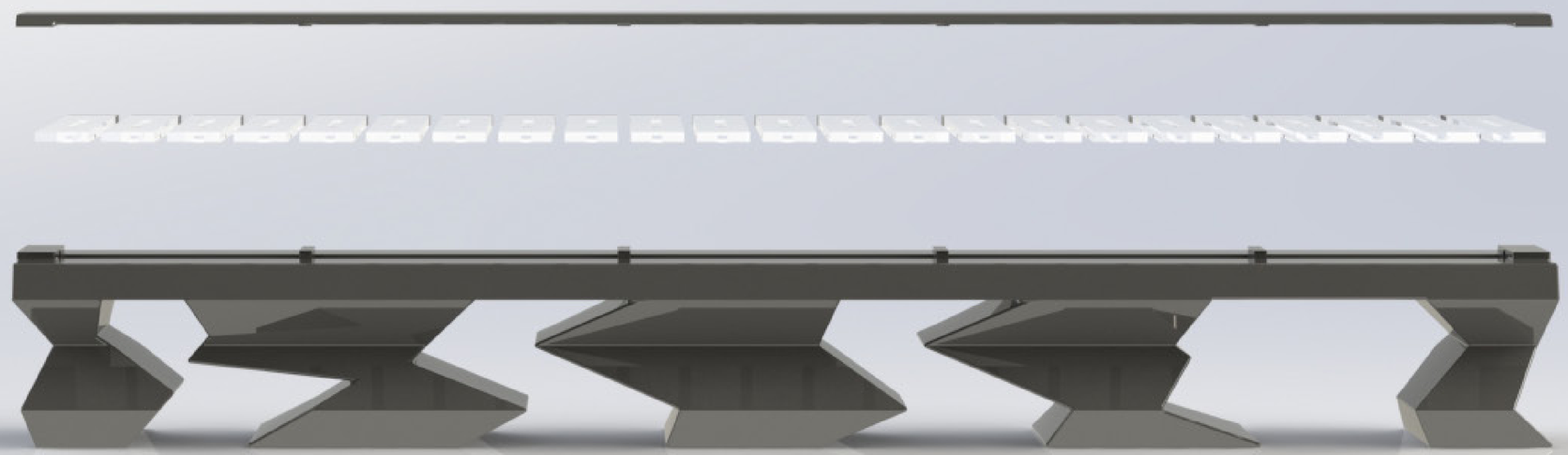


Project One

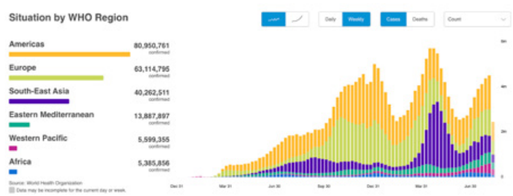
# Social Bench

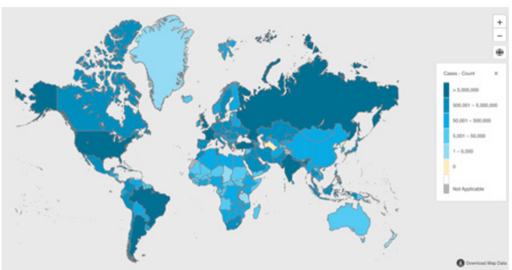
**A Smart Device To Impose Social Distancing**

# About Covid-19

## Global Cases Data

Globally, as of 6:00 pm CEST, 19 August 2021, there have been 209,201,939 confirmed cases of COVID-19, including 4,390,467 deaths, reported to WHO. As of 17 August 2021, a total of 4,543,716,443 vaccine doses have been administered.



## How does Covid-19 Spread

The virus can spread through droplets sprayed from an infected person's mouth or nose when they cough, sneeze, speak or even breathe. Current evidence suggests that the virus transmits mainly occurs during close social interaction, typically within 3 feet.

## Measures to Avoid

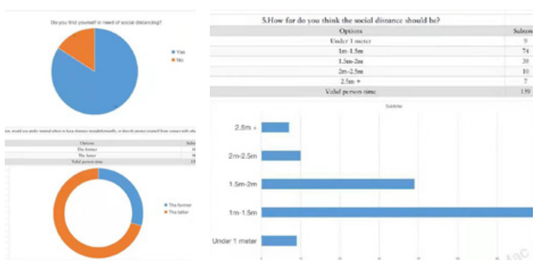
Keep yourself at least 3 feet from others to reduce the risk of infection, especially when others are coughing or sneezing. Maintain an even further distance from others indoors. The further you are, the better.

Consider it a routine to wear a mask in public. Make sure the masks are appropriately worn and disposed after use.

# Analyze

## Survey

After our observation, we decided to design a bench that guides people to follow social distancing. We conducted a questionnaire on people's opinions about social distancing, which tests their knowledge of existing prevention measures and suggestions on implementing social distancing.



## Conclusion

After our observation, we decided to design a bench that guides people to follow social distancing. We conducted a questionnaire on people's opinions about social distancing, which tests their knowledge of existing prevention measures and suggestions on implementing social distancing.

# Field Study

During our observation in Beijing, China, we concluded that most Chinese people followed the instructions of wearing a mask. However, they are less likely to maintain social distancing, especially when it comes to sitting in public

These are our conclusion after observing sitting behaviors in public

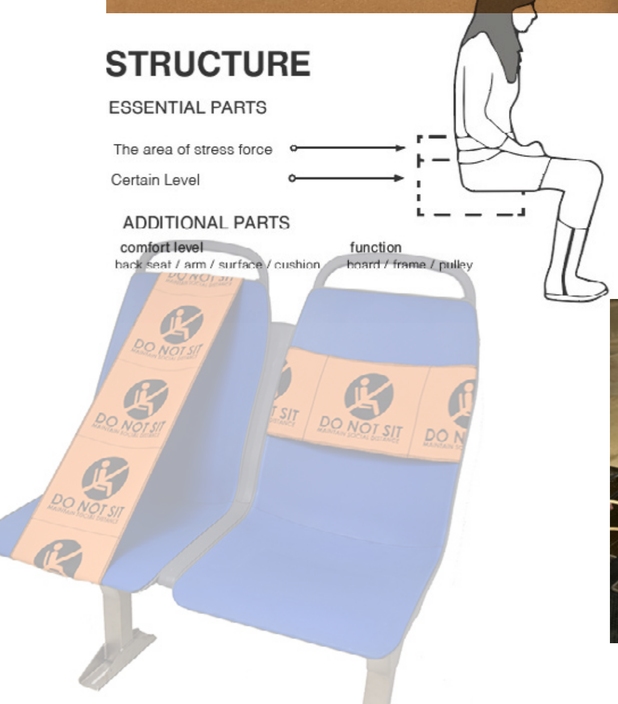
1. Most people consciously sit according to the 3-feet distance principle.
2. Some ignore the warning signs on seats and still seat closely.
3. A few chairs in public places has no warning signs.

# Idea Forming

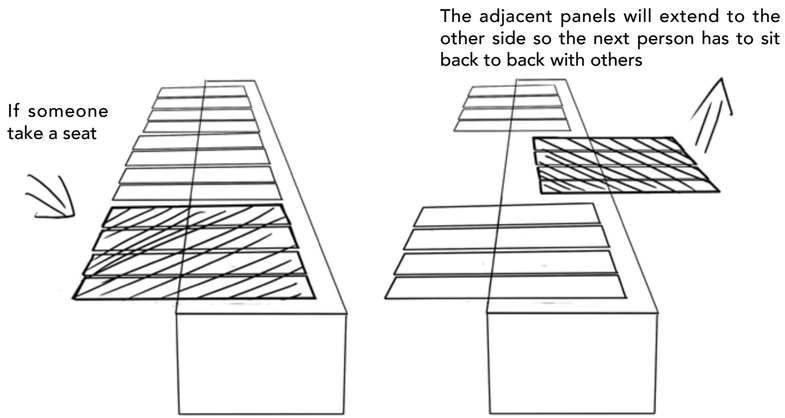
## Global Cases Data

Our goal is to design a bench that automatically reminds people to maintain social distancing, so that people can avoid the awkwardness of telling others to "stay away from me."

The common way to do that is simply put signs on the seat. Not only is that unattractive to look at, people can still ignore the sign and sit on it anyway.

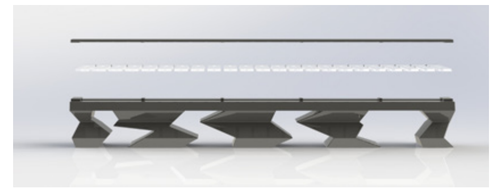


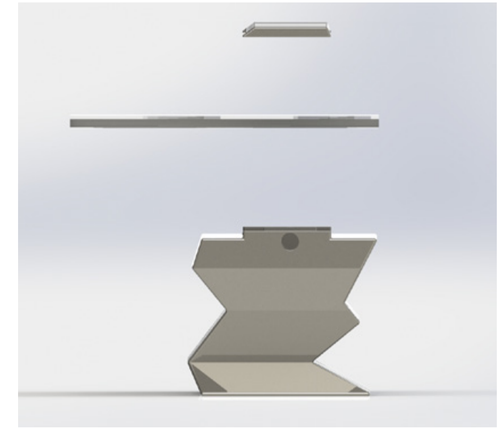

# Skecthing and Modeling



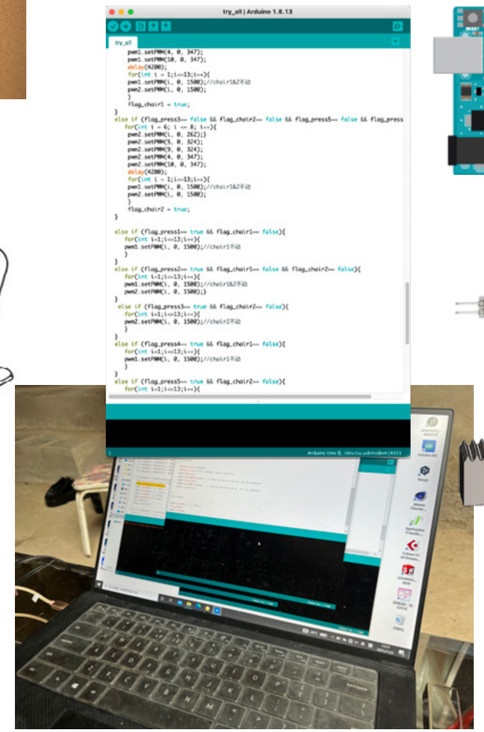

The bench's base will be made of stainless steel, while the seating area is consist of acrylic plates. A stainless steel plate is on top of the acrylic plates to prevent the plates from slipping.

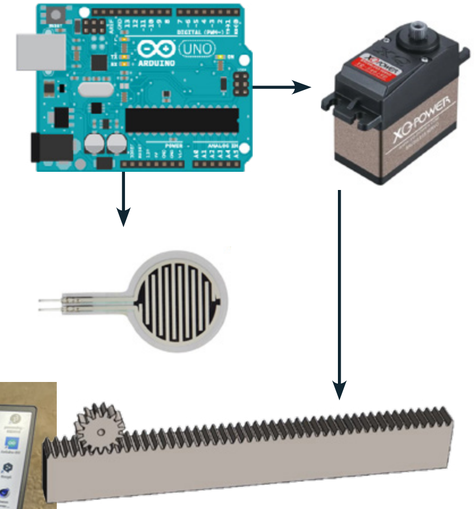
Pressure sensors are placed on the top of the seat surfaces to detect whether the seats are occupied. The steering gear drives the rack attached to the acrylic plate through the gear to move the acrylic plate back and forth based on the pressure sensors' detection.





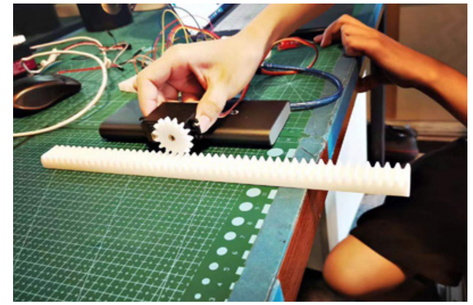
# Coding

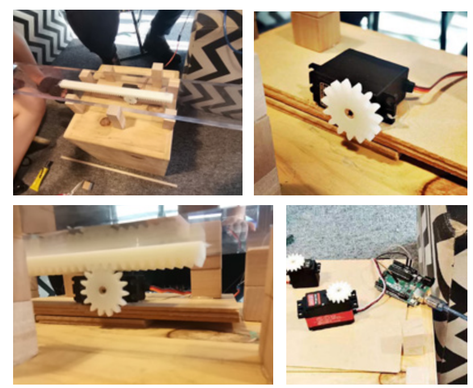





# Testing

After the design and mechanics have been settled, we created a small model to test our concept and code.



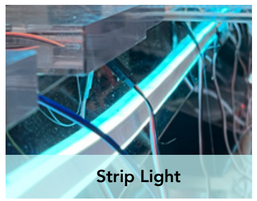


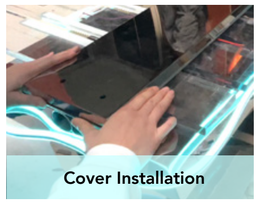
## Final Assembly

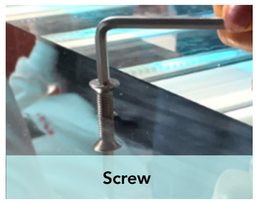
Polishing

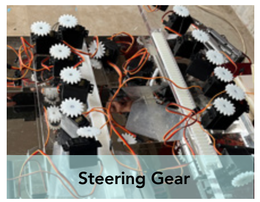
Rack Installation

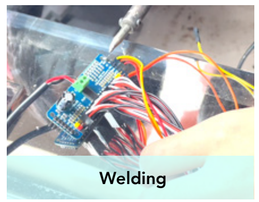
Gear Installation

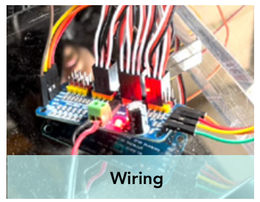

Strip Light


Cover Installation

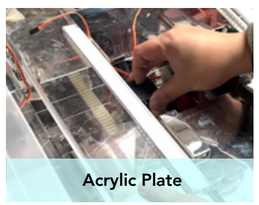

Screw

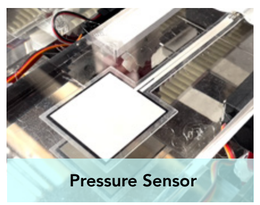

Steering Gear


Welding

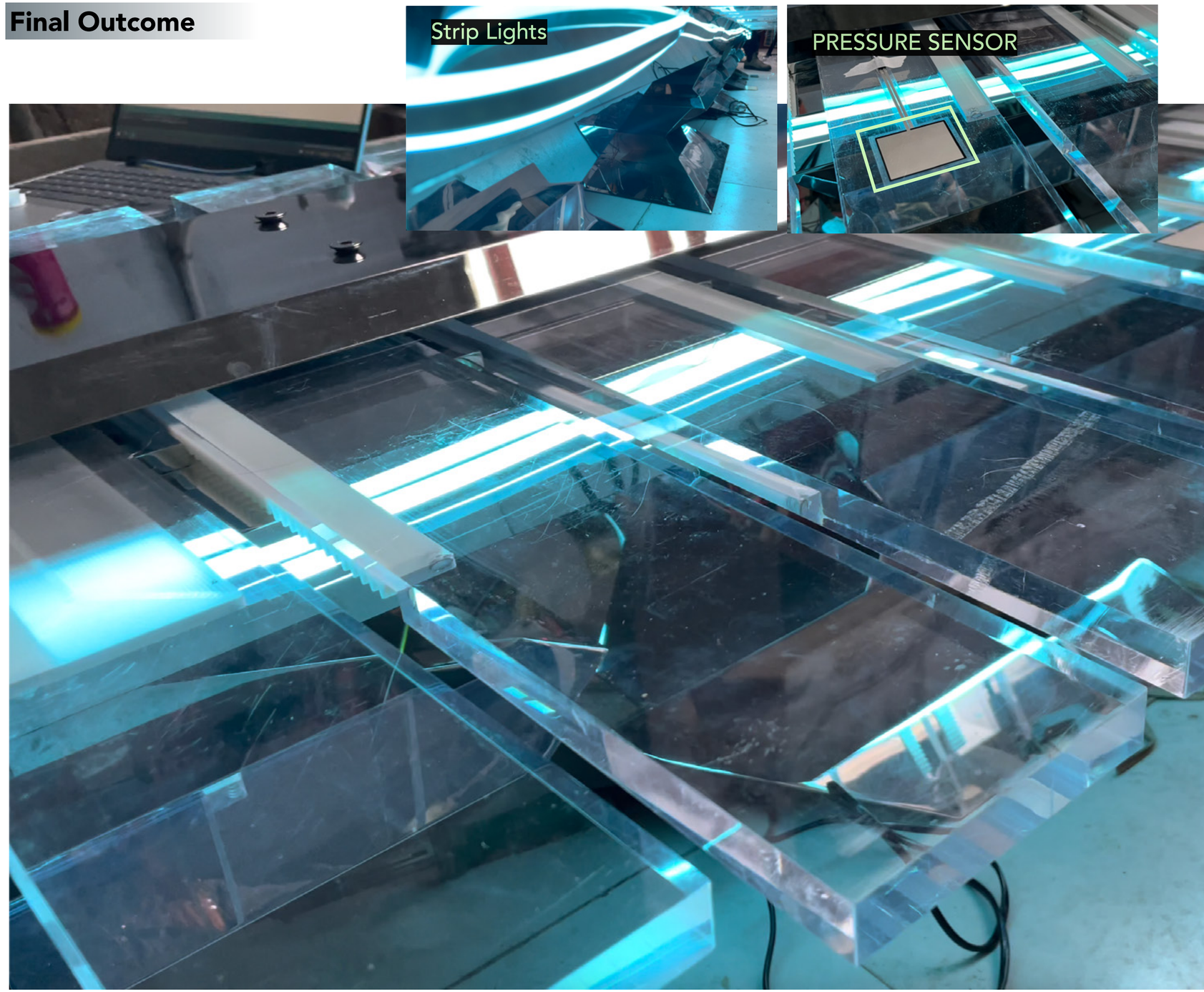

Wiring

Gluing


Acrylic Plate


Pressure Sensor

## Final Outcome



Project Two

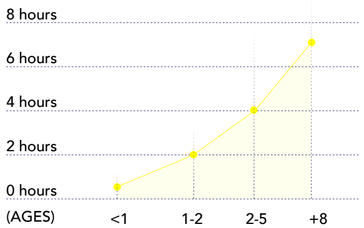
# Traffic Code

**An Innovative Way To Learn Coding**

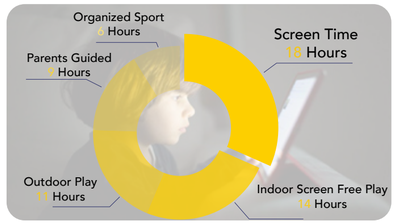
# Current Issue

One of the biggest concerns of today's parents is their kids' excessive use of screens. Computers and other electronic devices are getting more commonly used in schools, but kids still spend a considerable amount of time on screens even after school.

US Children Average Screen Time VS Age




US Children Free Time Spending (By Week)




# Interview

## Parents

Mark Sims, Age 35

"I've realized the importance of coding, but my son is only 3 years old and I don't want him to spend any more time on screens."

Bella Li, Age 32

"I always enjoyed spending time with my kids. I wish there's a product that allow me to teach them coding by myself."

## Kids

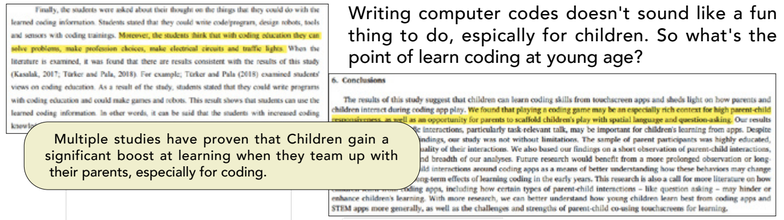
Kate Patterson, Age 4

"I just want something simple and fun, computer coding sounds hard."

Jacob Gibson, Age 5

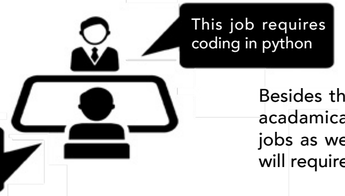
"I want a toy to play with mom and dad, I don't have many toys that I can share with them."

# Coding is the Trend



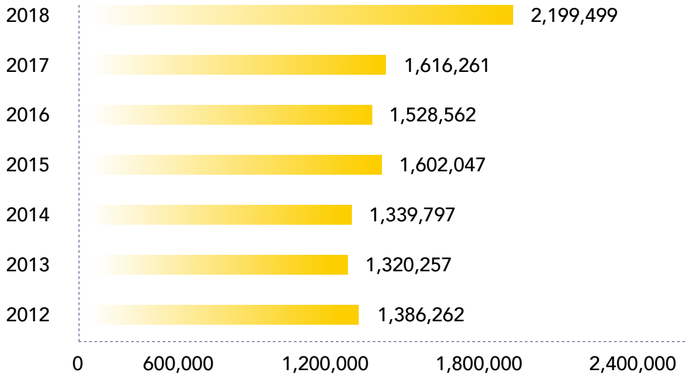
Multiple studies have proven that Children gain a significant boost at learning when they team up with their parents, especially for coding.

Writing computer codes doesn't sound like a fun thing to do, espically for children. So what's the point of learn coding at young age?




Besides the fact that coding can help kids acadamically, coding is essential to more jobs as well. In the near future, more jobs will require computer skills.

National Growth In Job Postings Requiring Coding Skills




# Similar Products Analysis

Now that we know what the parents and their kids expect, we must learn from existing products to improve upon. A total of 6 products from three different categories were chosen for the study.

- Plastic coonstruction toys that can be turned to just about anything
- Scale model cars, can also be placed on the dedicate Hot Wheel Tracks
- Toy dolls that can be dressed, can also come with houses, cars, furnitures, and pets.

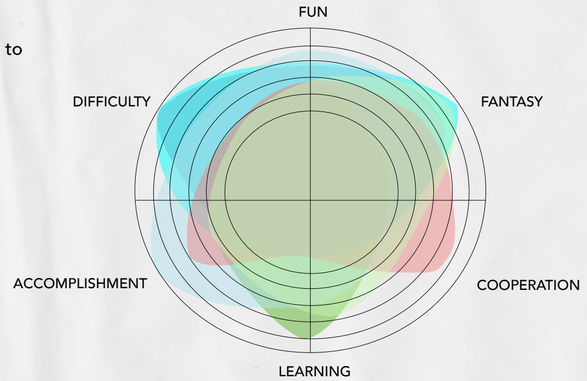
} Best selling toys of all time

- A train that automatically perform actions based on the trail built by players.
- A interactive robot that can react to it's surroundings and follow procedues entered by users on the app

} Toys that focuses on coding

- Co-operative board game that players take role of movie characters to experience the plot

Toys that focuses on Cooperation




From the above chart, we can conclude the following

- Toys that emphasize learning are not that fun to play
- Not many toys on the market are designed to be played between parents and kids
- Fantasy is essential to kids' creativity. You might view them as simple toy cars and dolls, but kids are seeing a thrilling car chase or a Fabulous tea party
- Complicated toys are less welcoming to small kids
- Satisfaction is important. One of the reasons why toys like Legos are so popular is the satisfaction you get after completing a set

# Design Orientation

What if there is such a toy that does not require a screen, teaches kids the fundamental of coding, while encouraging cooperation between kids and their parents?

USER: Parents with Children age from 3-5

TASK: A solution to educate children on coding

Foundation Concepts:

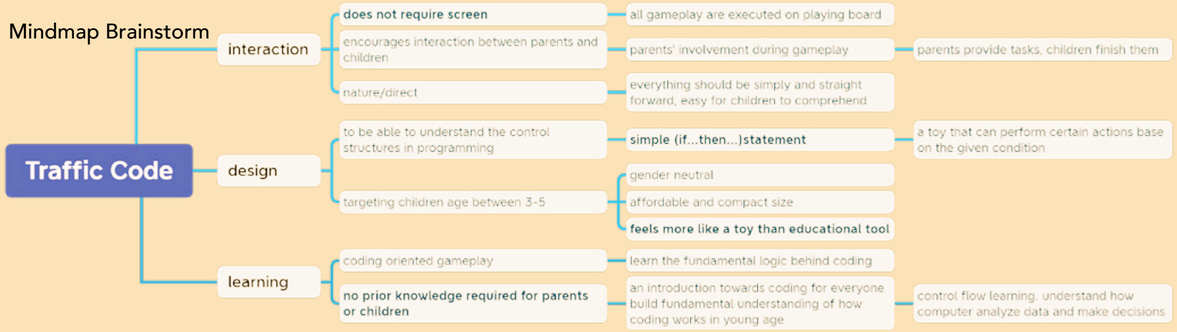
- A setting that satisfies kids' fantasy
- Encounrage cooperation between parents and kids
- Relatively easy to play
- Gain satisfaction after successful gameplay
- Based on fundamental coding logic

SCREEN FREE

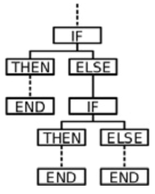
EASY TO LEARN

FOCUSES ON INTERACTION

Mindmap Brainstorm




# Thought Process

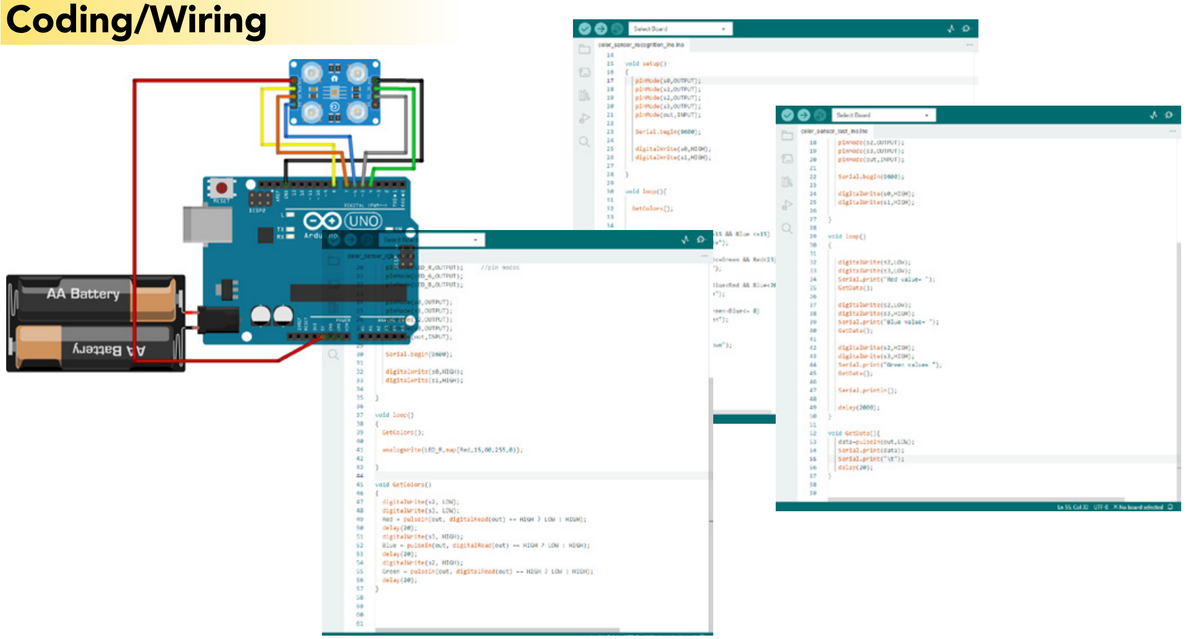



The toy automatically detects its surroundings to perform actions. For instance, if it detects A, it then perform action B. No user inputs required.

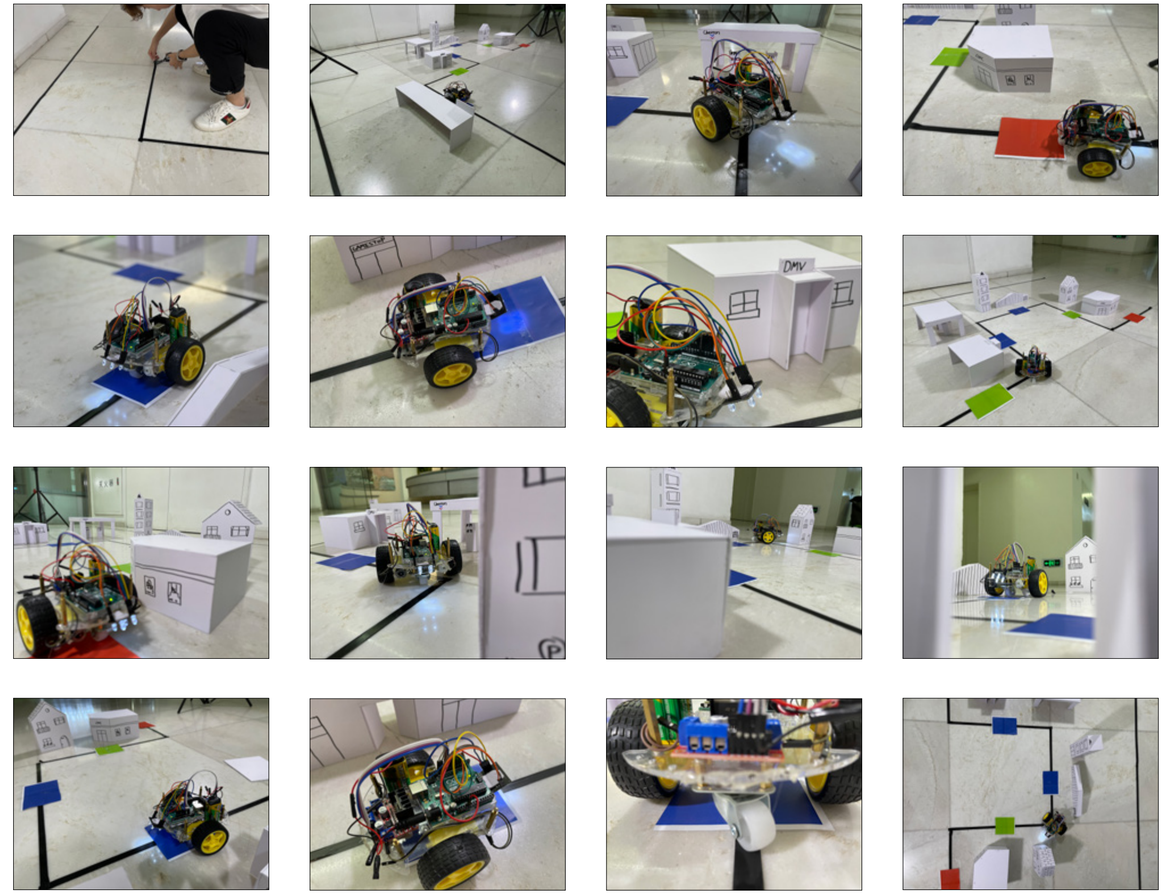
A car fitted with a color sensor navigates through the city by detecting the color panals below it.

Each color panel indicates a direction. Red for straight, blue for right turn, and green for left turn.

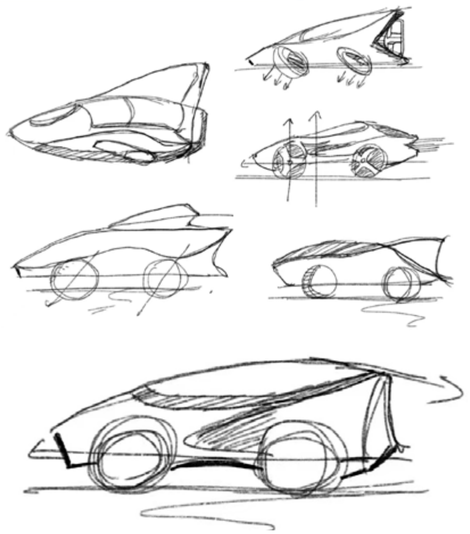
# Coding/Wiring

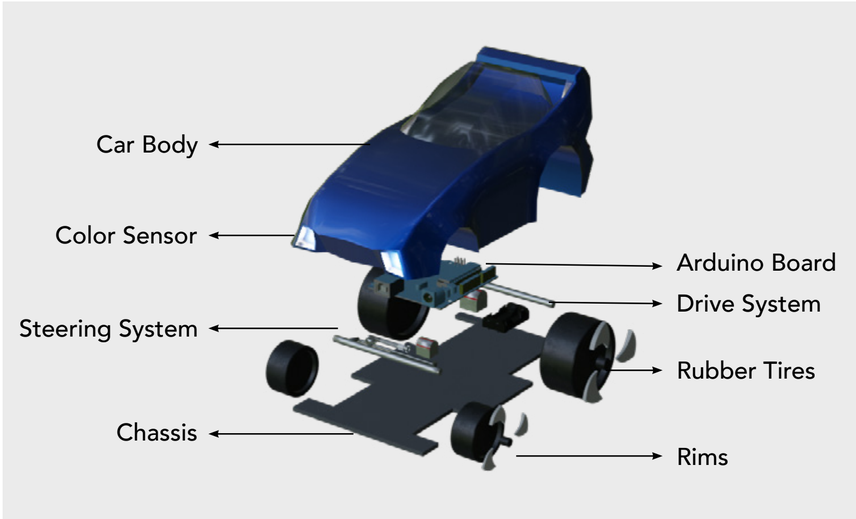



# Testing

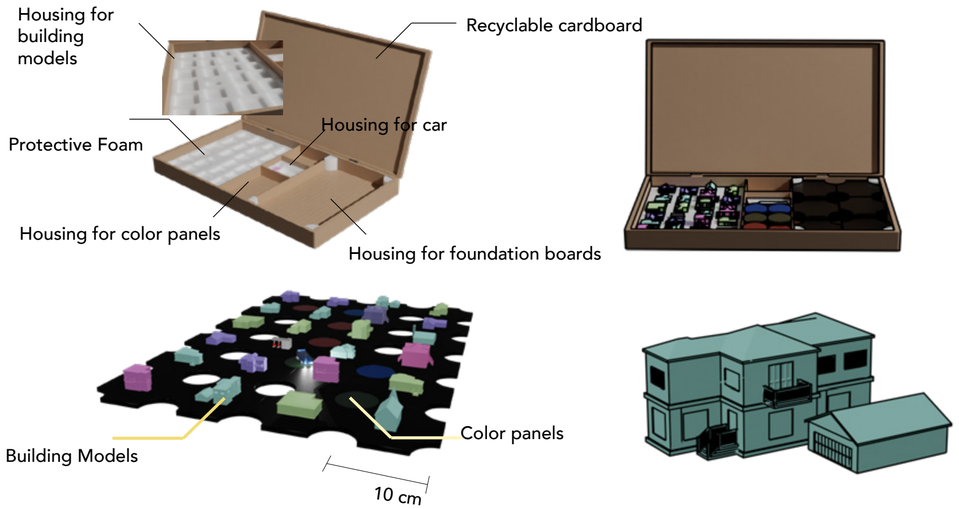


## Automobile design

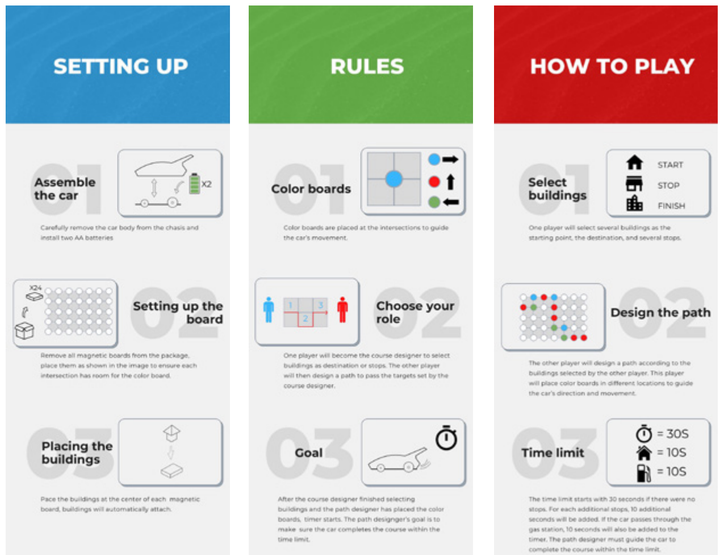





## Packaging and City Model




## Playing Instructions




## Users

User Persona

Interest

Sports
Toy cars
Coding
Video Game

Age: 4
Gender: Male
Family: Middle class, single mom

Interest

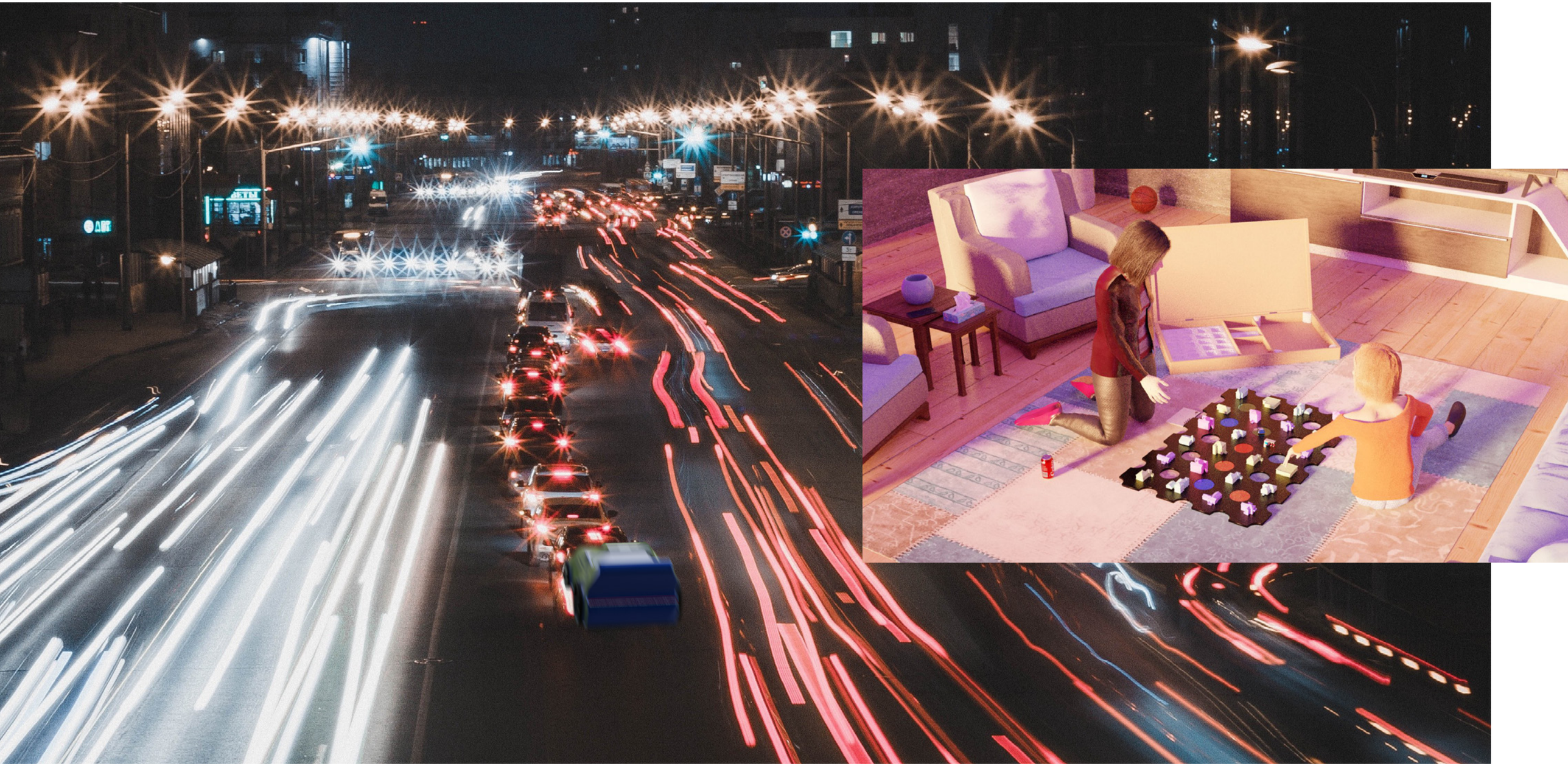
Sports
Toy cars
Coding
Video Game

Age: 5
Gender: Female
Family: Upper Middle class

User Journey Map

| | | | | | |
|---|---|---|---|---|---|
| States | | | | | |
| Children Actions | Select toys | Unboxing with the parents, fiddle with parts | Set up and assemble the toy under parents' instructions | Design a path for the car | Replay the toy |
| Touch Points | Mall, Local Toy Shop | Home | Home | Home | Home |
| Feelings | | | | | |
| Parents Actions | Make payment | Open the package, start taking out parts from the box | Reading Instructions | Set goals for the children | Replay the toy |

## Final Outcome



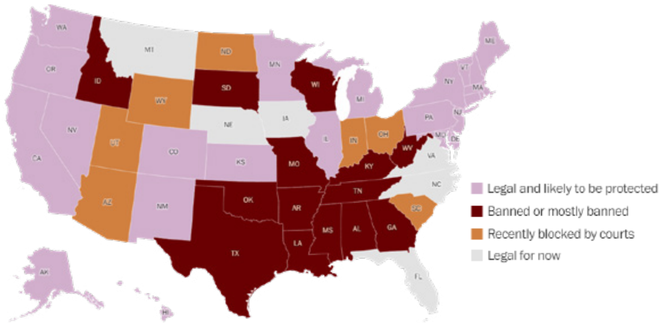
Project Three

# Life Box

**An advocate for a basic right**

## Inspiration—Abortion Act

On June 24, 2022, the U.S. Supreme Court officially DECLARED that the constitutional right to abortion no longer exists. In 2020, 620,327 legal induced abortions were reported to CDC from 49 reporting areas. Among 48 reporting areas with data each year during 2011–2020, in 2020, a total of 615,911 abortions were reported, the abortion rate was 11.2 abortions per 1,000 women aged 15–44 years, and the abortion ratio was 198 abortions per 1,000 live births.



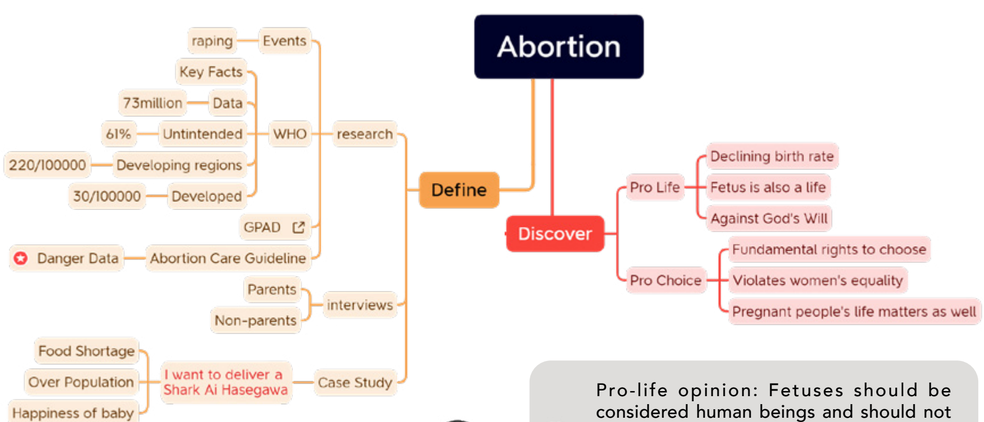
- At 2014 abortion rates, about one in four (24%) women will have an abortion by age 45.4
- Some 75% of abortion patients in 2014 were poor (having an income below the federal poverty level of $15,730 for a family of two in 2014) or low-income (having an income of 100–199% of the federal poverty level).



The abortion rate was 11.2 abortions per 1,000 women aged 15–44 years

The abortion ratio was 198 abortions per 1,000 live births

## Research and MInd Map

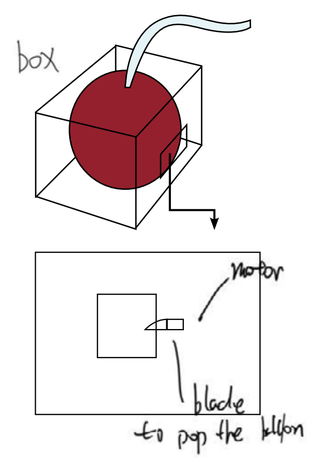


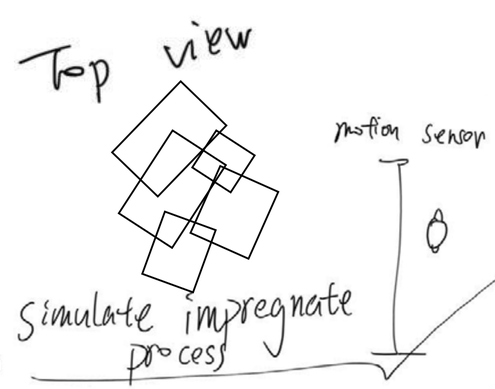

Many States took immediate action after the supreme court's declaration, meaning that people who cannot afford more children, people who were raped, or people with health conditions can no longer decide whether they want to keep the newborns or not.

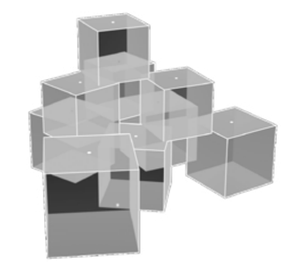
Pro-life opinion: Fetuses should be considered human beings and should not be intentionally killed.

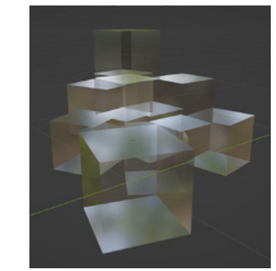
Pro-Choice opinion: The right to choose abortion is a fundamental human right, and it is essential to ensuring a woman can decide for herself.

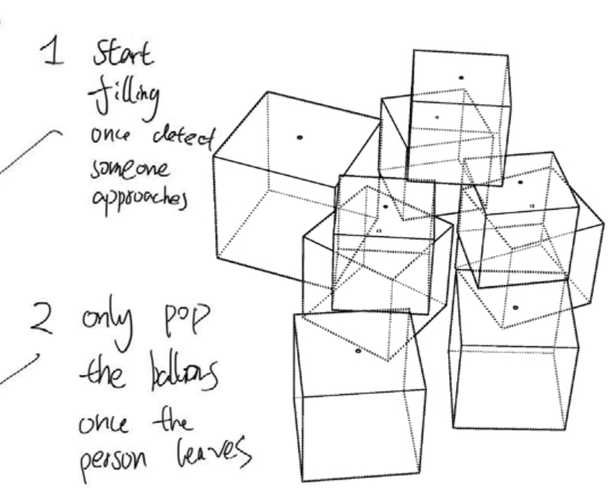
## Sketching and Modeling



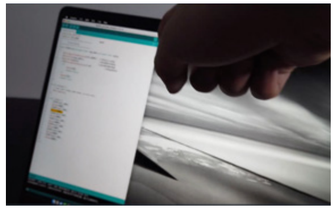



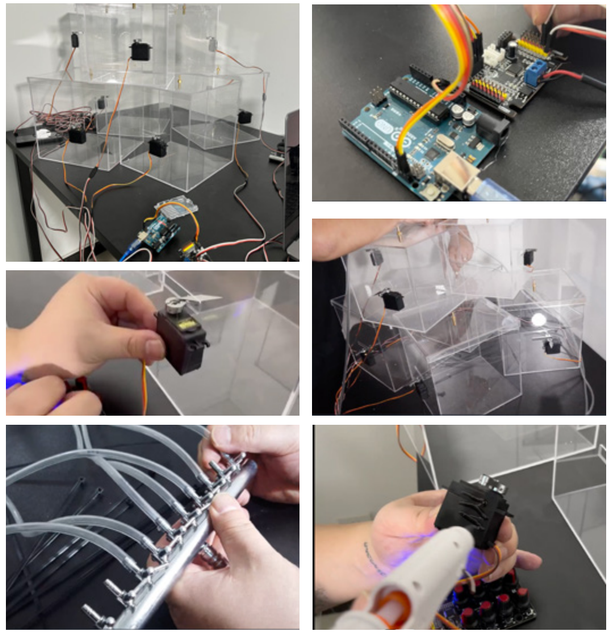




## Coding

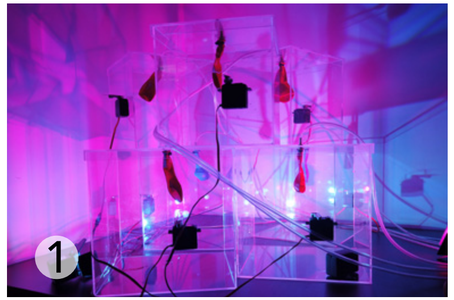


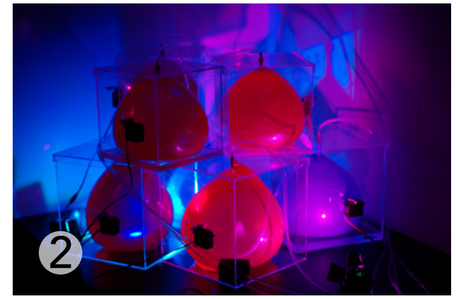
## Testing

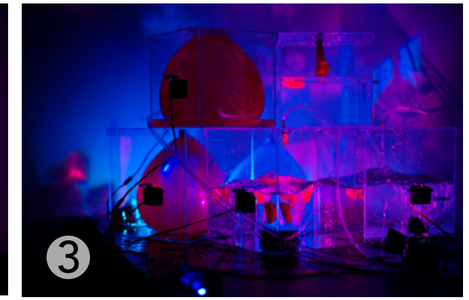


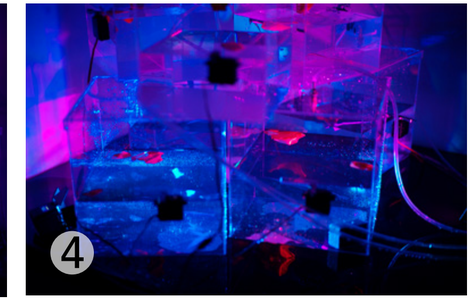
I use balloons to represent the fetus, and transparent boxes to represent the uteruses.

## Final Assembly



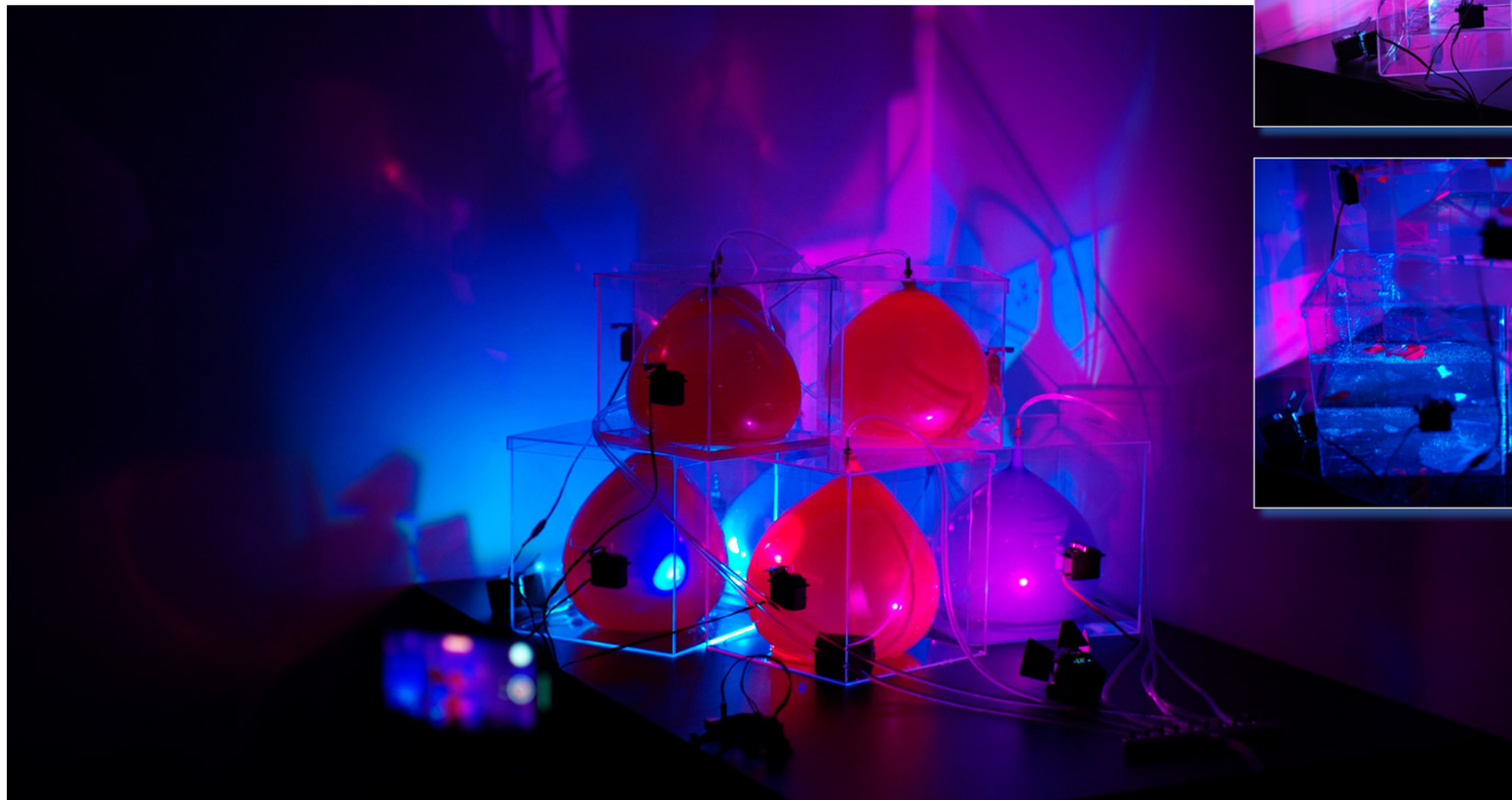

Viewer experience

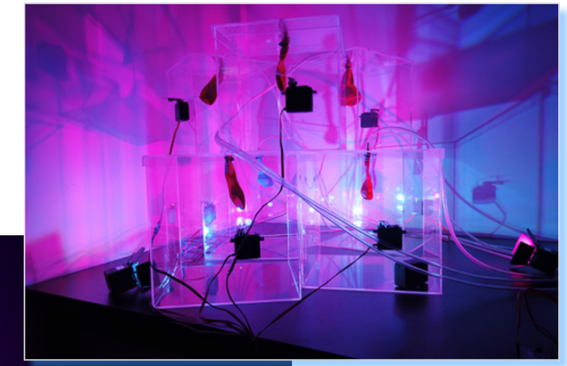
1: As a man, i never realized how harmful and painful the abortion process can be. It is really important for men to use protection, and take responsibility for the newborns.

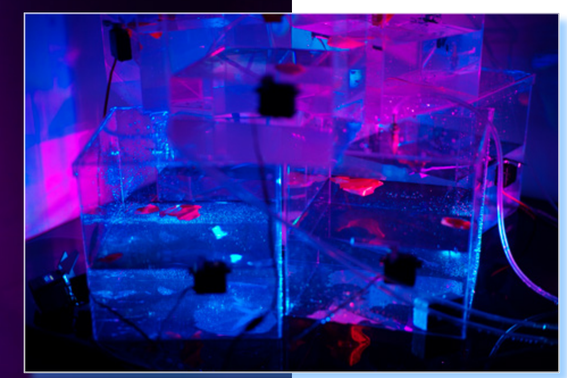
2: Watching the balloons pop makes me sad, I still think it is inhumane to end a human being like that.

3: I did not step away from the boxes, the balloons exploded in the end and water splashed all over the place. I guess the meaning is abortion is sometimes necessary before everything is too late.

## Final Outcome







Project Four

# Spinning City

**A City That's More Than A City**

## City Evolution

### 1765

18-19th Century in Europe and North America, featuring steam engines

### 1870

1870-1914, featuring steel, oil, electricity, and combustion engines

### 1980

1980s Digital Revolution, featuring personal computers and the internet

### Today

21st Century advance of AI, big data, robotics, IoT, blockchain and crypto

## Design Orientation

At the current greengas emission rate, the global sea level will rise about 5ft (1.5 meter) within the next 80 years.

Cities will lose a significant amount of land due to rising sea levels. Since most affected cities are coastal cities, it would be great if we can create new islands next to them to compensate for their land loss.

## City Function

The process of urbanization accelerates dramatically with each industrial revolution. However, the fundamental functions of cities remain roughly unchanged from the perspective of residents.

Cities offer variety ways of entertainment like movies, bars and etc.

Basic needs like housing, Medical care, food and water supply

Cities also offer many job oppoturnities from different industries.

Most large cities have public transportation system

Cities have large malls and plazas to fulfill residents' purchase need

## City vs. Suburb/Rural

### Pros

Increased Diversity: Big cities attract people from different places, meaning you get to experience the culture, cuisine, sports, and other activities from across the world.

Cultural Hub: Large cities are often cultural hubs for their entire state or region. There's no shortage of events, activities, and excitement, which often attracts people from other areas.

Accessible Public Transportation: Big cities tend to have better and more easily accessible public transportation systems. From metros to local buses, more people can use and benefit from transit than in smaller communities.

### Cons

Cost of Living: Since a lot of people want to live in cities, the cost of living is higher than in rural or even suburban areas.

Less Space: Cities are desirable to live in and have limited land for construction, which results in higher housing prices and smaller dwellings.

More Crime and Pollution: With more people, there is more potential for both minor and violent offenses, as well as more trash and air pollution.

### Pros

More Affordable Housing: Compared to busy cities, there is more land available in the countryside, which helps keep housing costs low.

More Space: You have a lot more space, physically speaking, in rural areas. This gives you plenty of room to add to your home, raise animals, or build new structures.

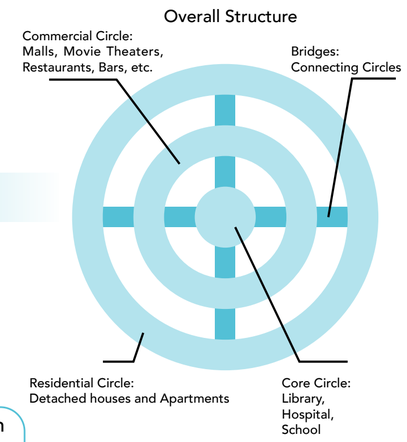
Proximity to Nature: Rural communities may be far from the big city, but they are closer to nature and green spaces. Spending time outdoors is highly beneficial for your health and well-being.

### Cons

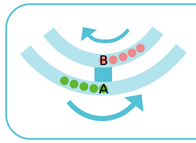
Fewer Businesses and Job Opportunities: Due to their small size and low cost of living, rural communities typically offer fewer jobs. Similarly, because there are fewer people, there are also fewer businesses you can patronize. This means that you may have to travel outside of your town, or spend more money, to get all of the products and services you need.

Reliance on Cars: Suburban areas tend to have limited access to public transit. This means you have to own, pay for, and drive a personal car as your primary mode of transportation.

## Design Essentials

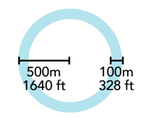



### Transportation




Each circle spins in different directions, to get from point A to point B, you can simply wait at the connecting bridges.

### Population




The residencial circle covers an area of 70 acres, which is ideal for a population of 1,000.

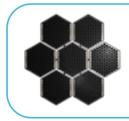
### Under Water Engines

The Island is powered by jet propulsion engines located underneath the Outer circle. The entire city can move in any direction at ease.

### Water

Pumps are installed underneath the inner circle to pump water for desalination.

### Electricity

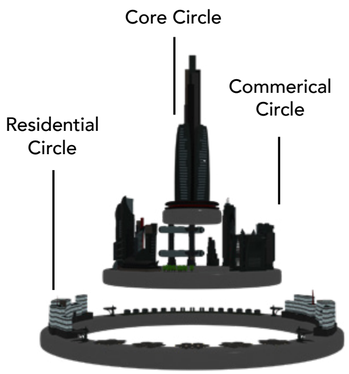


Solar panels are installed on the island surface to supply energy.

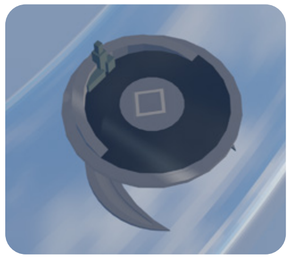
### Food

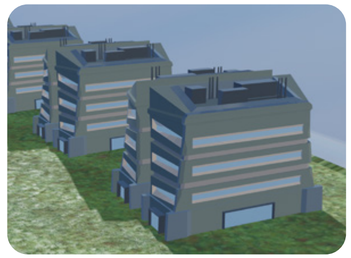
Food and other products will be delivered by drones.

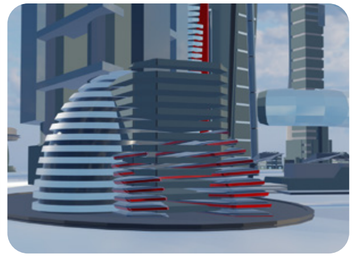
## Layers

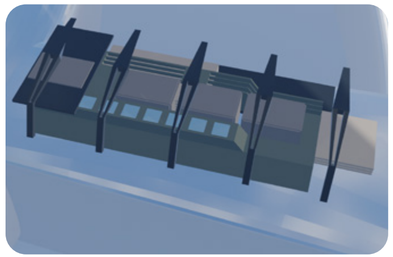


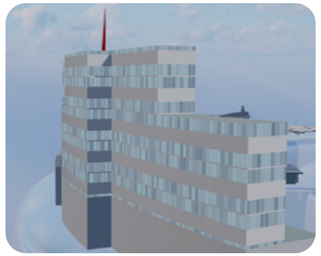

## Buildings

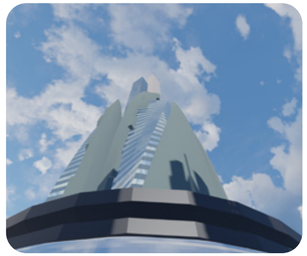

Halipads for drones to land.


Detached houses for long-term or permanent residents


Commercial Buildings: Night Club


Lounge one the bridges for resting


Apartments for short/long term residents


All in One mega building

## Final Outcome