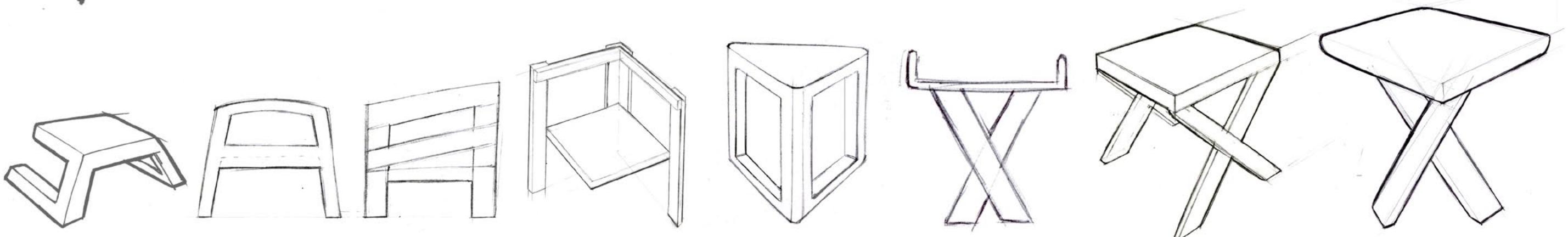
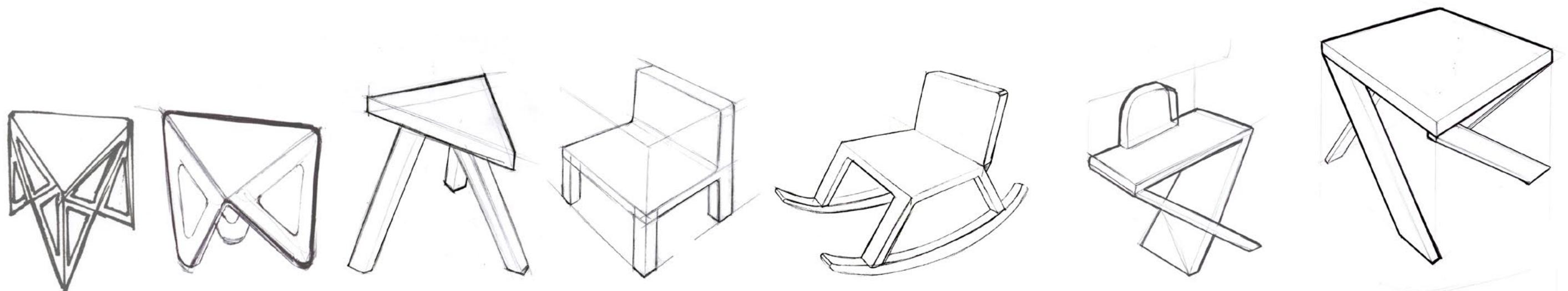
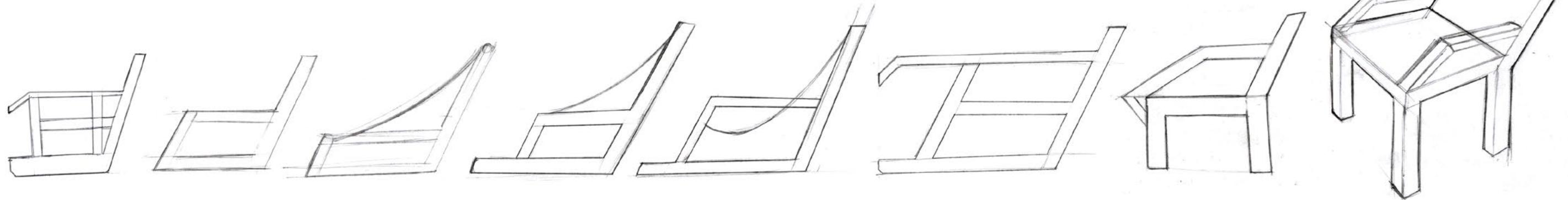


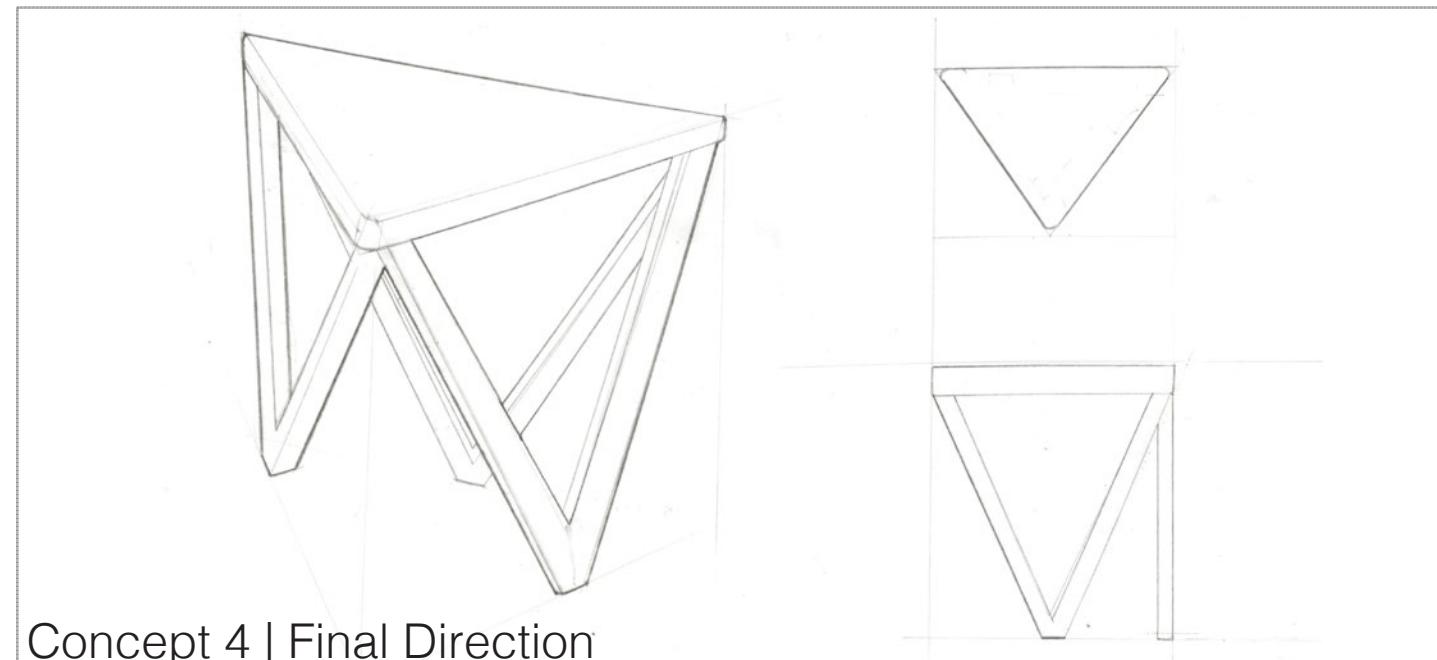
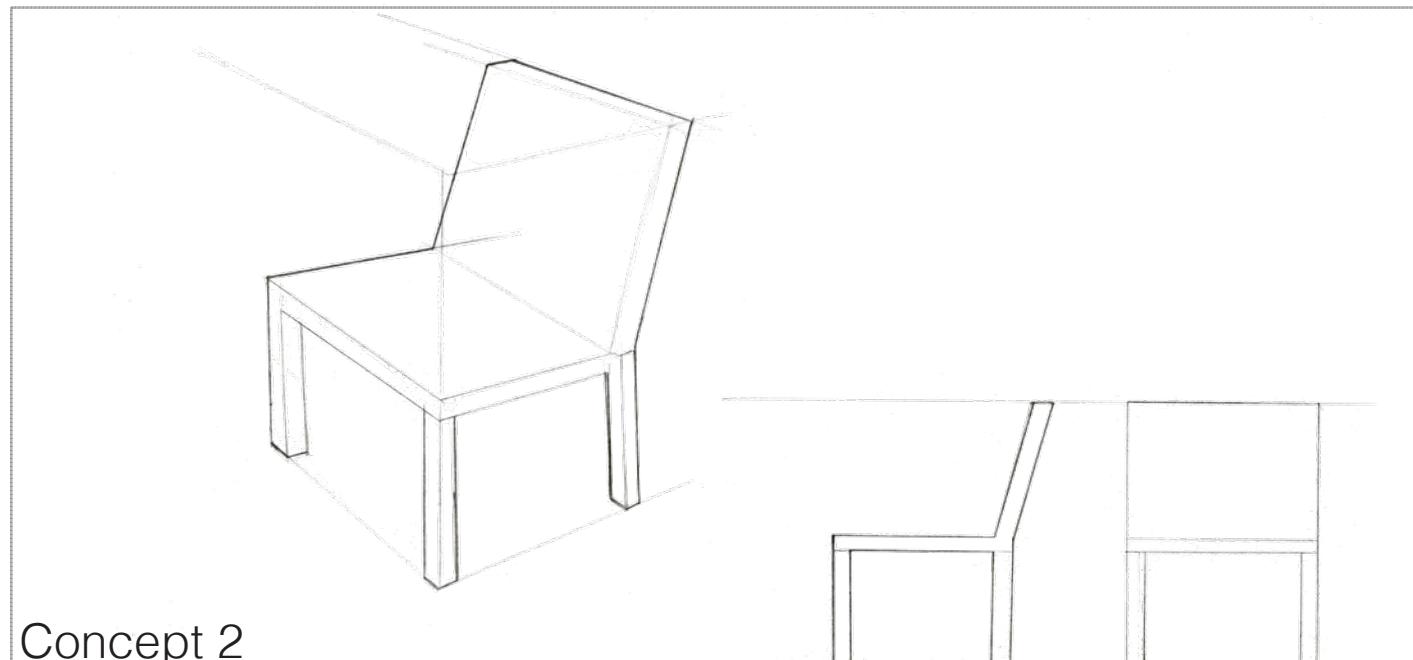
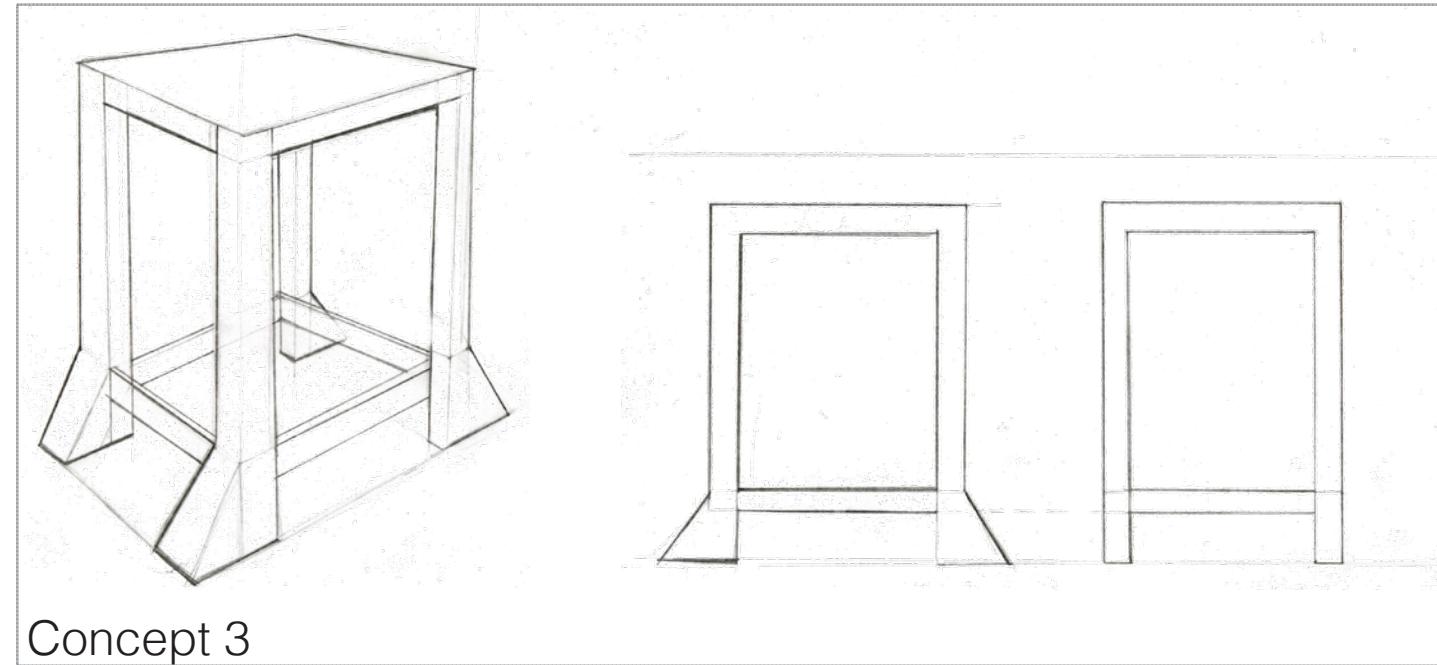
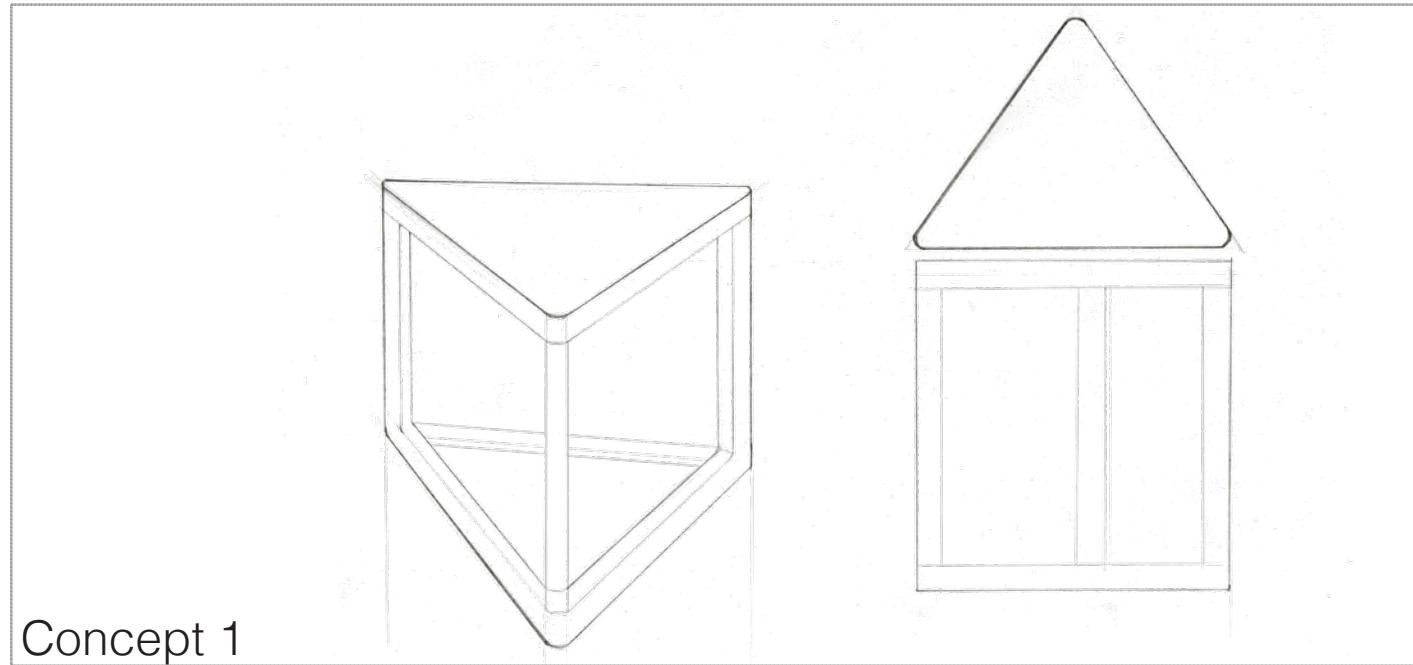
△Stool

By Vikram Mishra

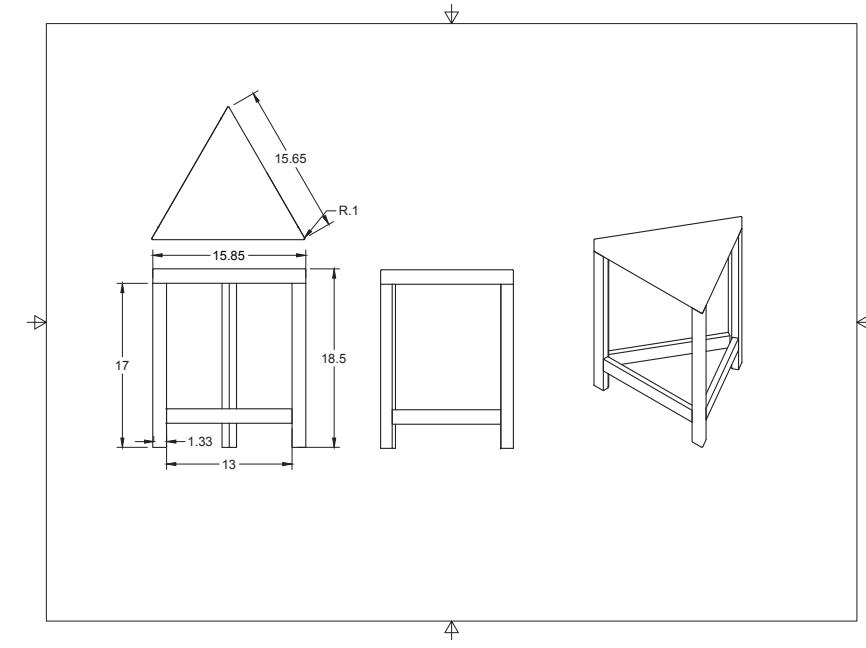
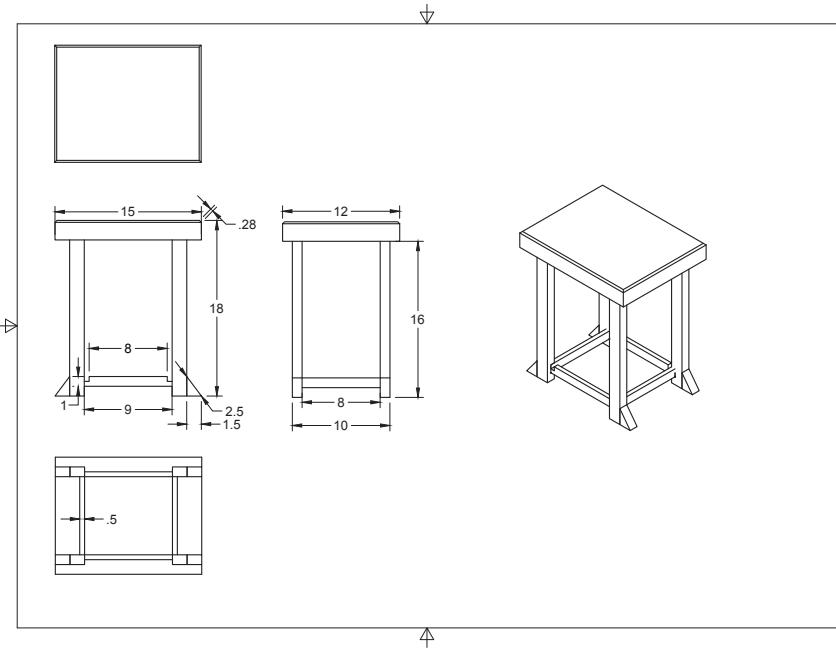
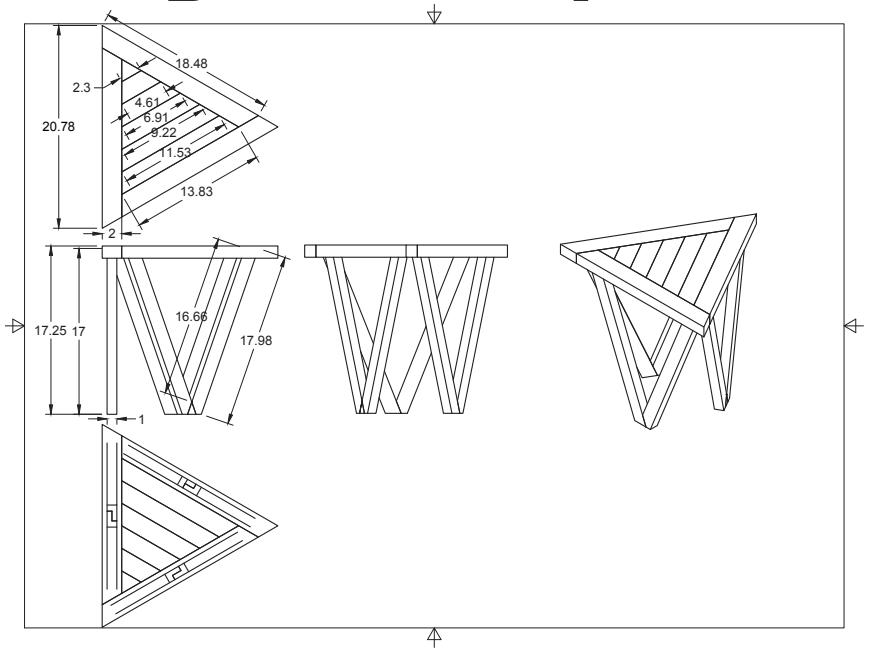
Sketch Ideation



Concept Direction



Design Concepts



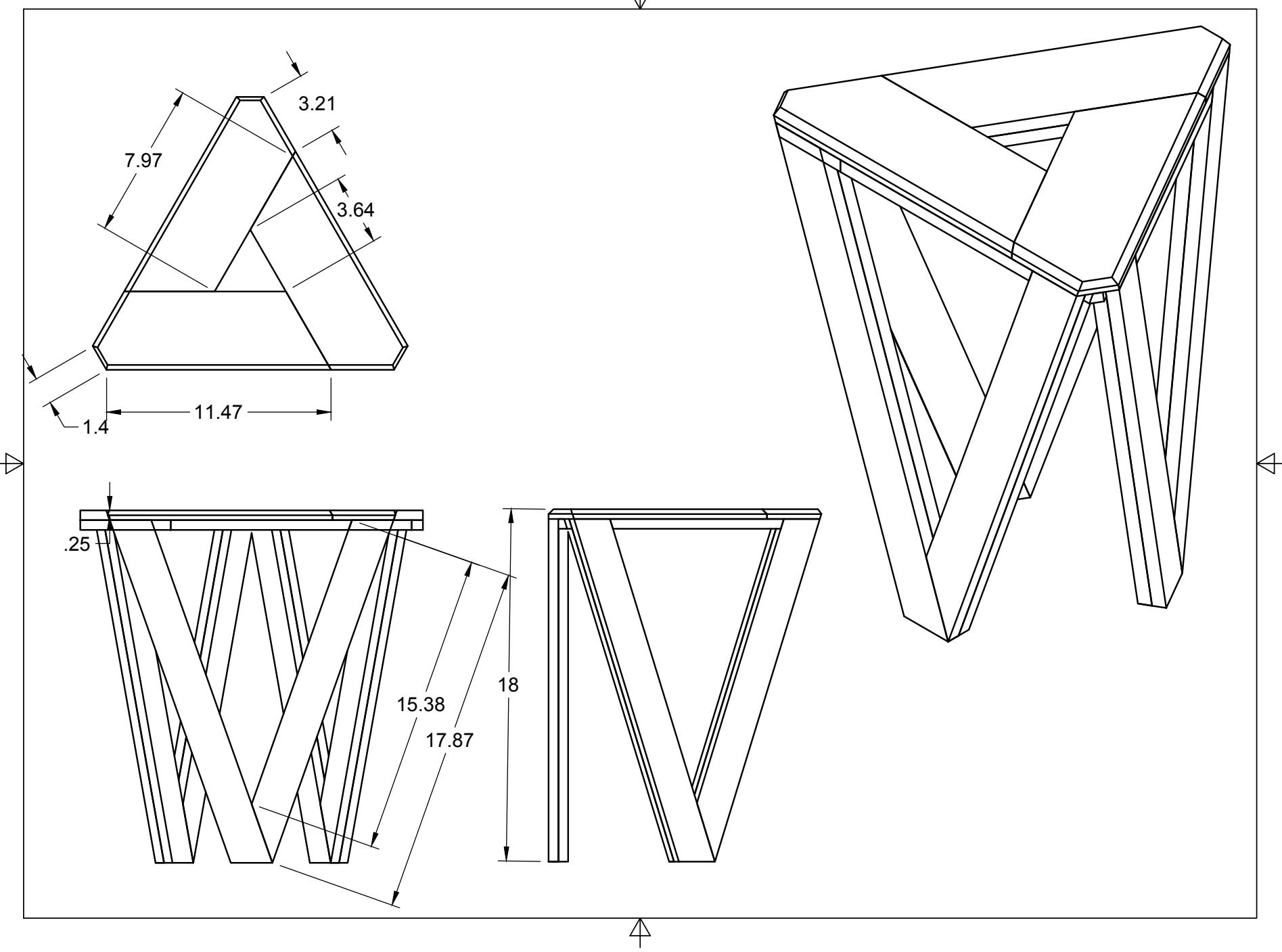
Full Scale Prototype

Advanced my final design direction from CAD into the physical world, working from 2x4 lumbar.

Used pine wood to make a full-scale model and learned the manufacturing process shortcomings and ways to make the process more efficient.



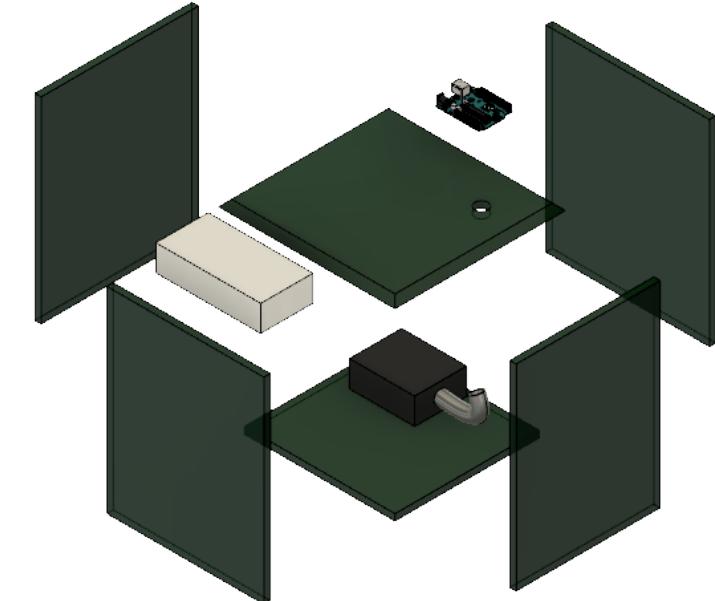
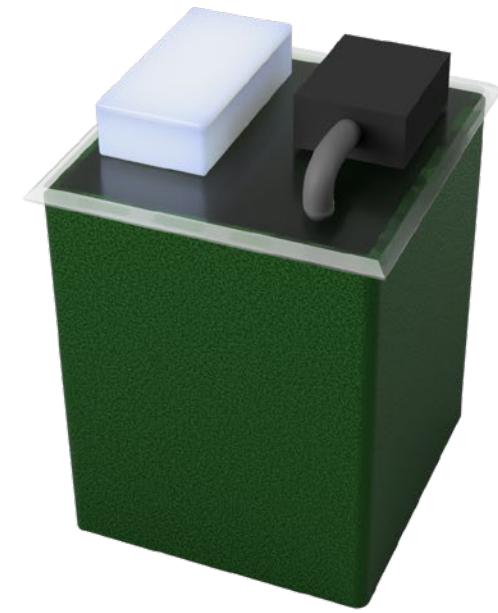
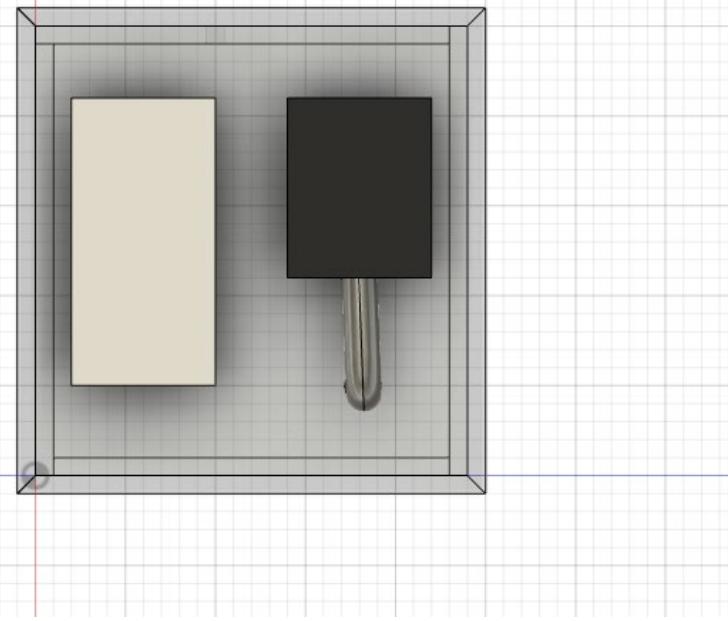
Construction



The Δ Stool

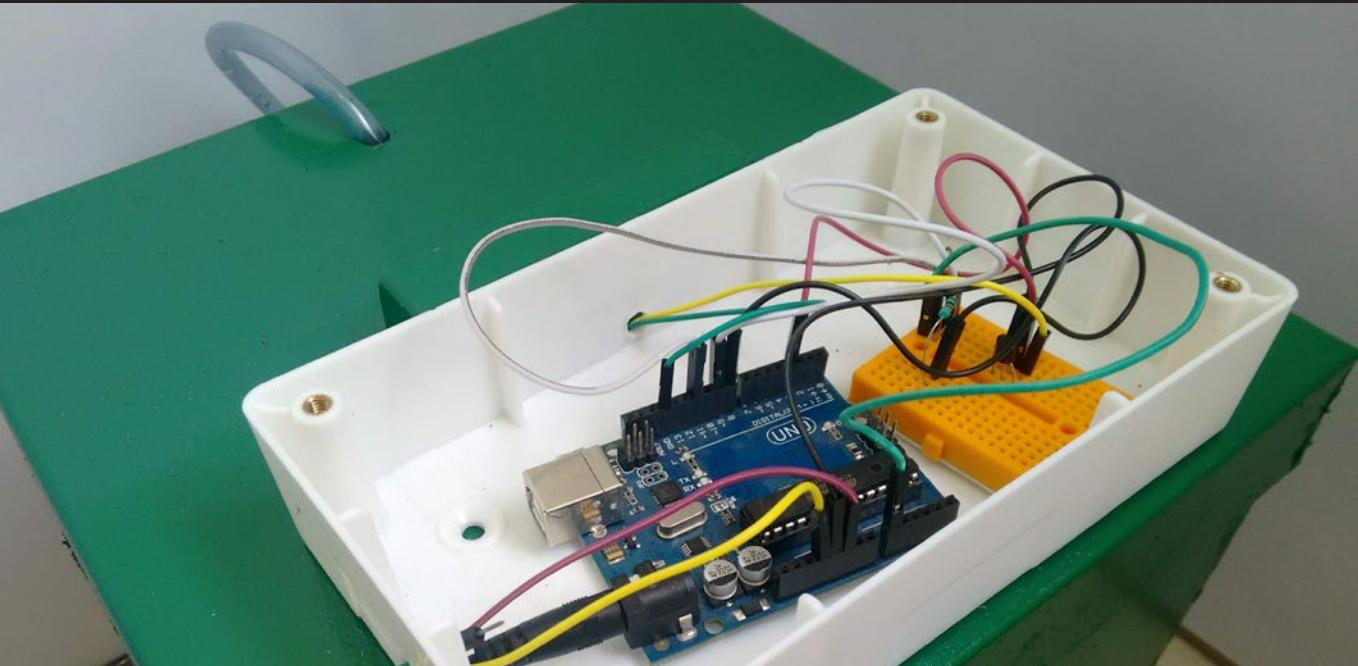






Eureka

Automated Watering Assistant



Why Automate Watering?



Conserves Water

Convenience 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

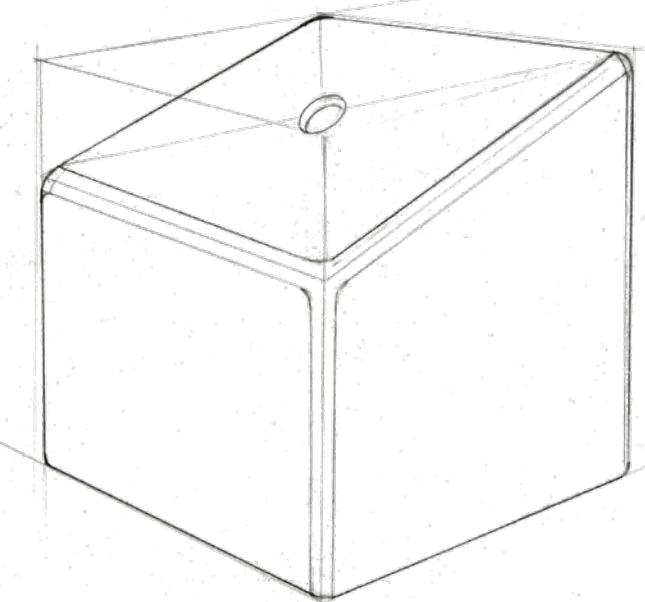
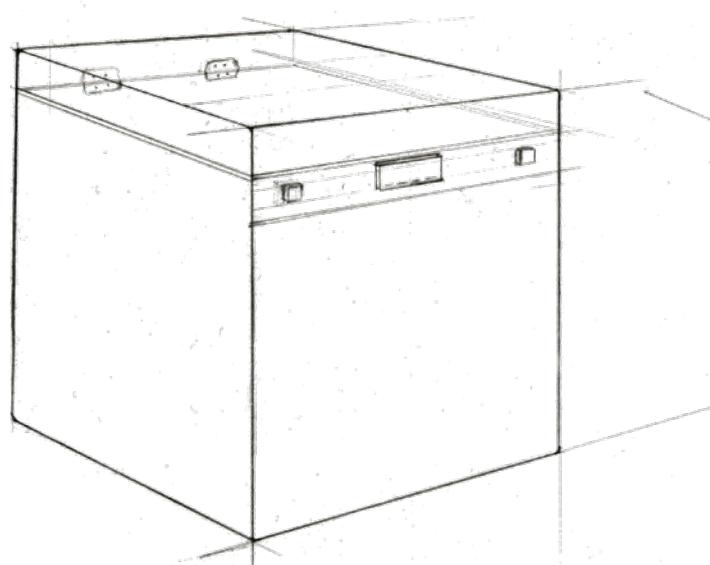
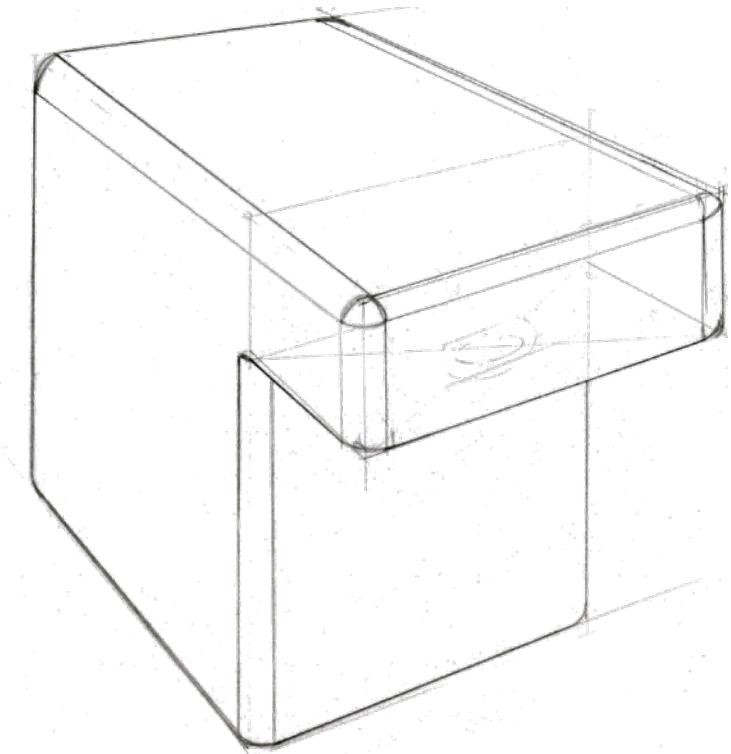
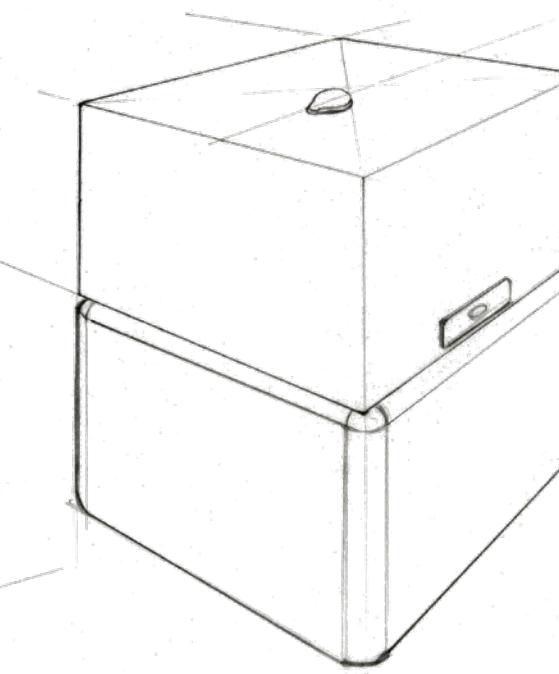
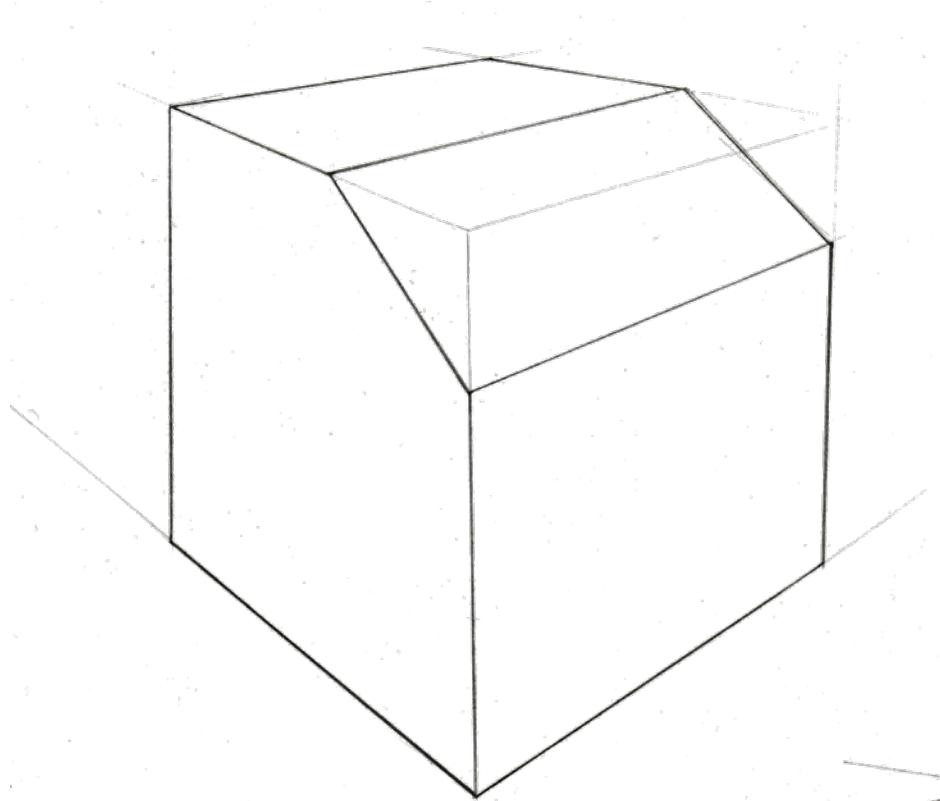
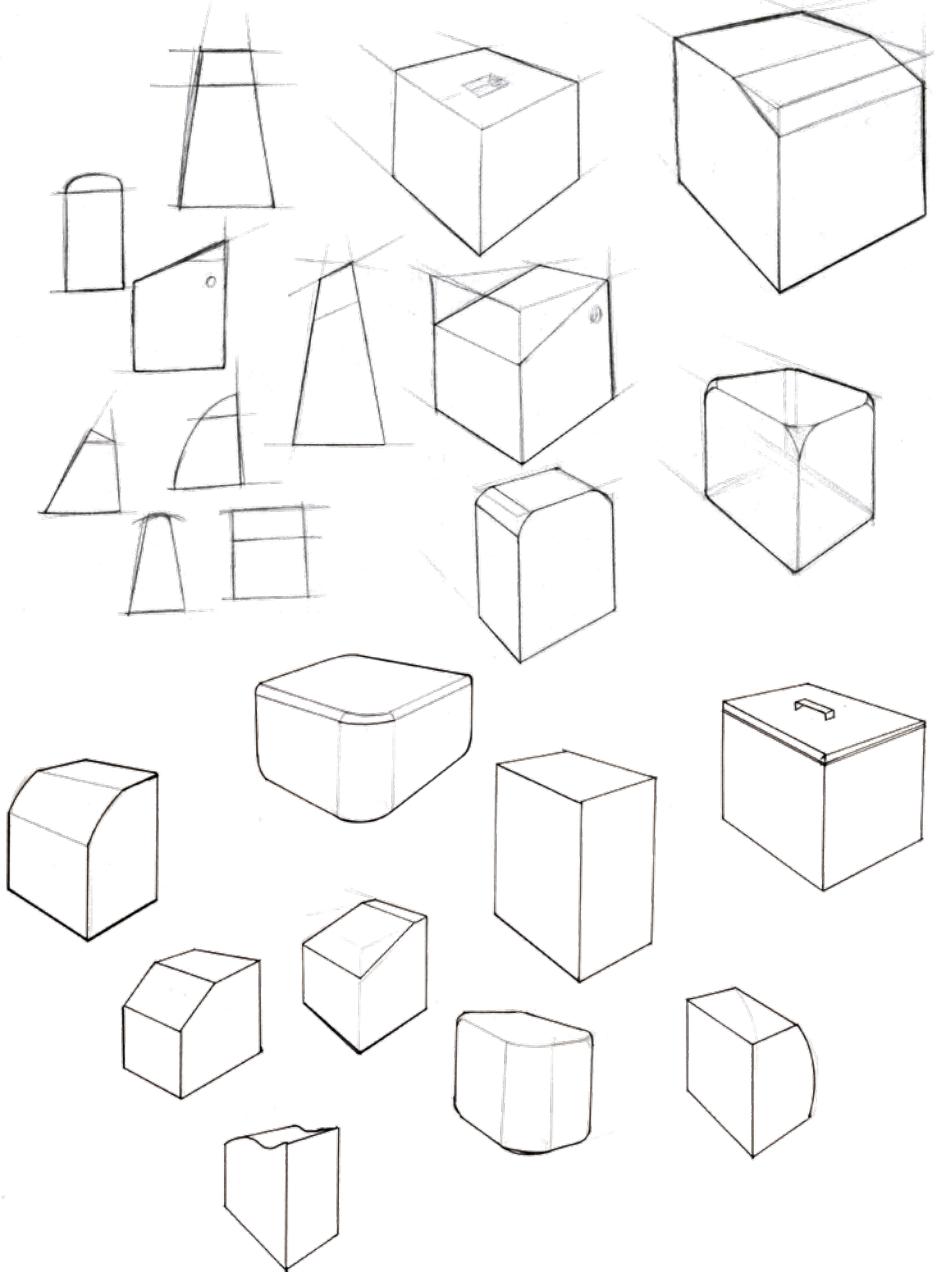
Disadvantages:

Requires a constant pressurized water supply

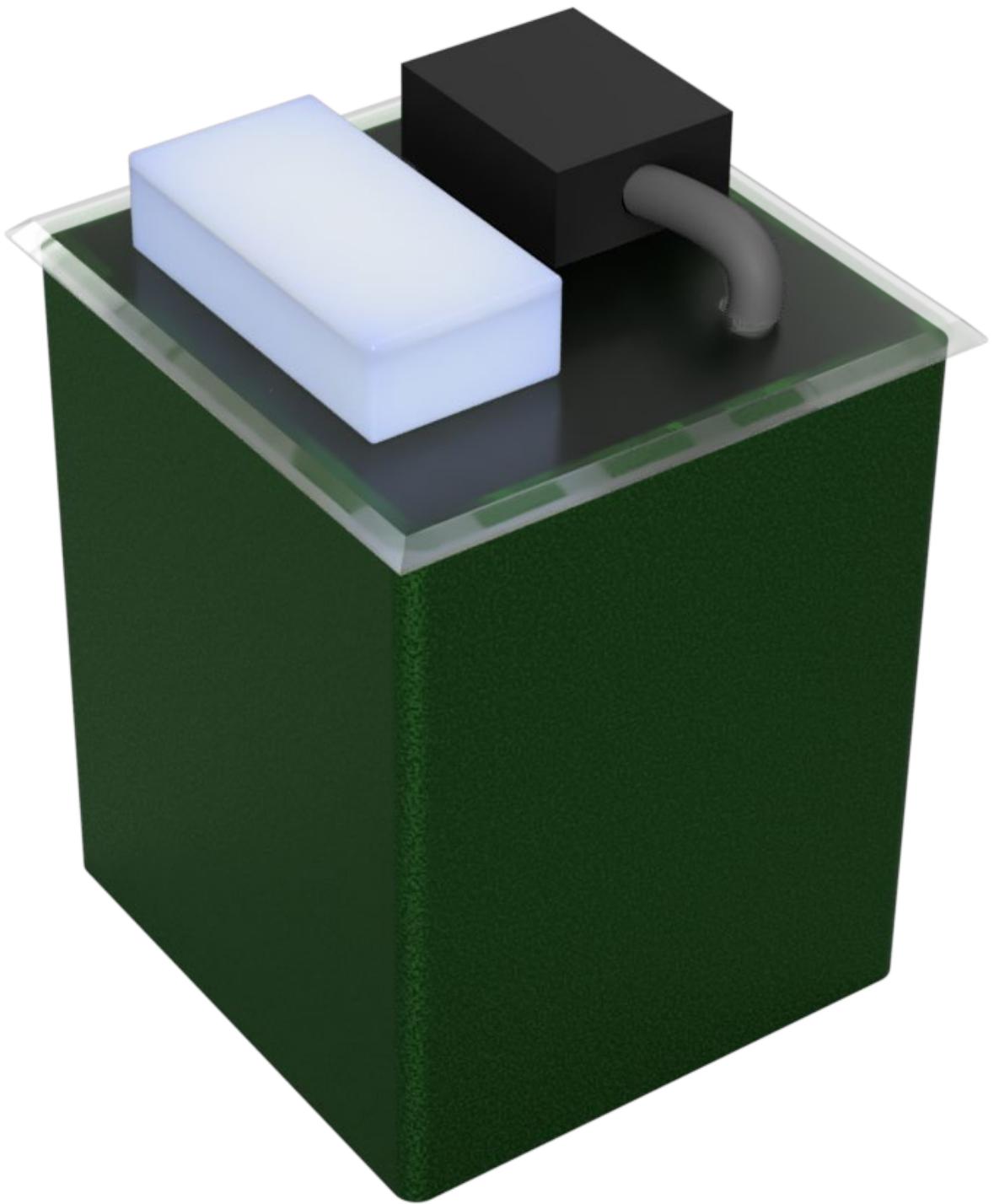
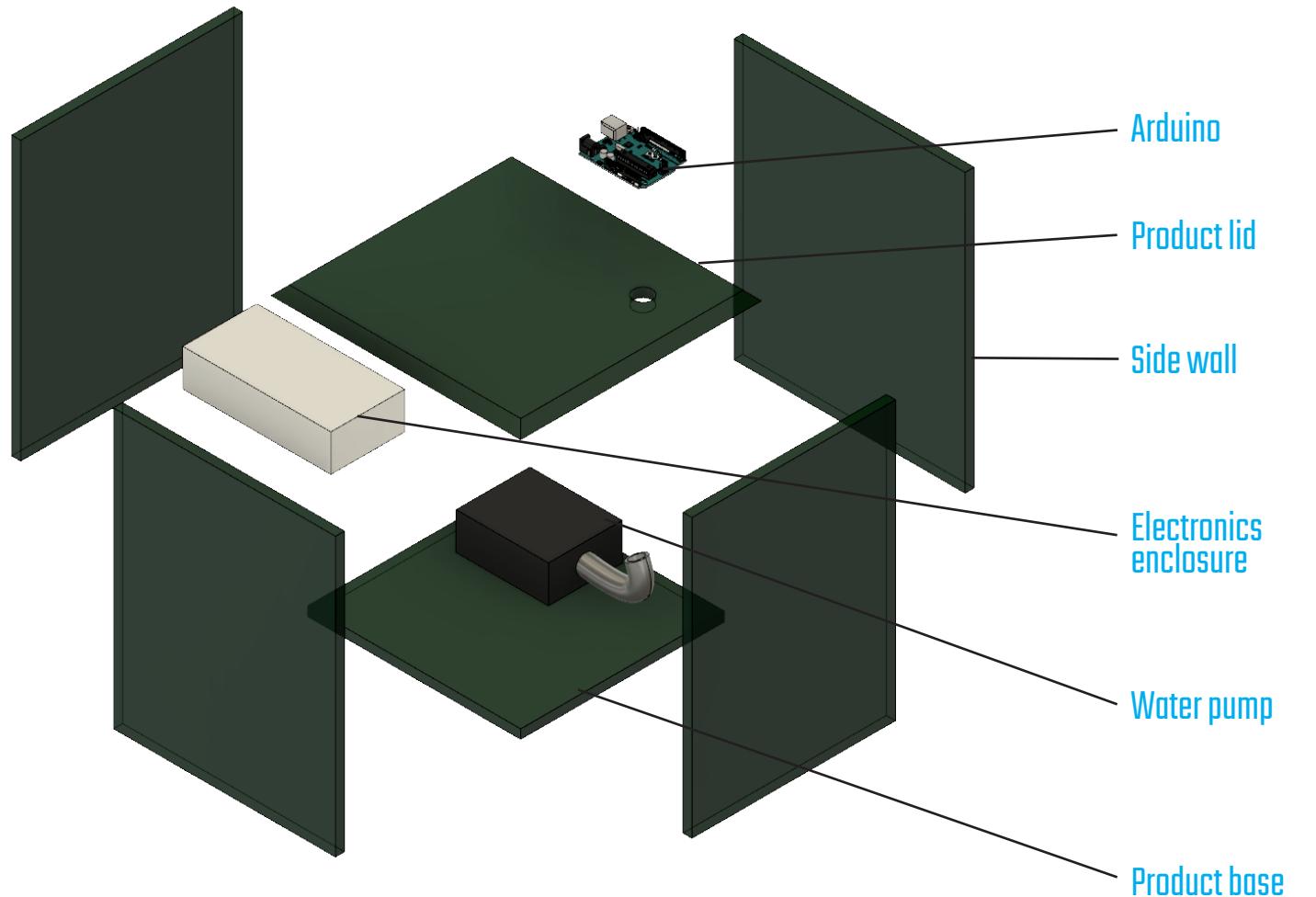
Expensive (\$130 for an area of up to 75 square feet)

User set watering frequency, not based on soil humidity

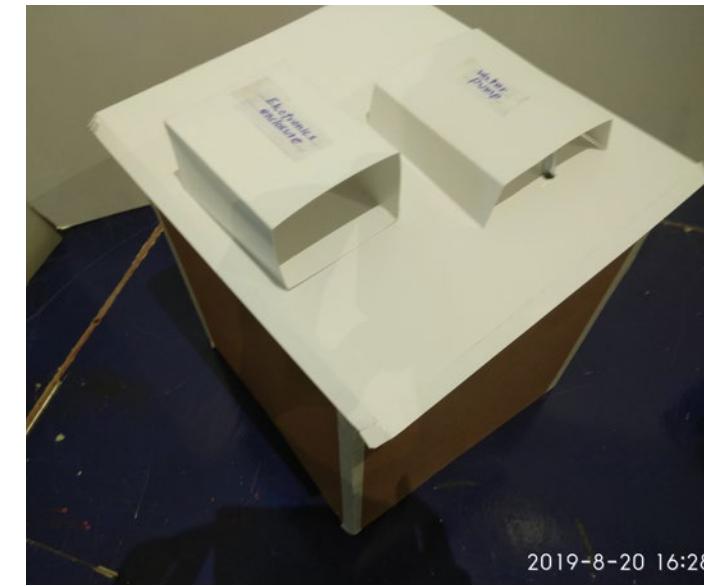
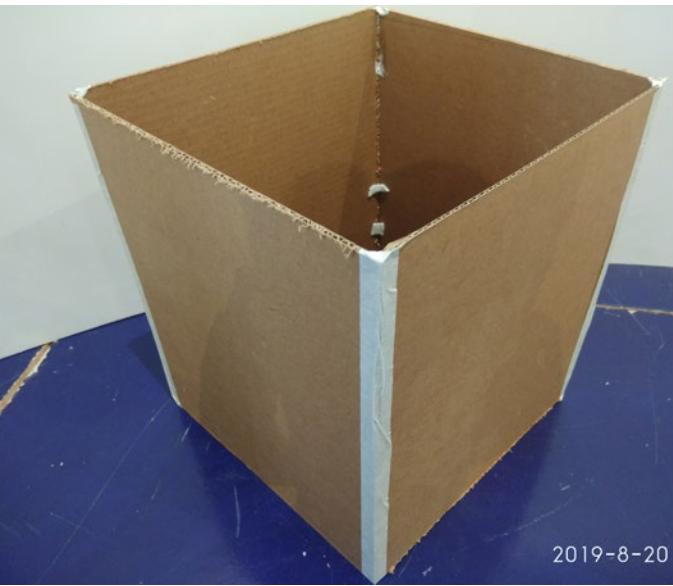
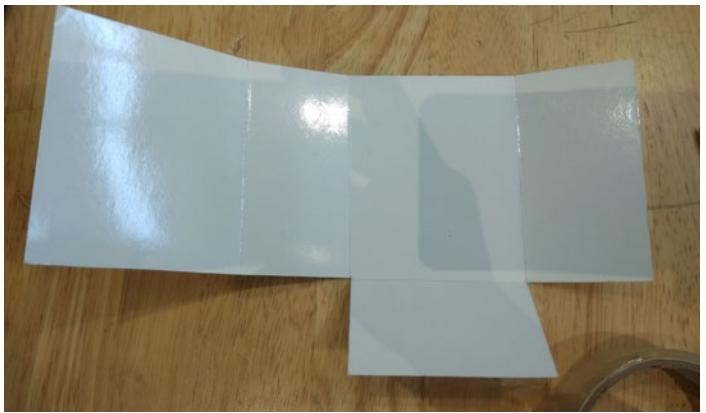
Sketch Ideation



Product Visualization



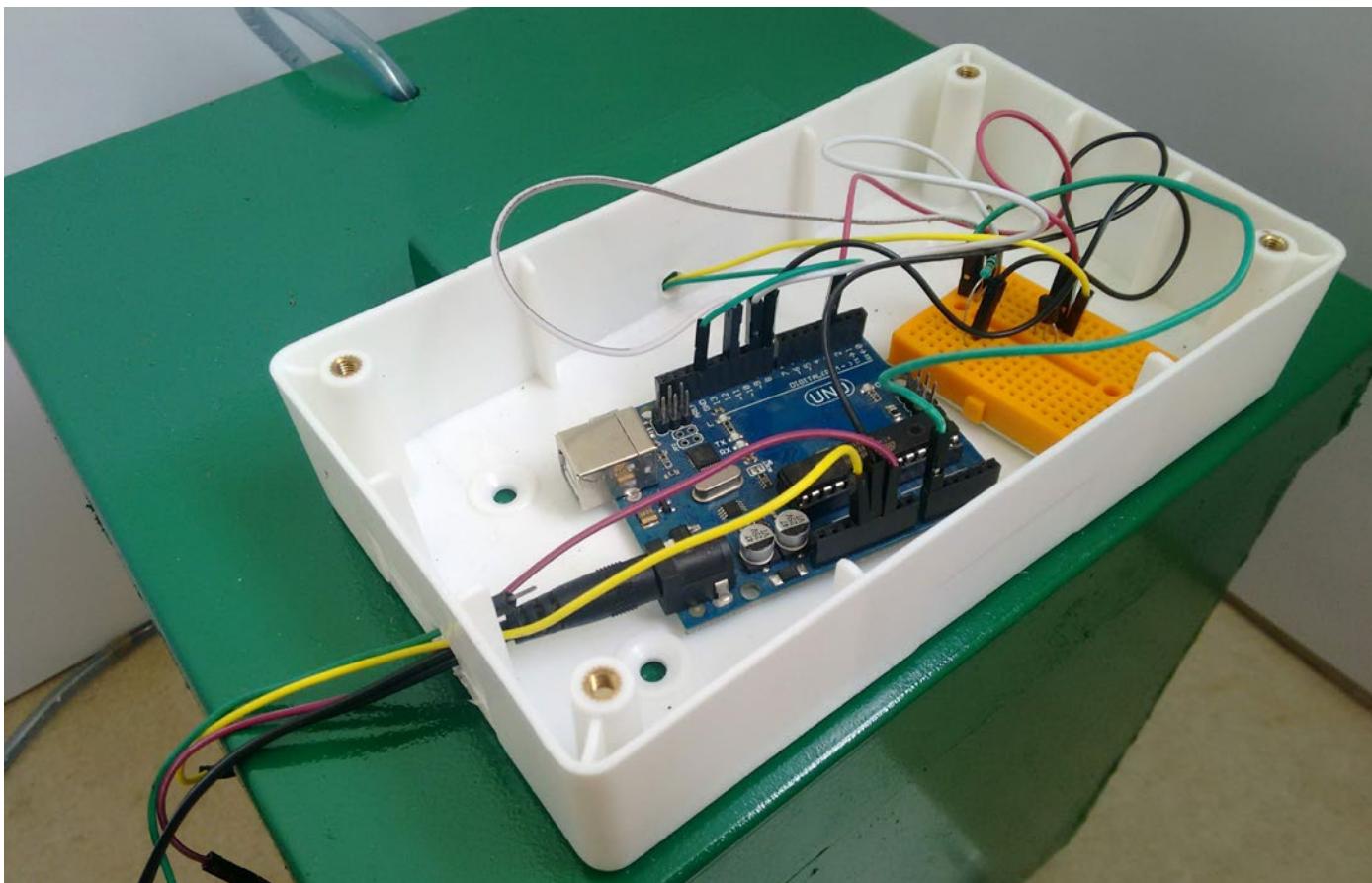
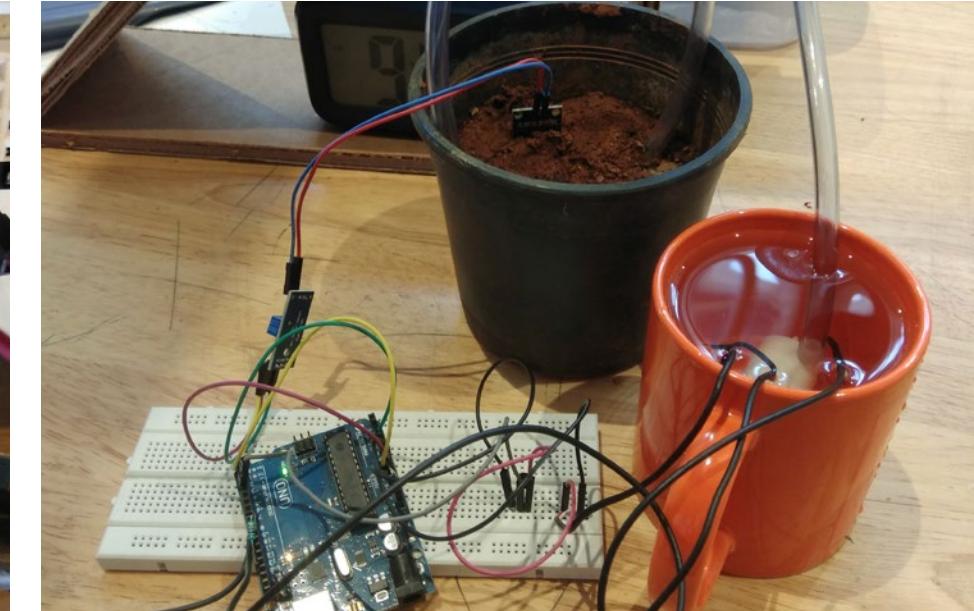
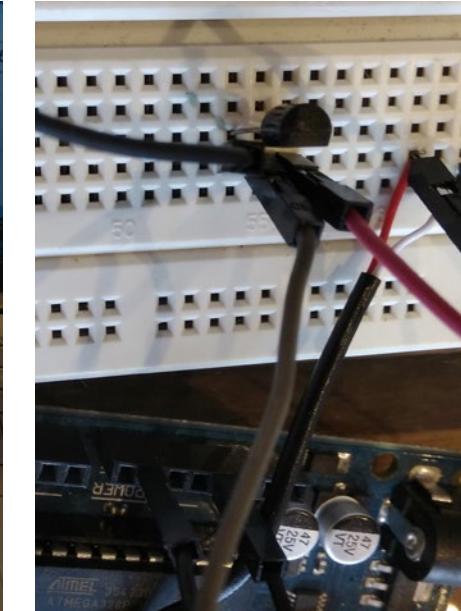
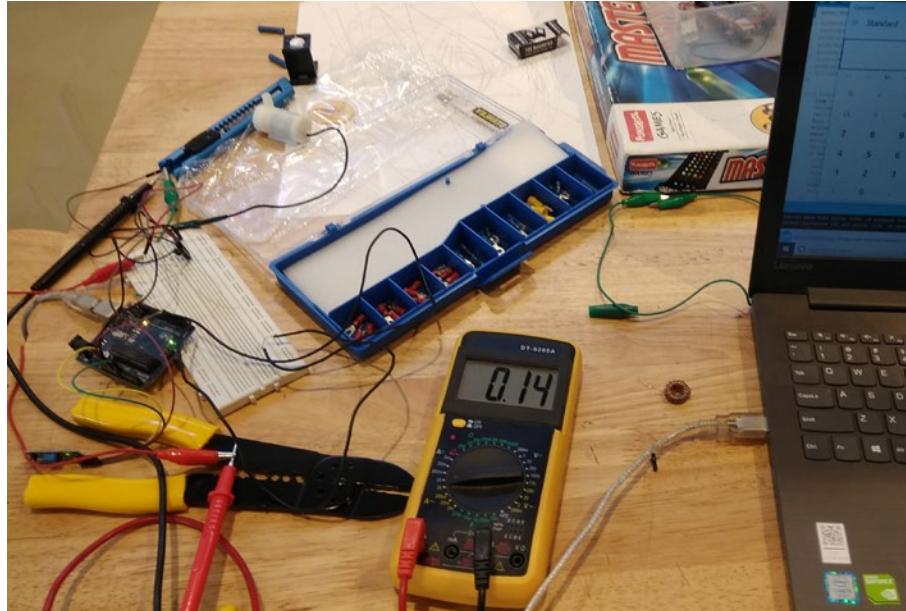
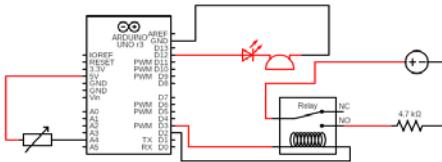
Prototyping



Material Exploration



Electronic Prototyping



The serial monitor output shows the following data:

```
0
nan 988.00
0
nan 996.00
0
nan 995.00
0
nan 996.00
0
nan 996.00
0
nan 999.00
0
nan 998.00
0
```

Checkboxes at the bottom of the serial monitor window:

- Autoscroll
- Show timestamp

The code for the Arduino sketch is as follows:

```
}

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
        }
    }
}
```

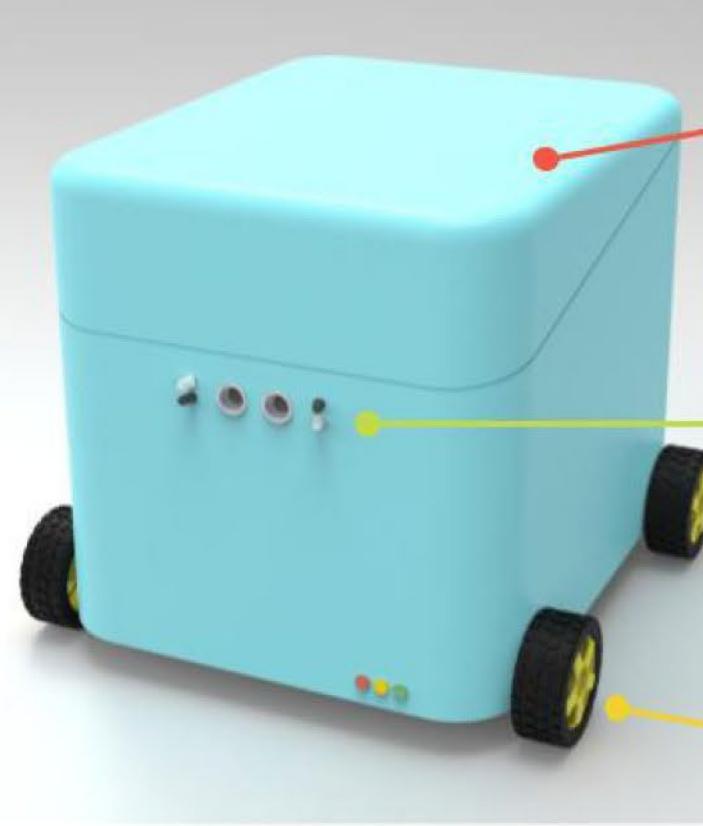
Finishing





The Cooler Robot

Product Architecture



Cooler

Insulated box to store beverages

Circuits

Controls the motors based on sensor inputs

Wheels

Wheels driven by motors to move the robot around

A robot to perform the simple task of keeping drinks cool anywhere, at any time. This robot will follow the user while keeping beverage cans in a temperature controlled storage space.

Activity Analysis

The product will mostly be used outdoors during the summer on days when people are outdoors. It can be used for small groups of people or individuals.

1. Obtain Beverages
2. Open lid

5. Trigger Robot
6. Select Mode

3. Place Beverages
4. Close lid

7. Use Robot
8. Clean Robot and Store

Inspiration



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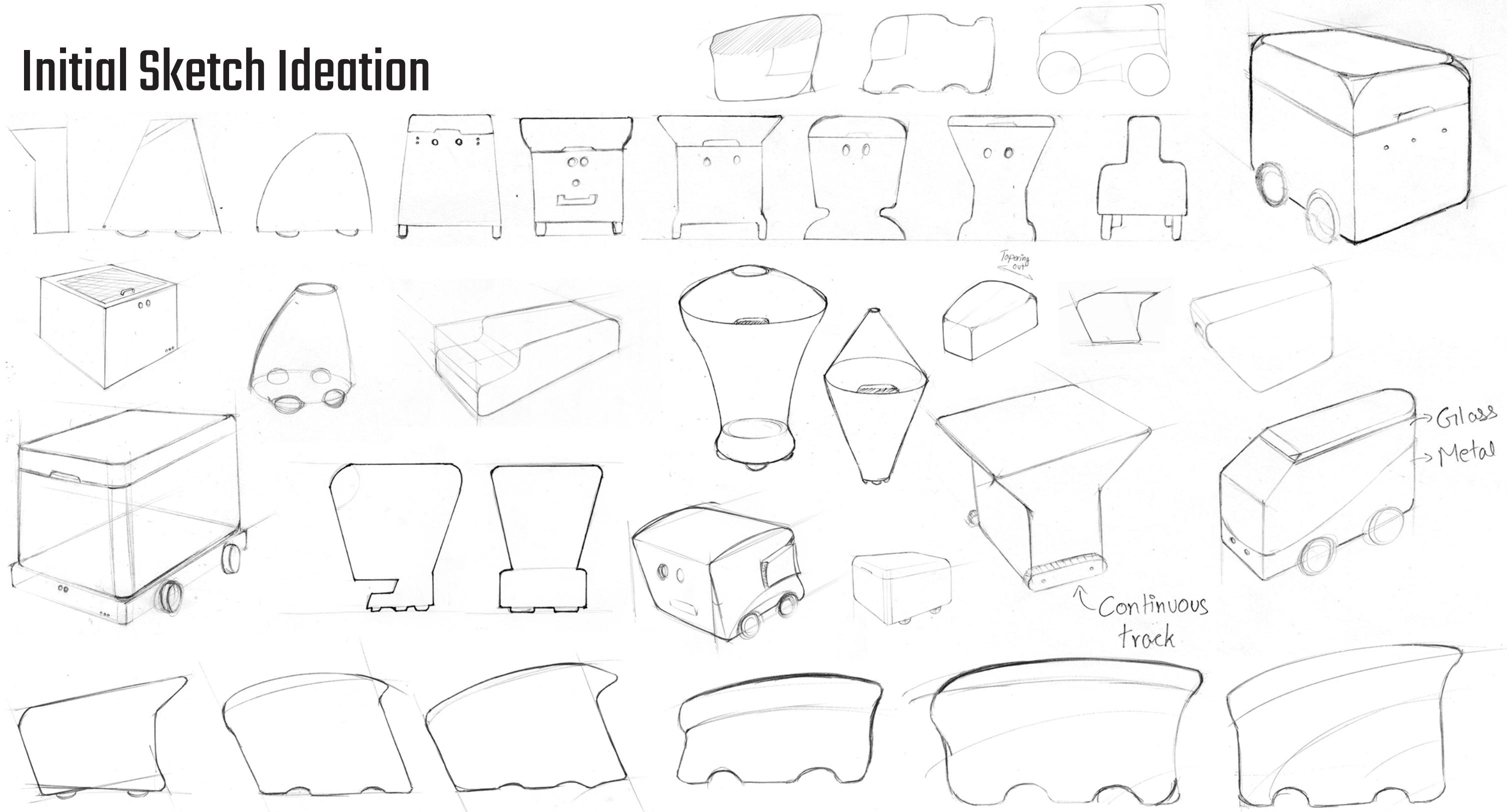
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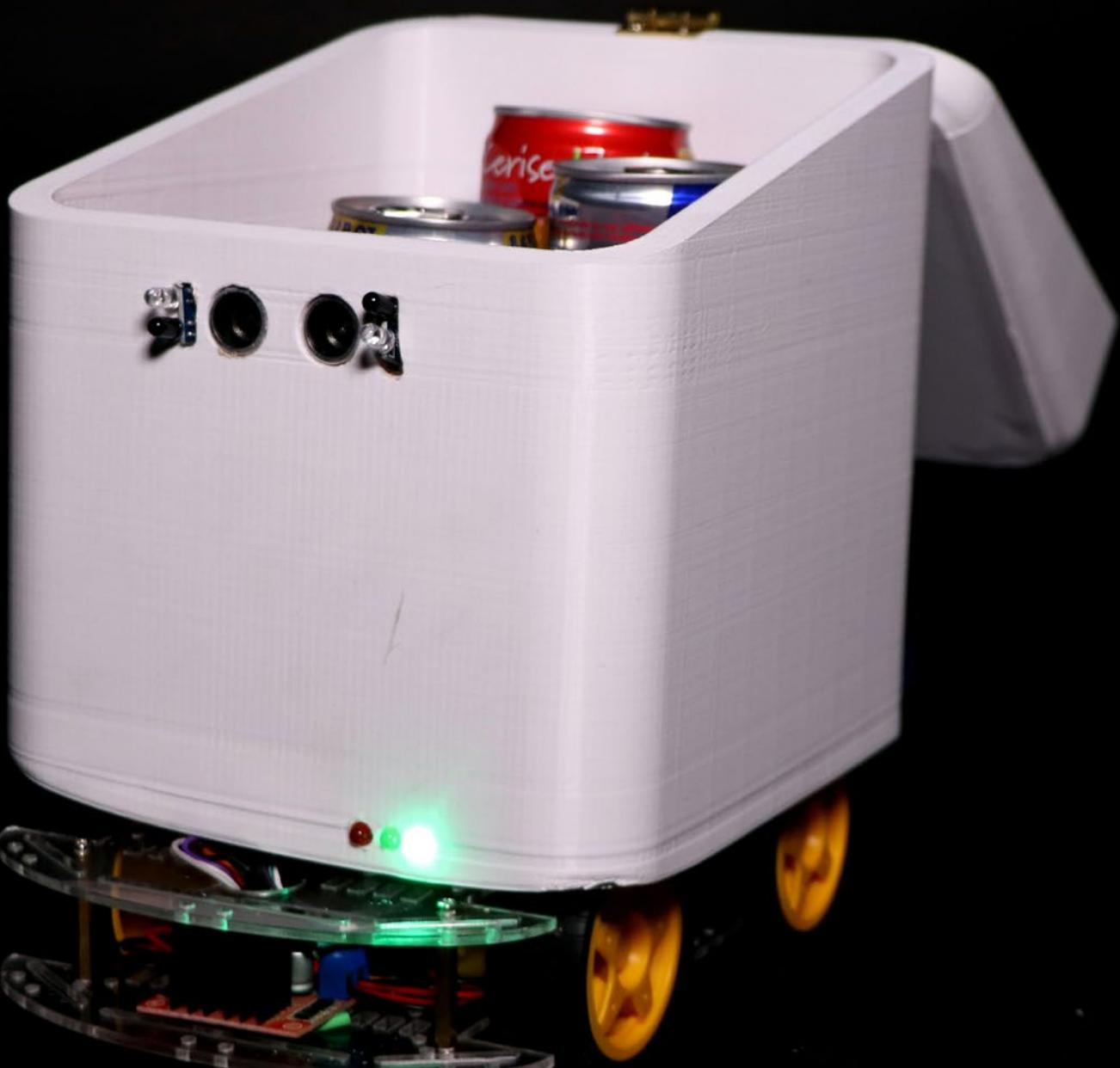
Initial Sketch Ideation



3D Printed Working Prototype

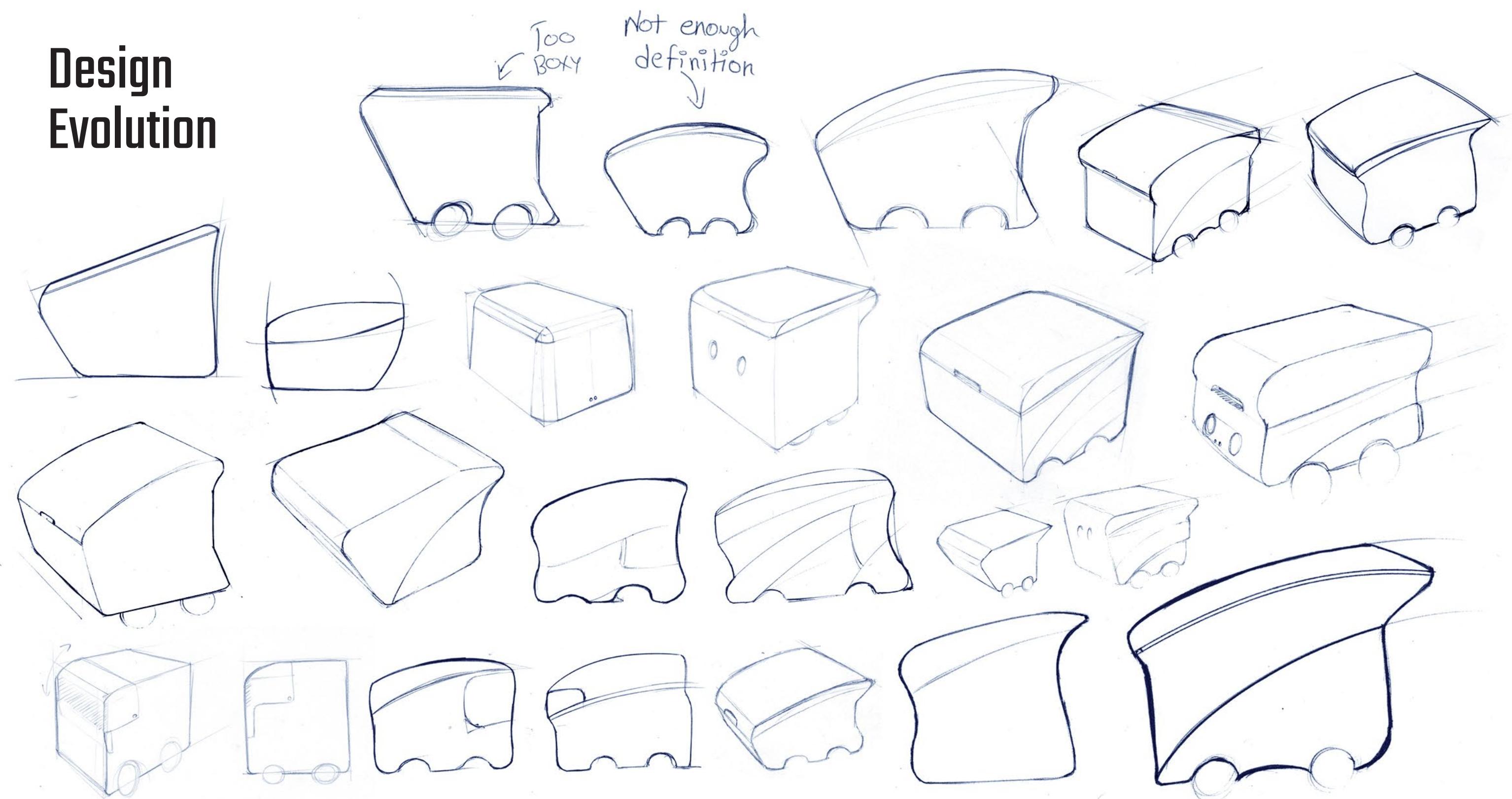


Prototype Testing



1/4 Scale Prototype

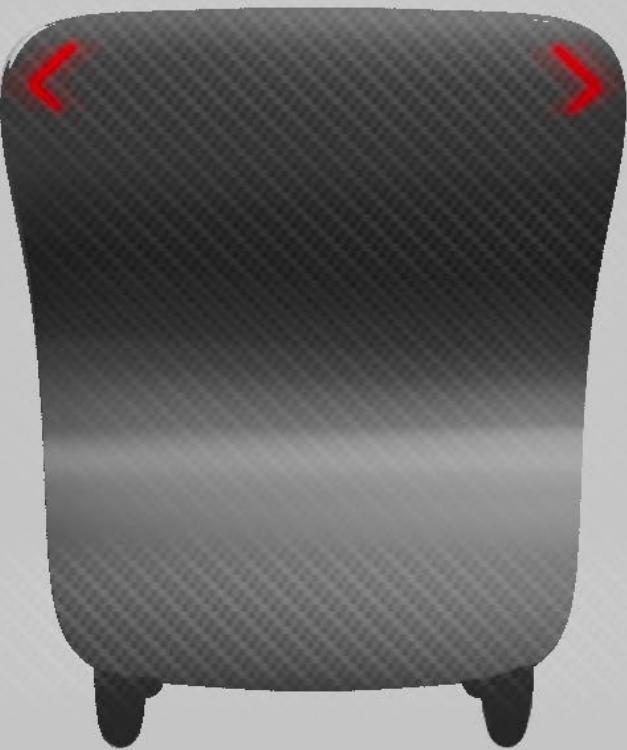
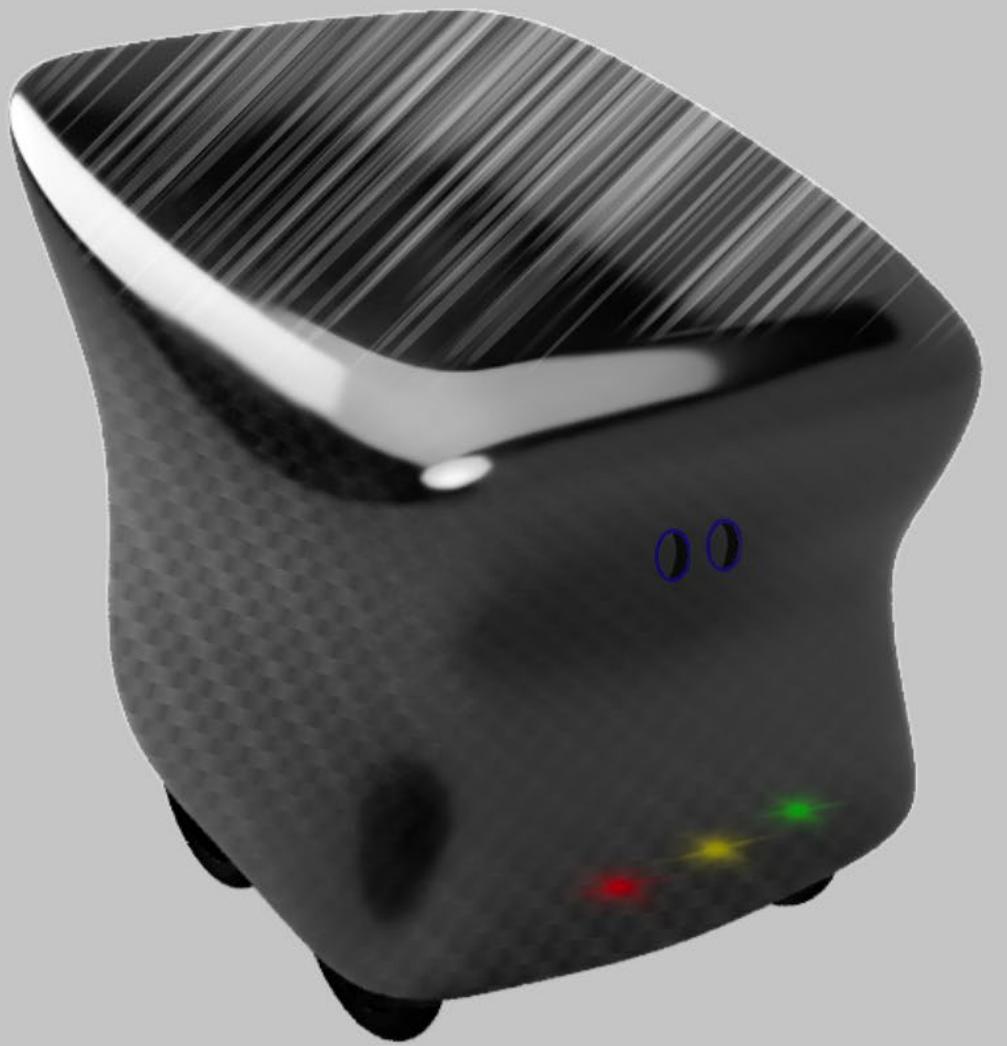
Design Evolution



3D Evolution



Concept Render



The Cooler House





