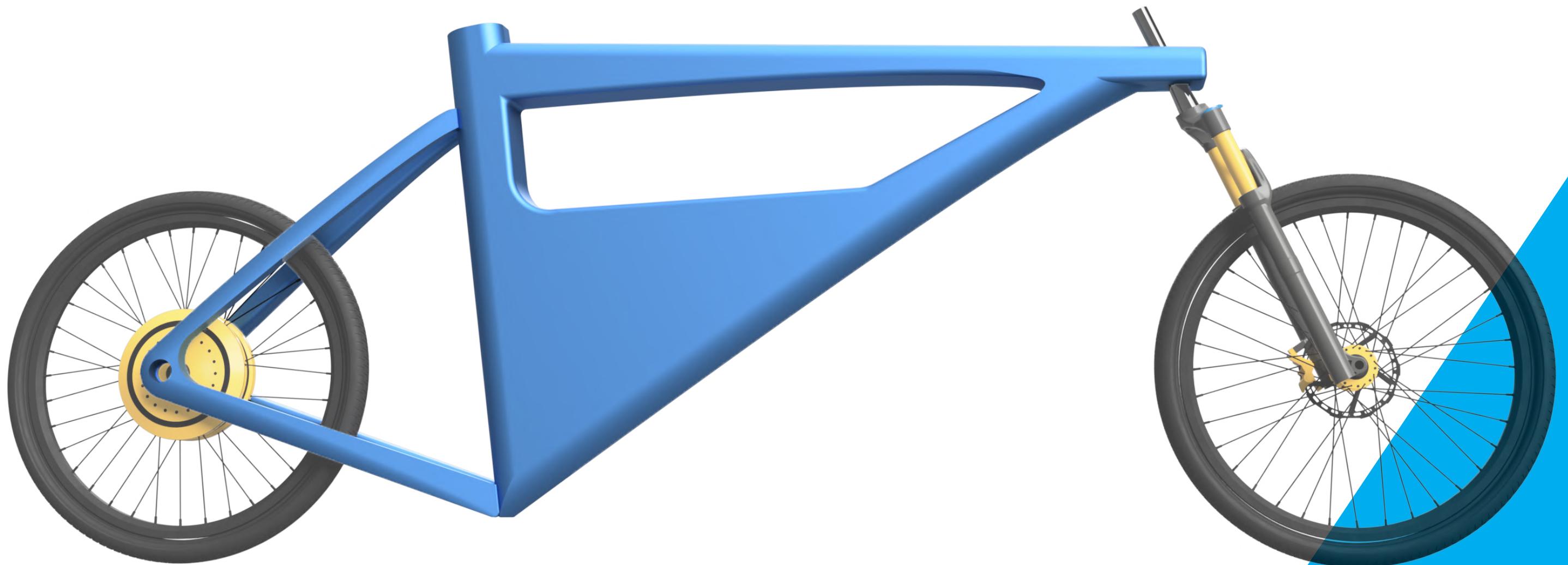


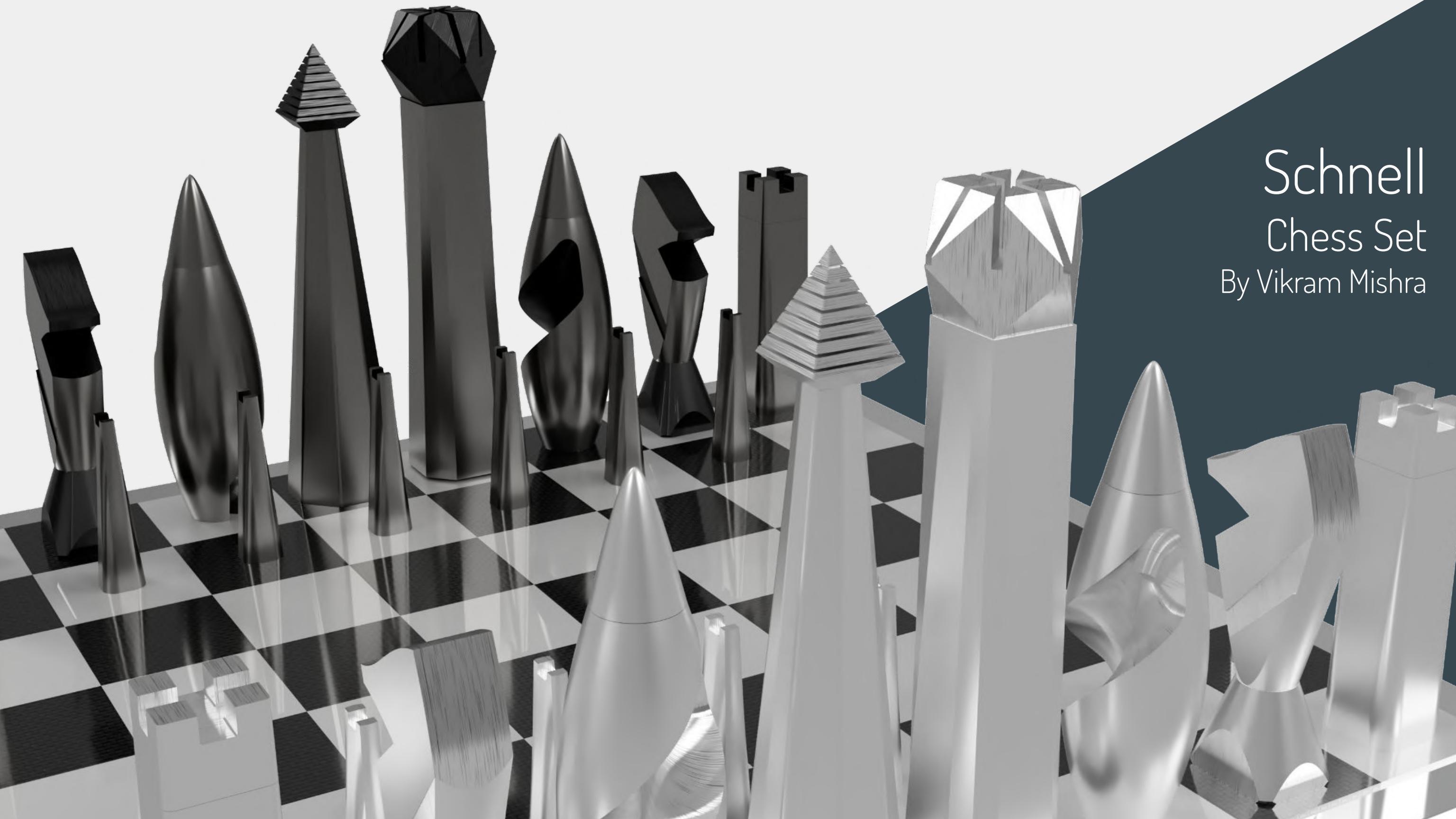
Li-ion batteries  
embedded in frame



Airfoil design  
inspired from  
aircrafts

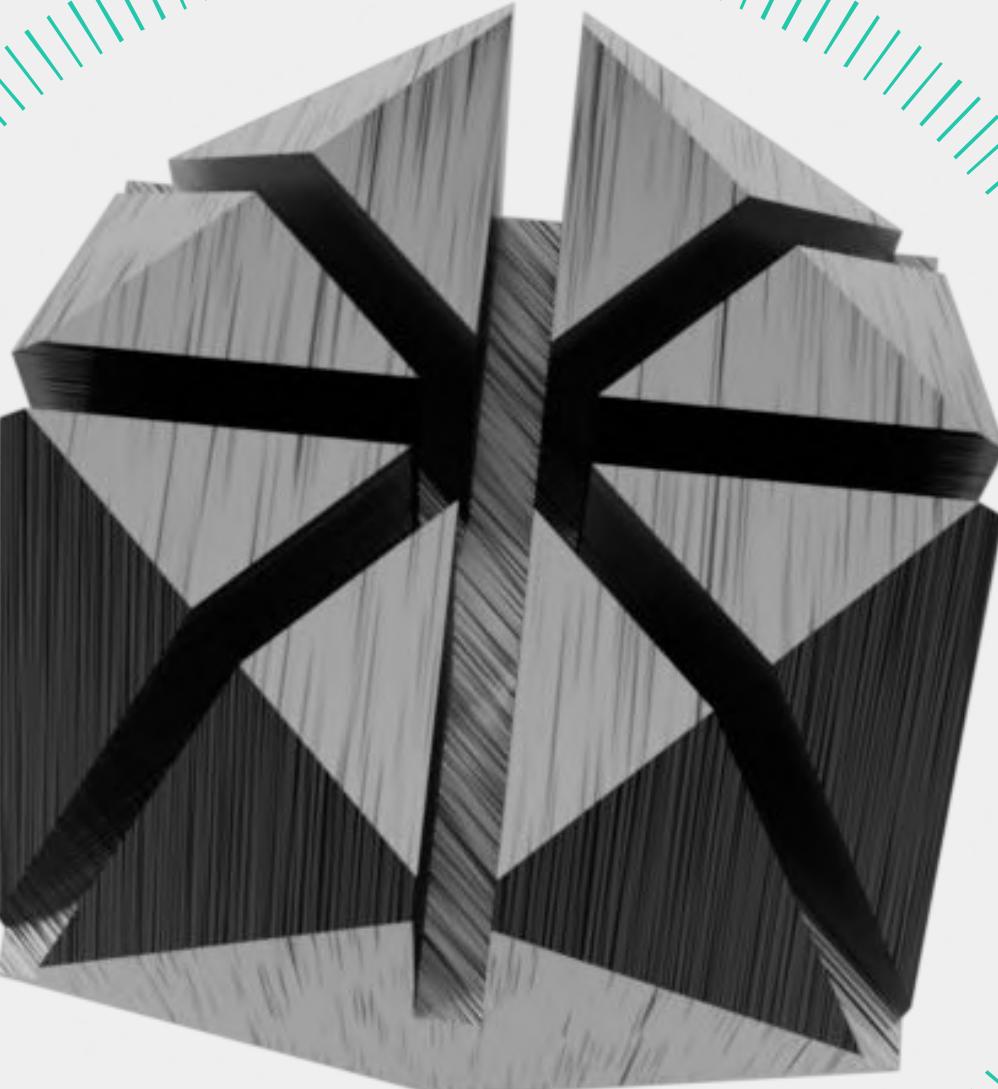
# VeBike





# Schnell Chess Set

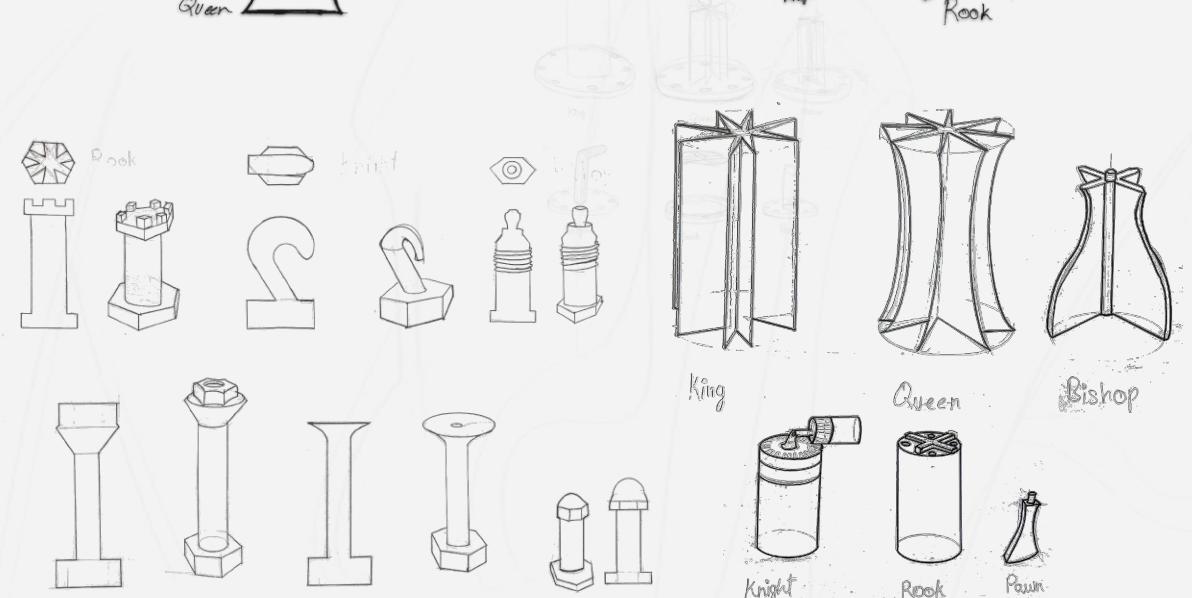
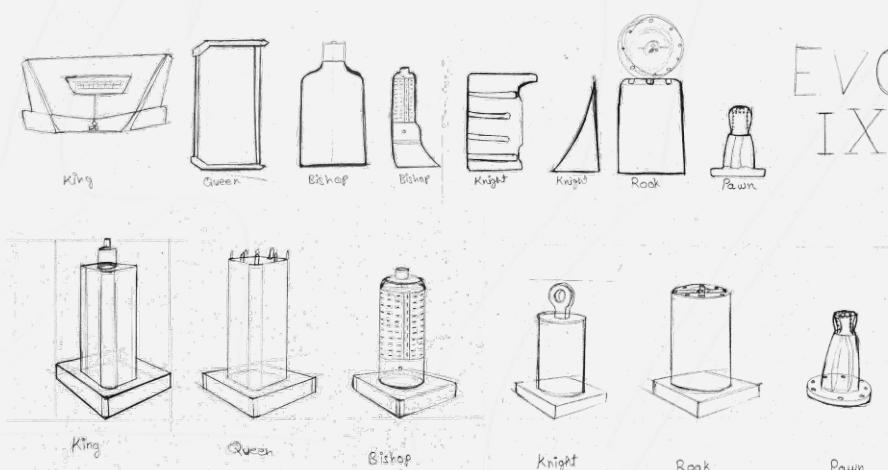
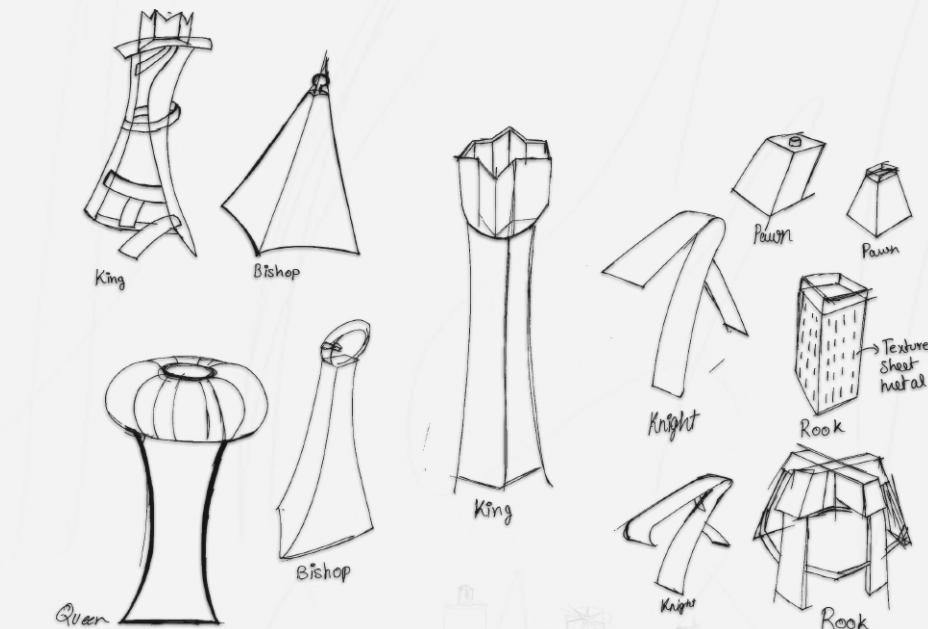
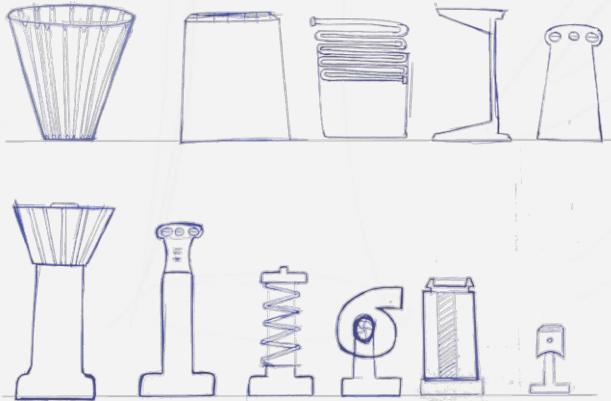
By Vikram Mishra



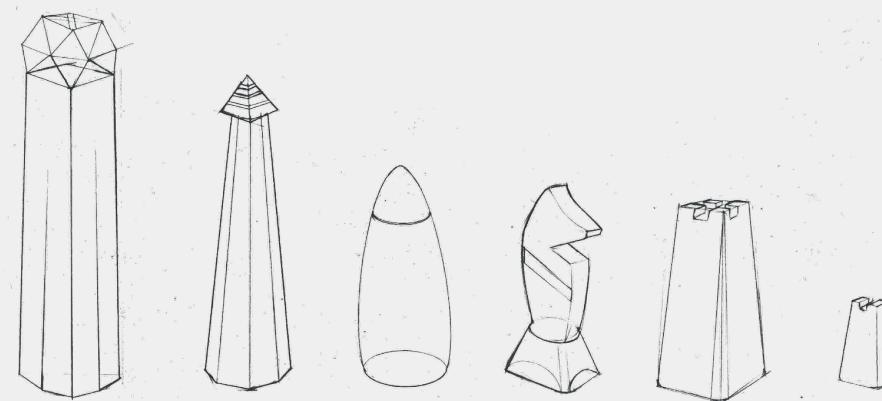
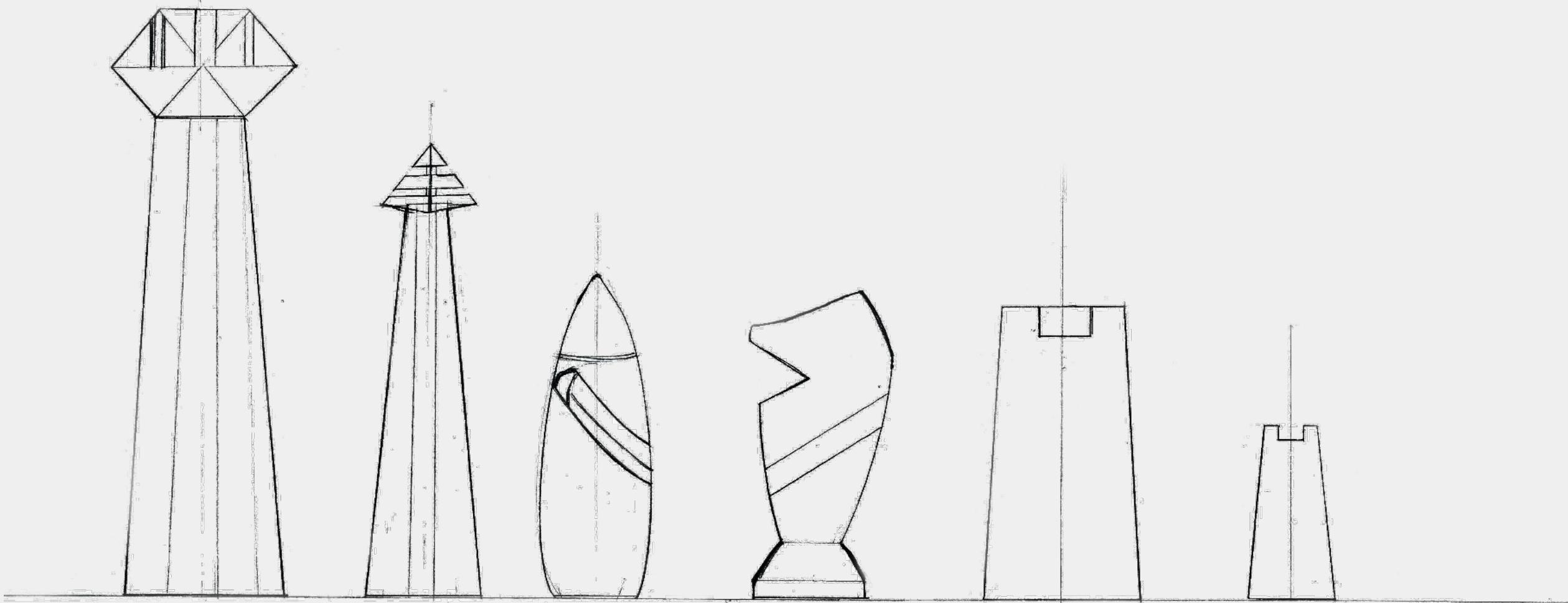
# AESTHETIC

Made from finely machined metal pieces, this chess set will fit in corporate offices of automotive companies and in car showrooms and dealerships, as well as in garages with collectable cars and as a showpiece in cabinets in houses of automobile enthusiasts who enjoy customizing vehicles, especially with custom made parts

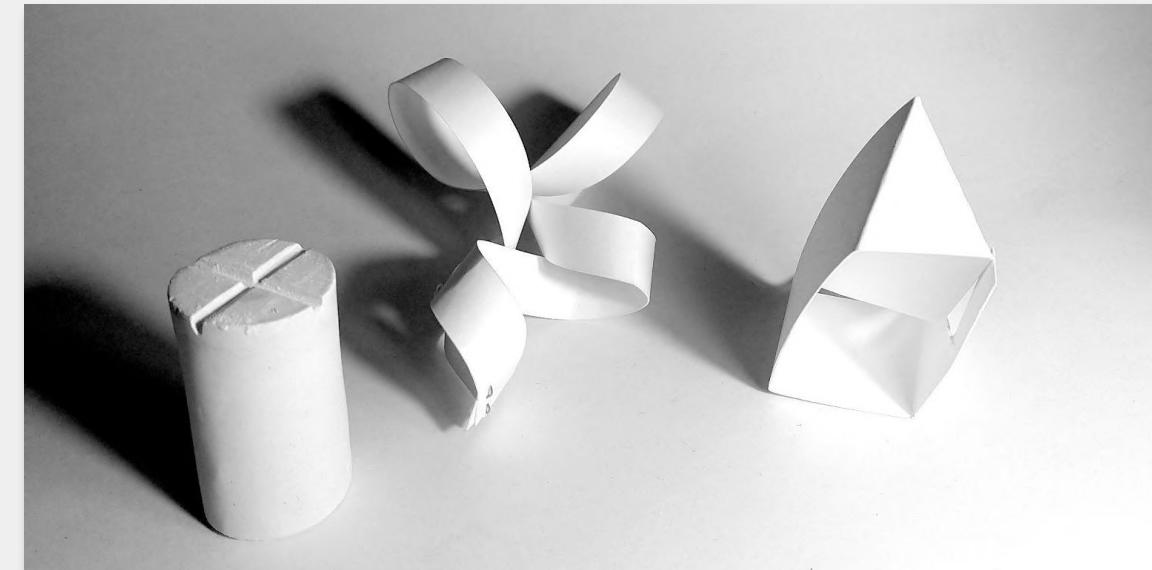
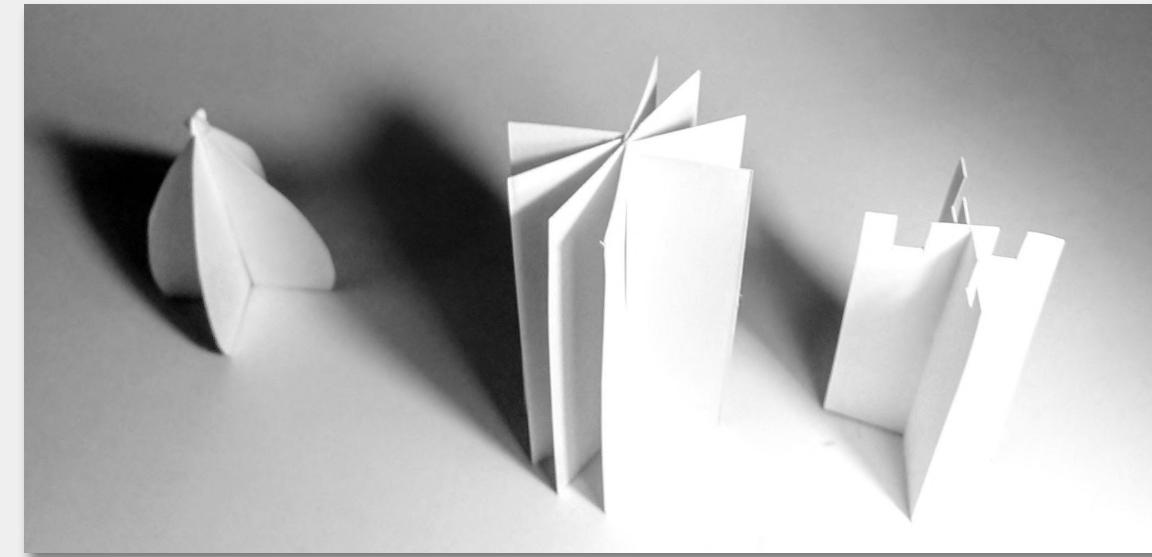
# SKETCH EVOLUTION



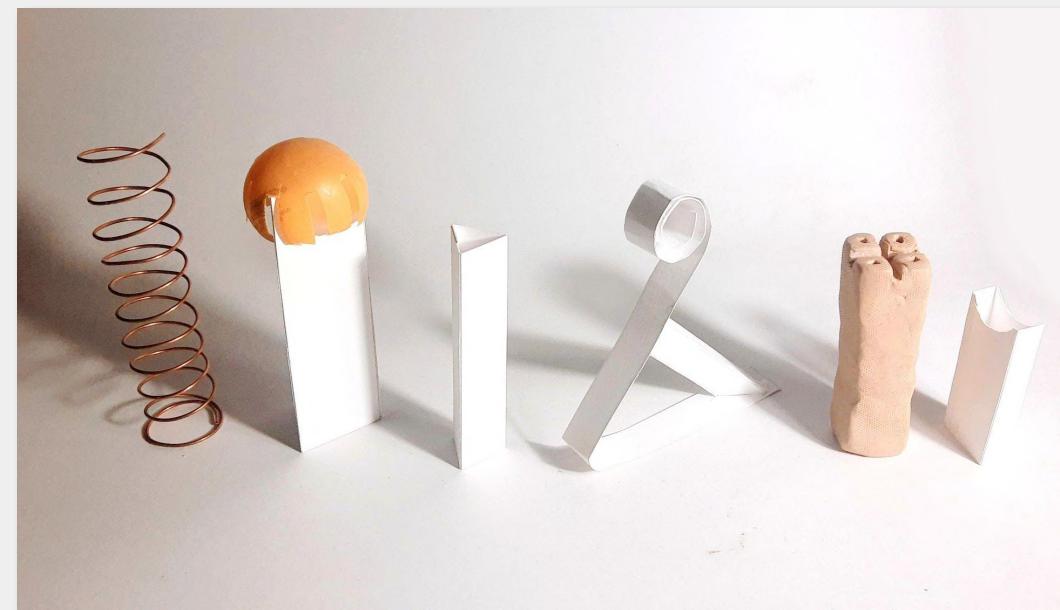
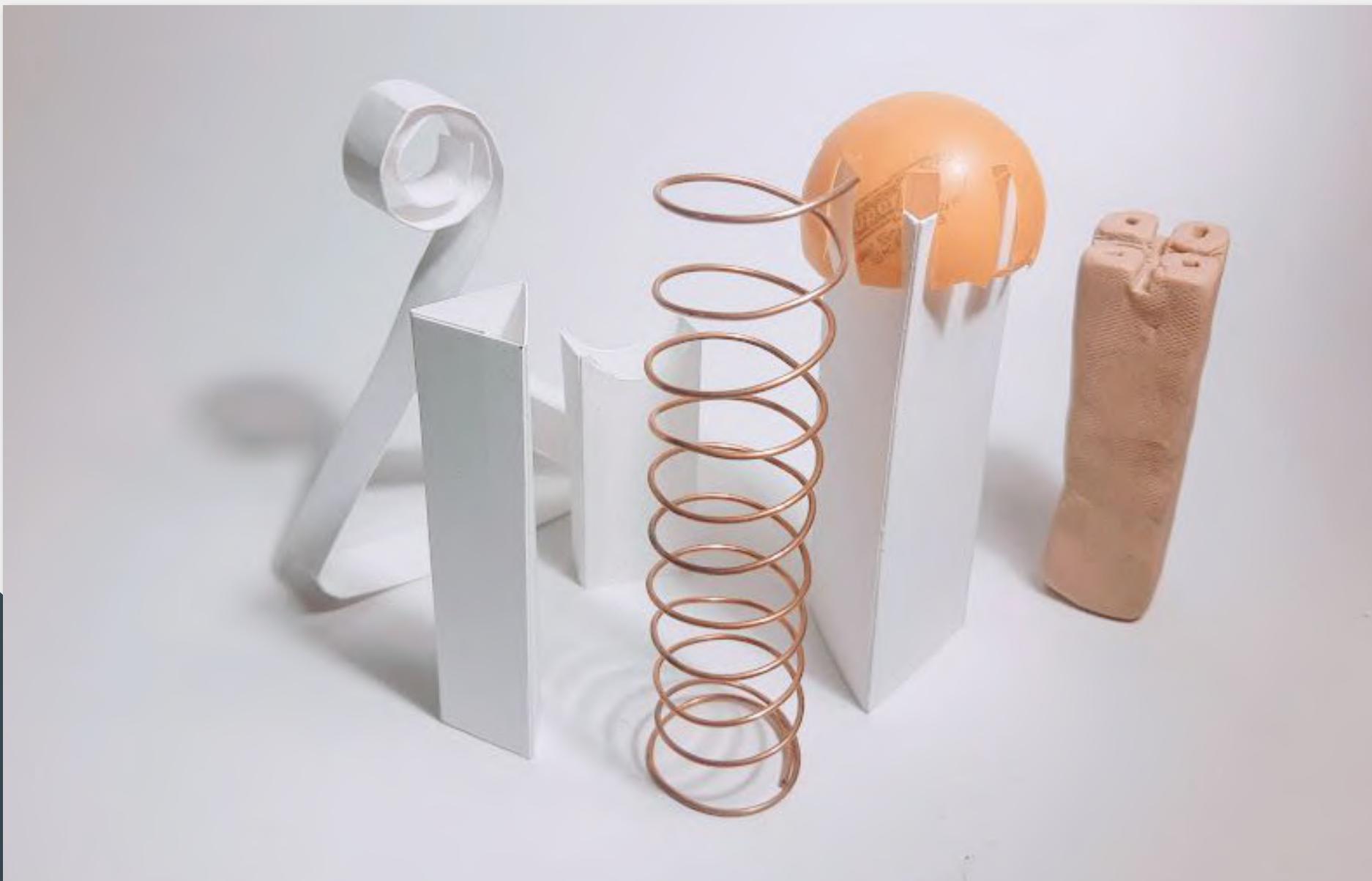
# CULMINATION SKETCHES



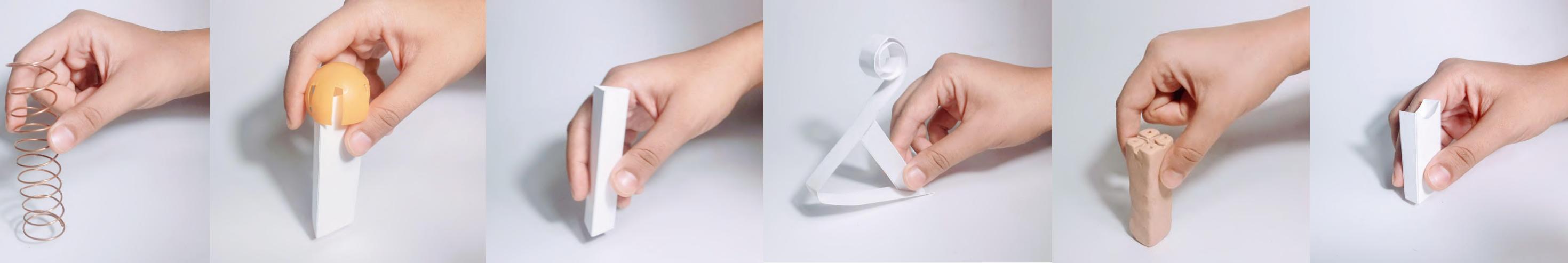
# 3D SKETCHES



# RESOURCEFUL PROTOTYPES



# HUMAN FACTORS EVALUATION



## IDENTIFICATION

- The pieces were identifiable primarily through the hierarchy
- The bishop doesn't have any features of the conventional bishop, it is difficult to identify

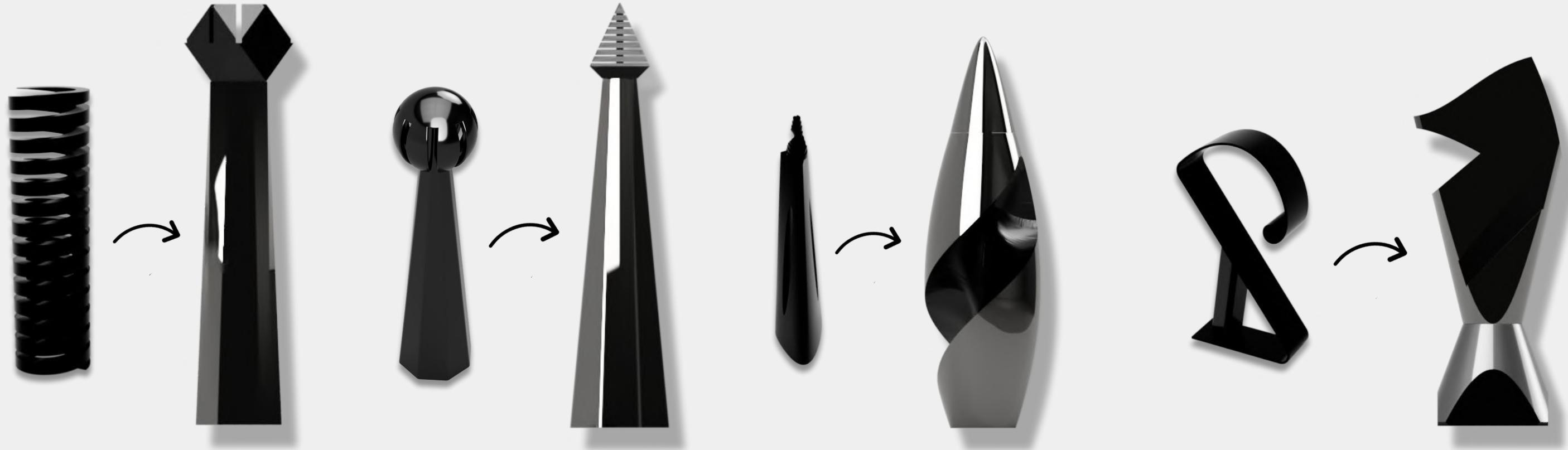
## GRASPING

- The pieces were grasped without any hesitation and without much thought
- The rook and Queen were grasped from the top while the rest were grasped from the middle or the bottom

## CONCLUSIONS

- The pieces could be more successful at being identifiable using features other than the hierarchy of size
- The design of the pieces does not interfere with grasping and picking them up

# DESIGN CHANGES



King incorporates idea of  
a finely machined  
custom top attached to a  
casted base  
The form becomes more  
aesthetic

Top of the queen becomes  
easier to manufacture in a  
CNC machine

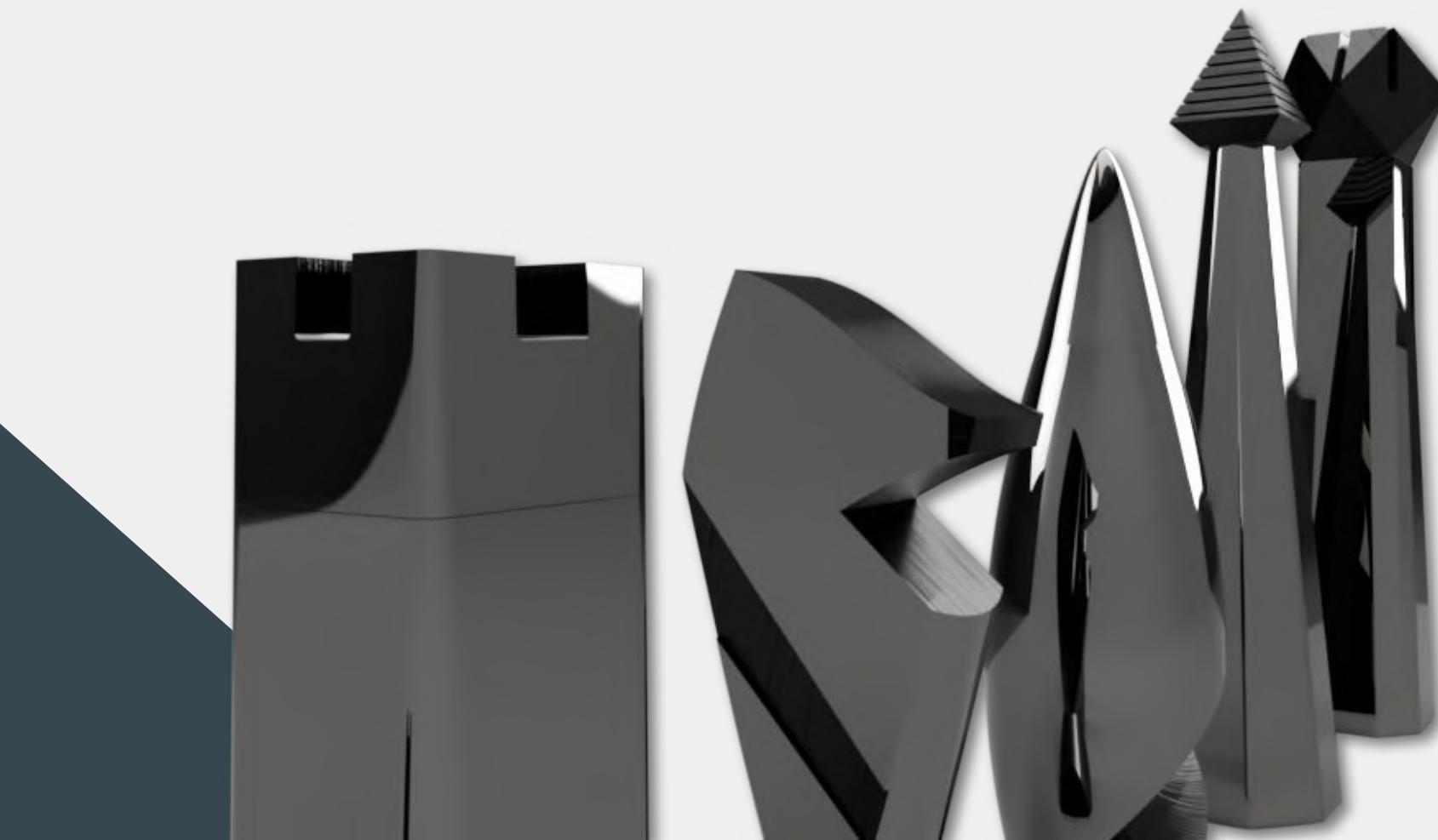
Bishop becomes more  
aesthetic and uniquely  
identifiable

Knight design changes from  
functional to aesthetic  
Manufacturing process changes  
from bending sheet metal in a  
metal shop to a CNC machine

# THE FINAL FORM



# TEXTURE CONSIDERATION



CNC Brushed  
Stainless Steel

Smooth Casted  
Stainless Steel

