ARTIST

ENGINEER

DEVELOPER

MARWA ALALAWI'S

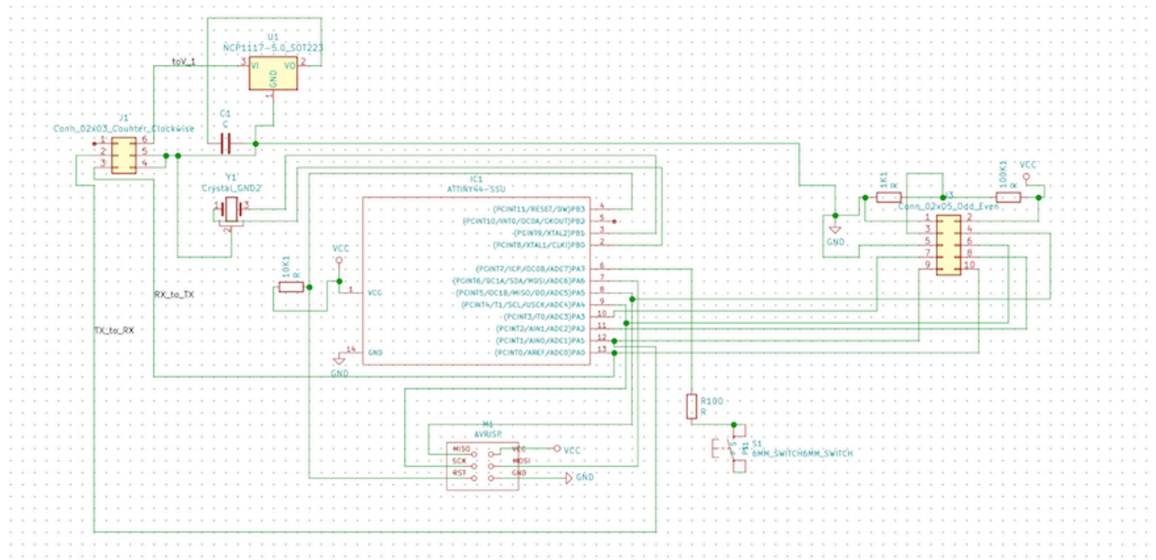
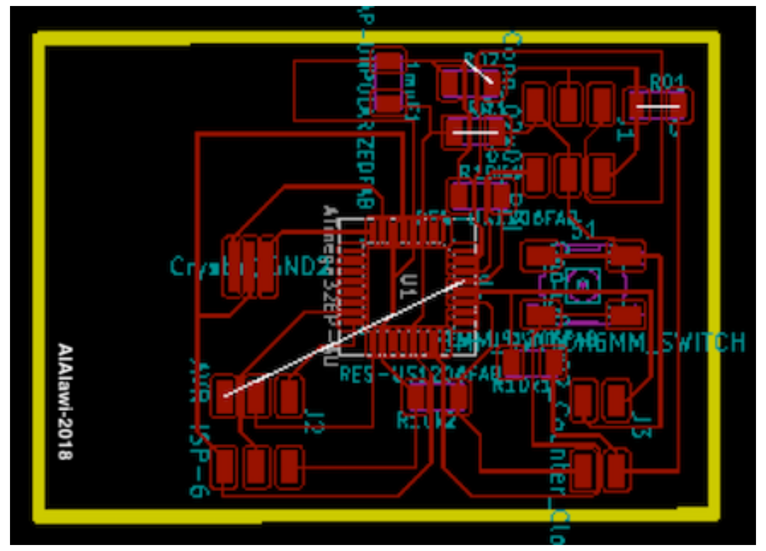
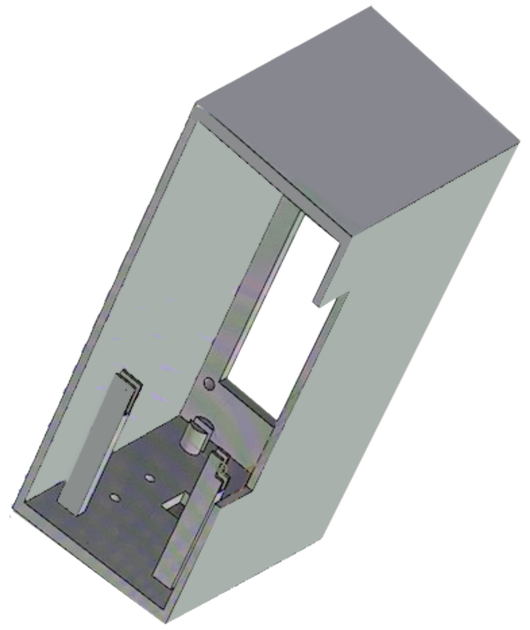
PORTFOLIO

KanKan

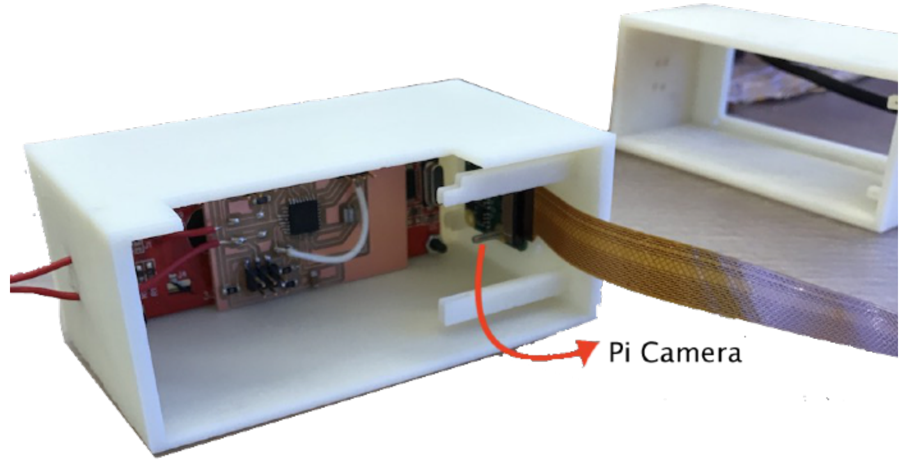
KanKan

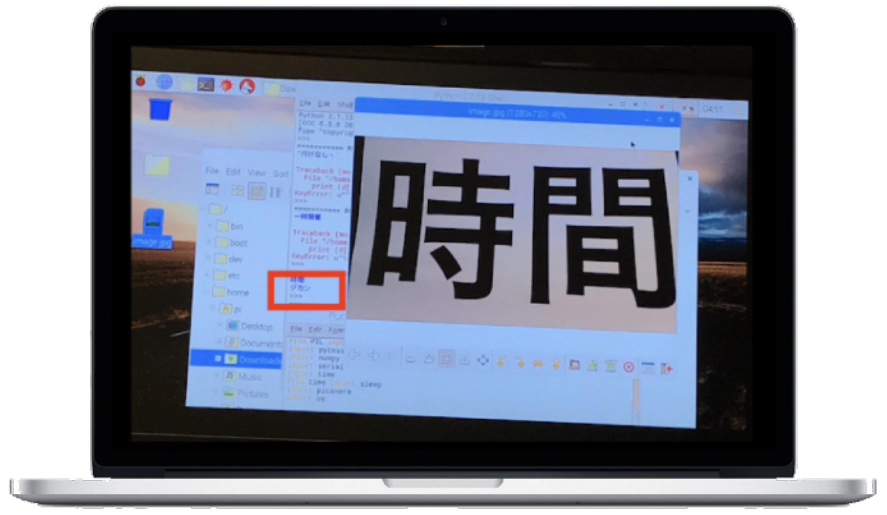
"KanKan" is a device I built, from scratch, to aid Japanese language learners like myself. KanKan utilizes Optical Character Recognition by taking pictures of **Japanese** text expressed in **Chinese** characters (Kanji), and returns on an LCD screen the same word but expressed in another set of phoneticized Japanese characters called Katakana. For this product, I used a combination of the Tesseract OCR platform, a PCB designed by me including an ATMega, RPI, RPI Camera Module, and an LCD screen. The primary computer language used for coding was **python**. KanKan was displayed and live demoed at the MIT Media Lab, and received the praise and recognition of Media Lab Professor Neil Gershenfeld.

http://fab.cba.mit.edu/classes/863.18/EECS/people/marwa/FinalProject.html

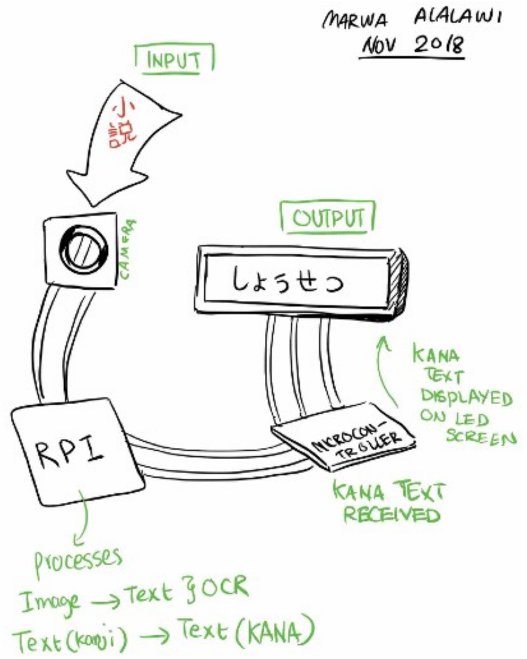
Img [2-1] From Left to Right: PCB Schematic, PCB design, & 3D CAD Model





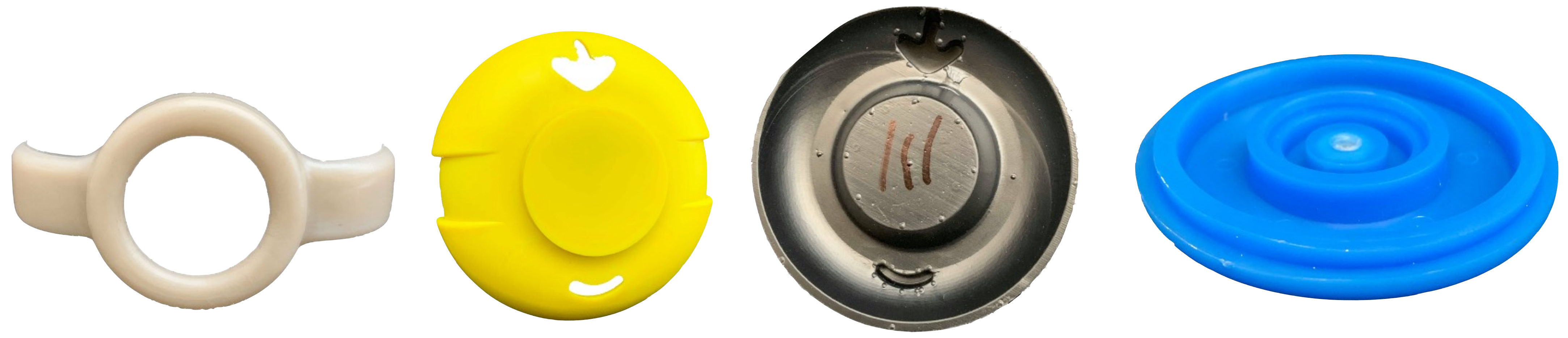

```
dhcp-18-30-125-174:Python_script marwaalalawi$ python ./tess-try.py
<type 'unicode'>
時 間
じ か ん
```

Img [2-2] Kanji to Katakana conversion though Tesseract and RPI. Python is mainly used for Optical Character Recognition and internal dictionary mapping of Kanji to Kana.

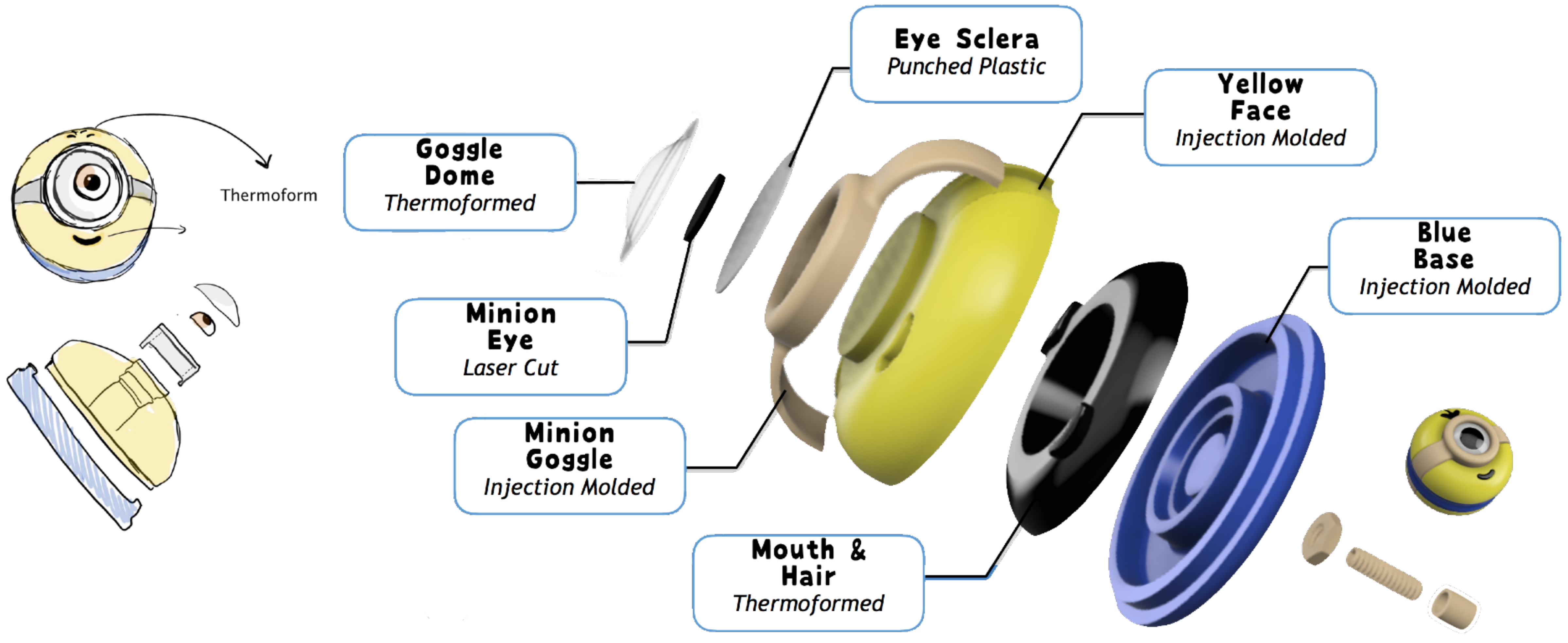


Img [2-3] KanKan displaying Japanese text

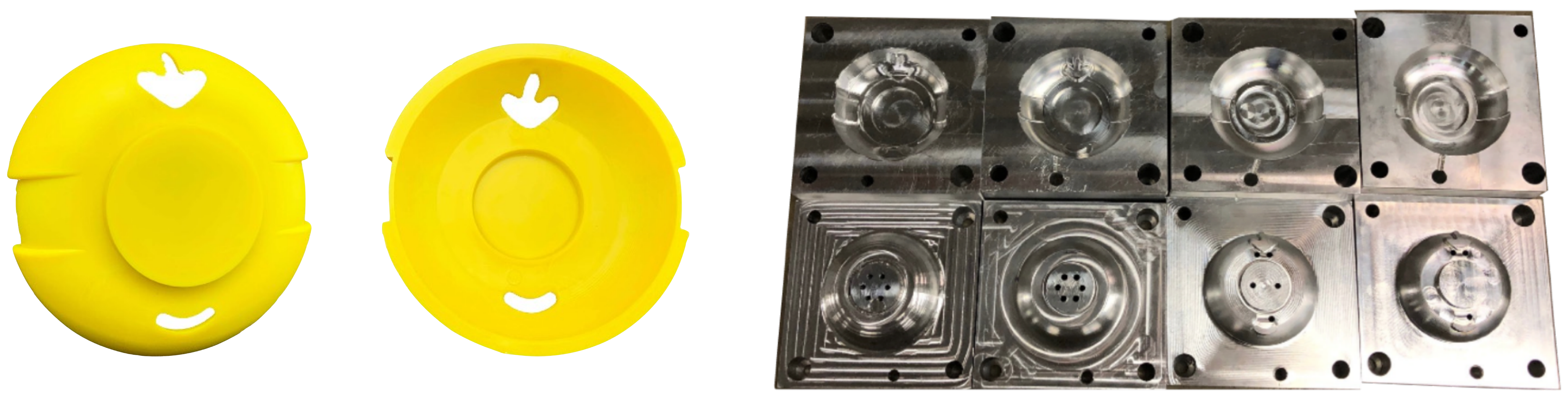
Minion Yo-yo



Img [3-1] Minion yo-yo main parts



Img [4-1] Initial yo-yo design (by Marwa AlAlawi) and 3D exploded view of minion yo-yo



Img [4-2] Injection molded yellow face with molds (different iterations) used for injection molding

2.008, also known as Design and Manufacturing ii, is a class taken by many mechanical engineering students as part of the MechE degree at MIT. In 2.008, students form teams of 4-7 to design and mass manufacture 50 functional yo-yos from scratch. In my team of four, I was mainly in charge of **coming up with the overall design of the yo-yo**, which we based on the cute Universal Studios "minion" character—as well as the **3D CAD (computer aided design), CAM (computer aided manufacturing), mold milling , and injection molding of the yellow body of the yo-yo. (Other tasks included laser cutting, punching, thermoforming and milling other molds).**

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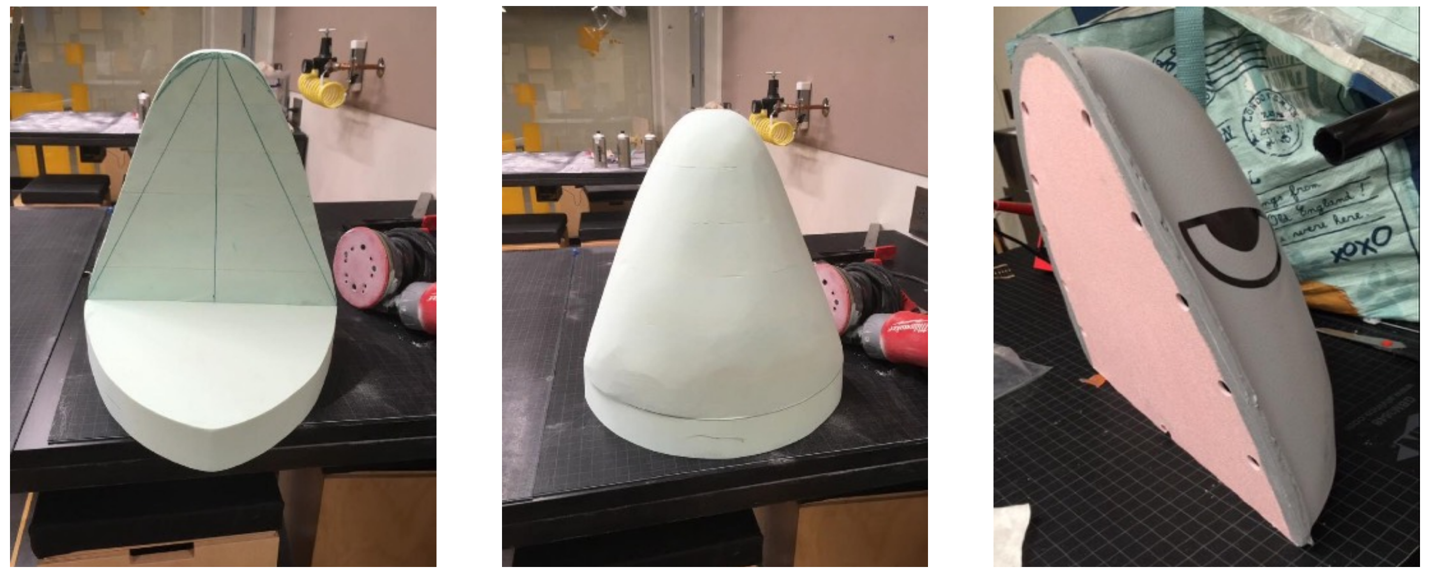
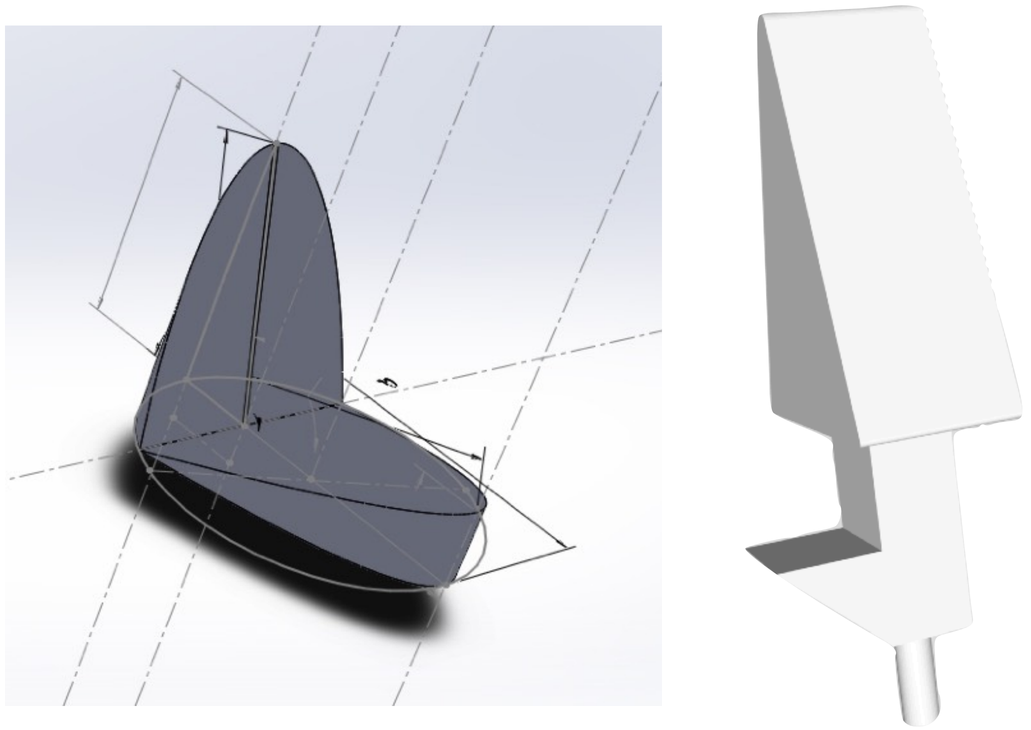
Shark Splash

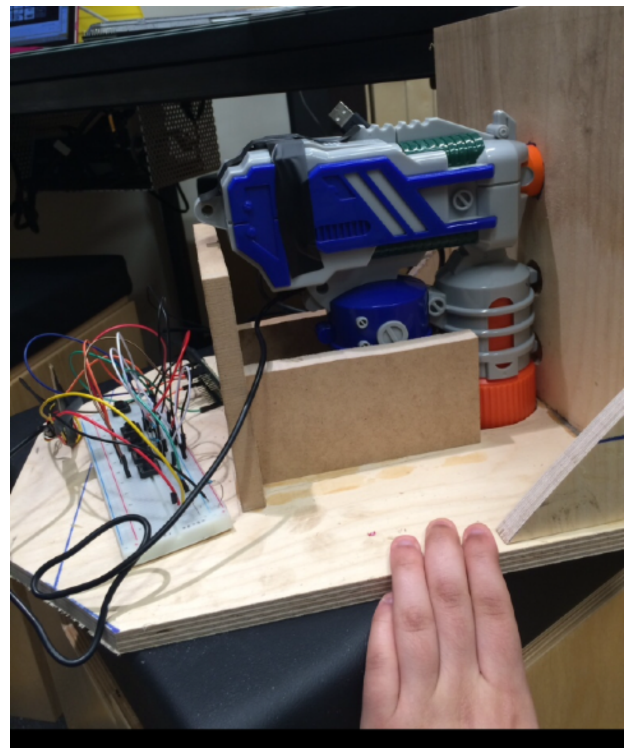


Img [7-1]
Making of Shark Splash upper and lower mouth by creating green foam mold to use for ABS plastic thermoforming.

2.00b was an introductory mechanical engineering class at MIT. In 2.00b, a team of around five students collaborate for a whole semester to build a functional toy from scratch. I worked on a team that made "Shark Splash": a water splashing game where we randomly assign a trigger tooth to one of the shark's many falling teeth using a microcontroller. With Shark Splash, children take turns to push down the teeth from a shark's mouth, and if by chance, the trigger tooth is pushed, the shark splashes water and the player is out of the game. The game continues until the last one standing doesn't get any water on them by pushing down the randomized trigger tooth.



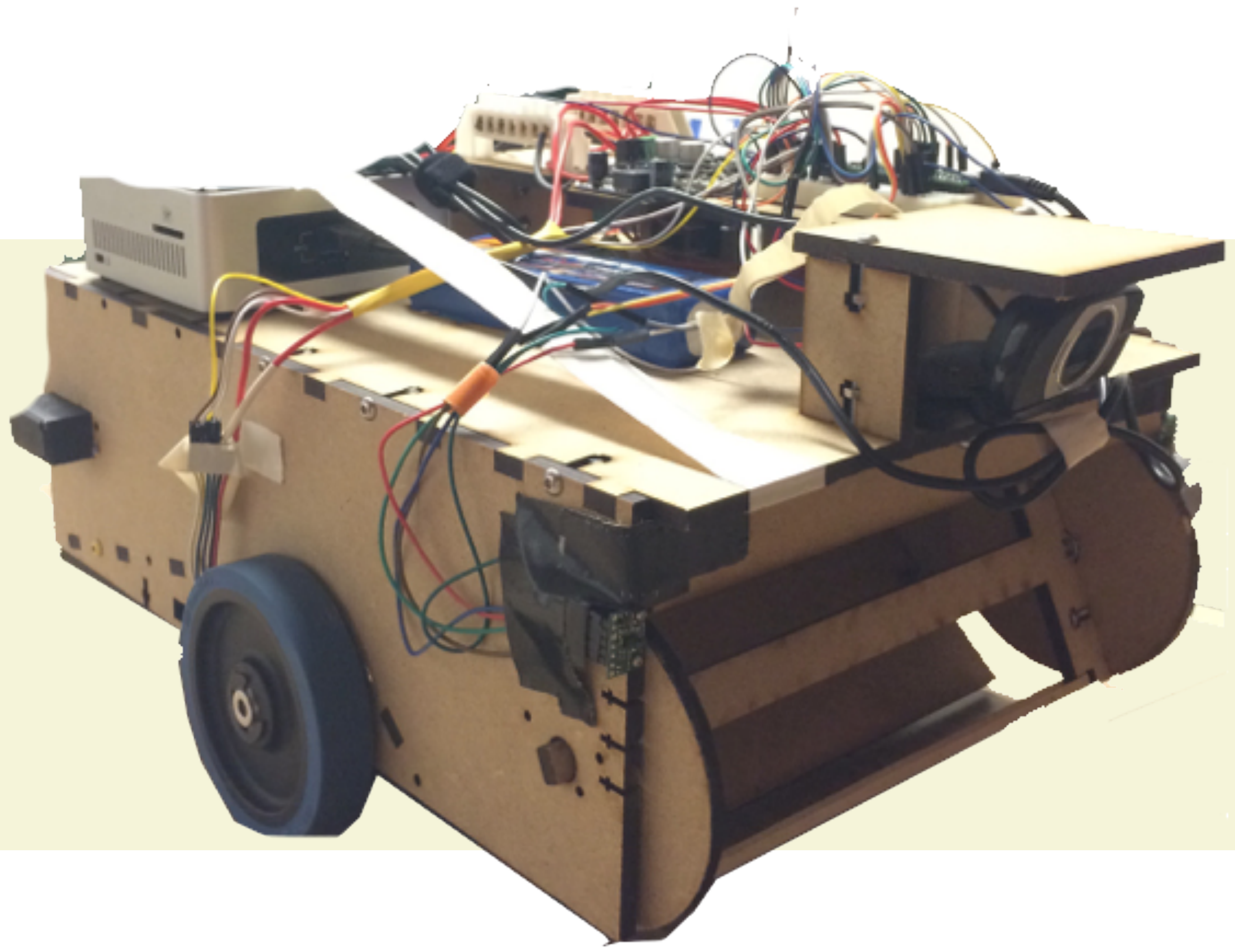
Img [8-1]
3D CAD model for teeth and Shark Splash overall model.



Img [8-2]
First works-like model of Shark Splash developed by Danny Gelman and me to mimic the functionality of the toy.

In terms of the mechanical component of the project, I was responsible for **developing the teeth push and release mechanism** where I made small pockets for each tooth, nested within the base, and used bendy polystyrene to allow the teeth to flexibly be pushed down, and then pulled up for resetting. I also **created the green foam mold** for the toy through sanding, and the final upper mouth piece of the shark. As for the electrical engineering component of the project, I was in charge of **making the primary circuit connections** (unsoldered iteration) and integrating the resistors, transistors and fuses. I also wrote code using Arduino for our first works-like model of the toy, where we used an electrical water gun connected to four external buttons to mimic the functionality of Shark Splash. I **randomized the buttons** such that any of the four buttons could potentially splash water once pressed if one of them happens to be the trigger tooth.

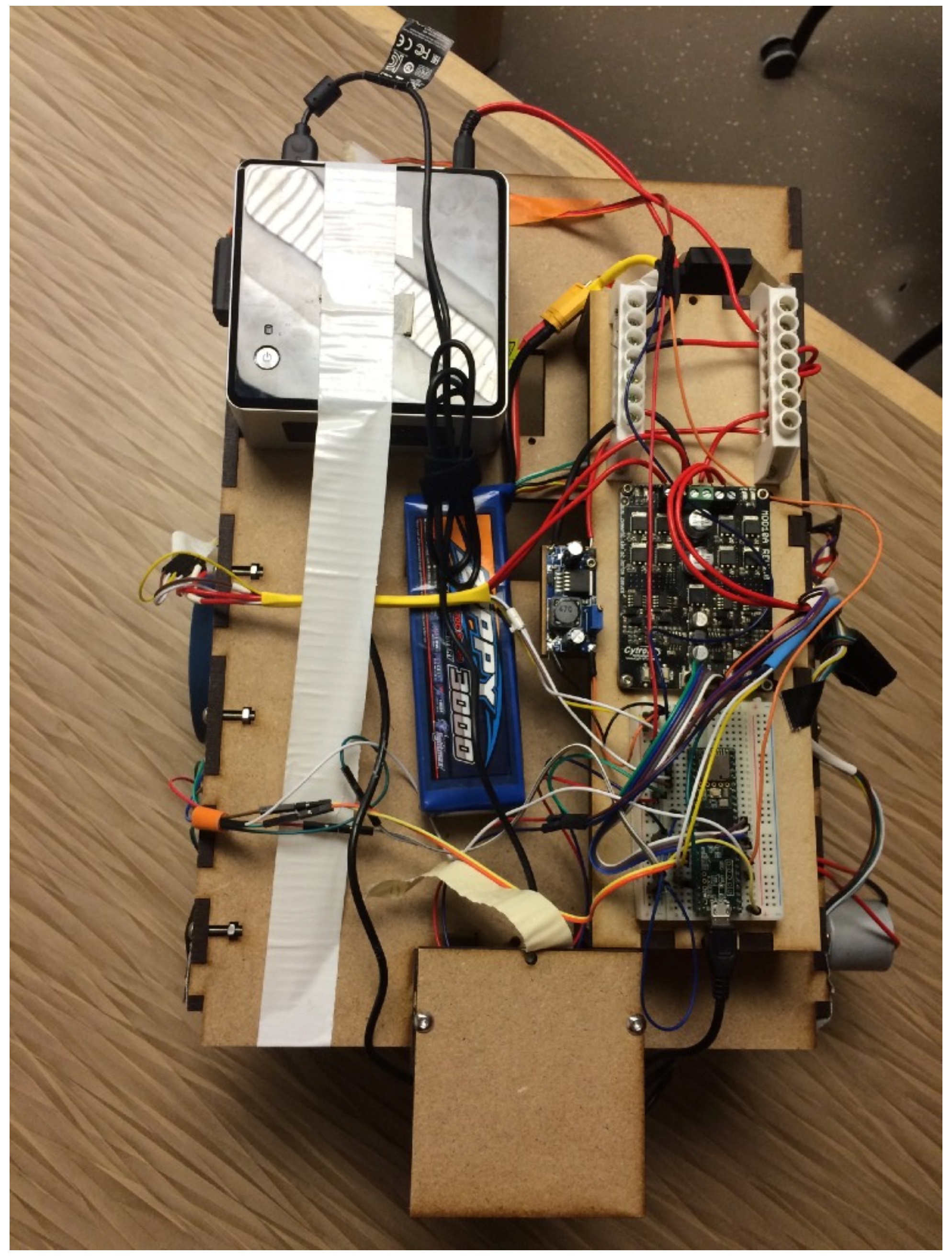
Img [8-3]
Shark Splash splashing water at team member, Katie, when she pushed down the trigger tooth at final presentation.

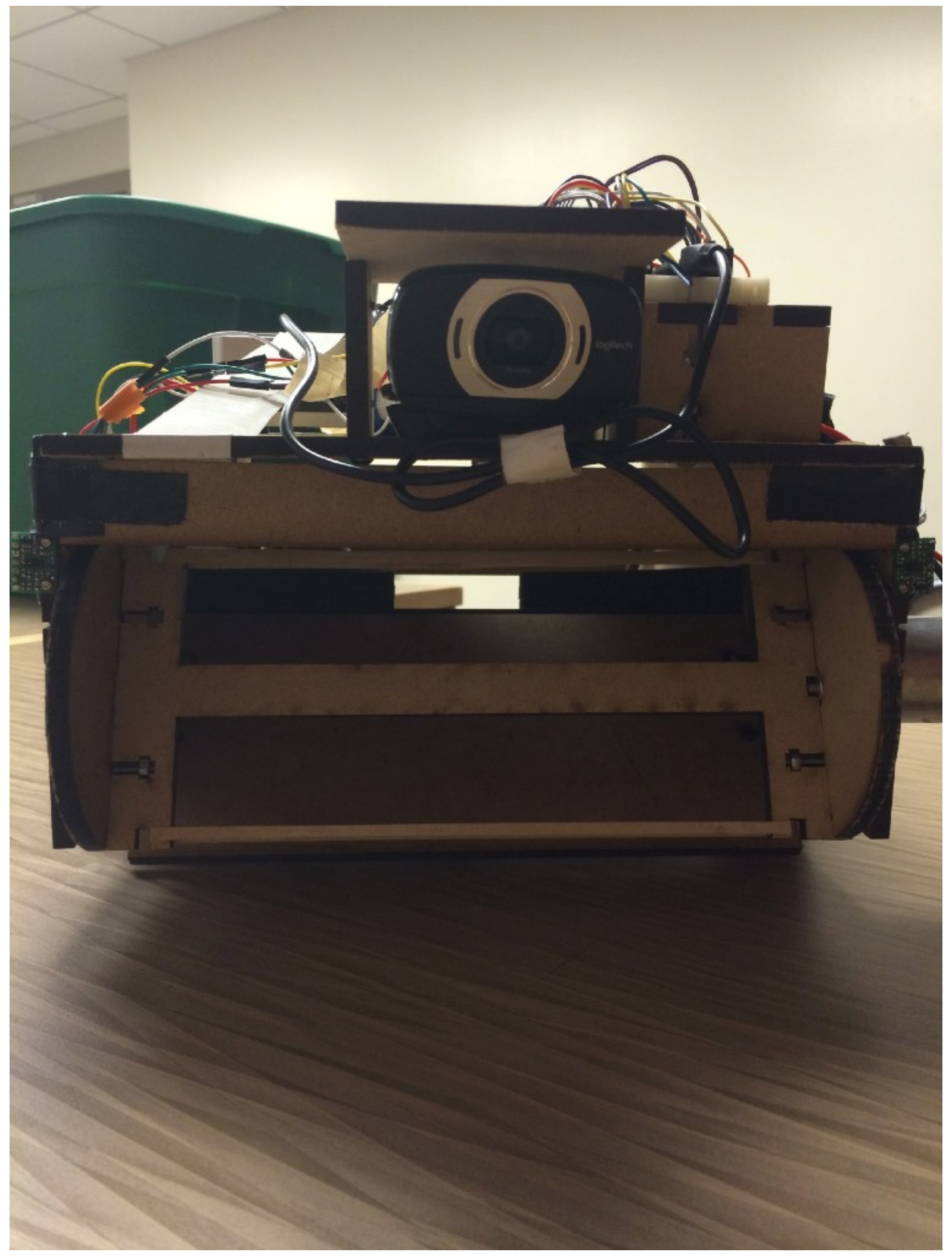


BALL-E

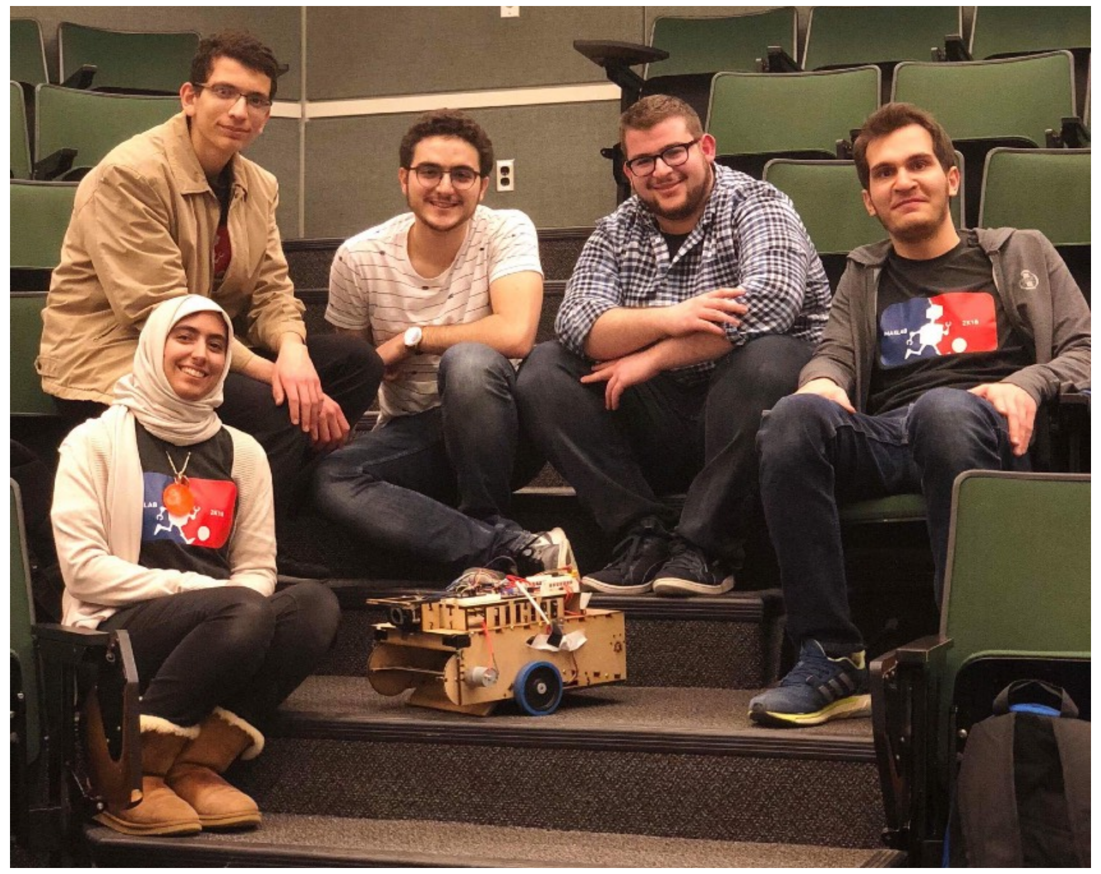
The Mobile Autonomous Systems LABoratory competition is an autonomous robotics competition held at MIT. During MASLAB, I worked in a team of five to design an autonomous robot. Our team's robot is named Ball-E, after the robot "Wall-E", because it is capable of autonomously collecting colored balls, sorting them according to color, and pushing them into goals while avoiding walls. Our team won first place during the mock competition, but placed 4th (out of 8 possible positions) because our time of flight sensors (distance sensors) crashed.

I was mostly responsible for the **electric engineering component** (wiring, supplying needed voltage through step-down converters, soldering, adding pull-up resistors where needed) of the robot, as well as **writing code for the RGB color sensor** (to enable ball sorting). My code was written through the Arduino interface (C++/C), and I had to conduct a number of tests before acquiring accurate readings for red, blue and green colors at reasonable distances.





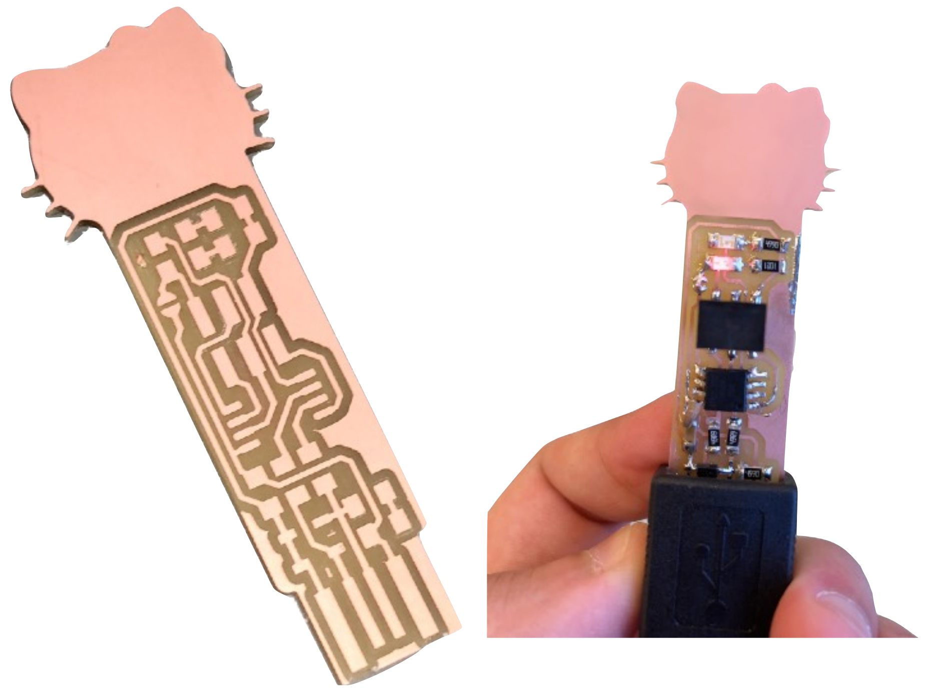
Img [8-1]
Team robot: Ball-E top view and front view. The camera shown in the picture is connected through USB to a NUC where computer vision code (through OpenCV) is used to detect colored balls.



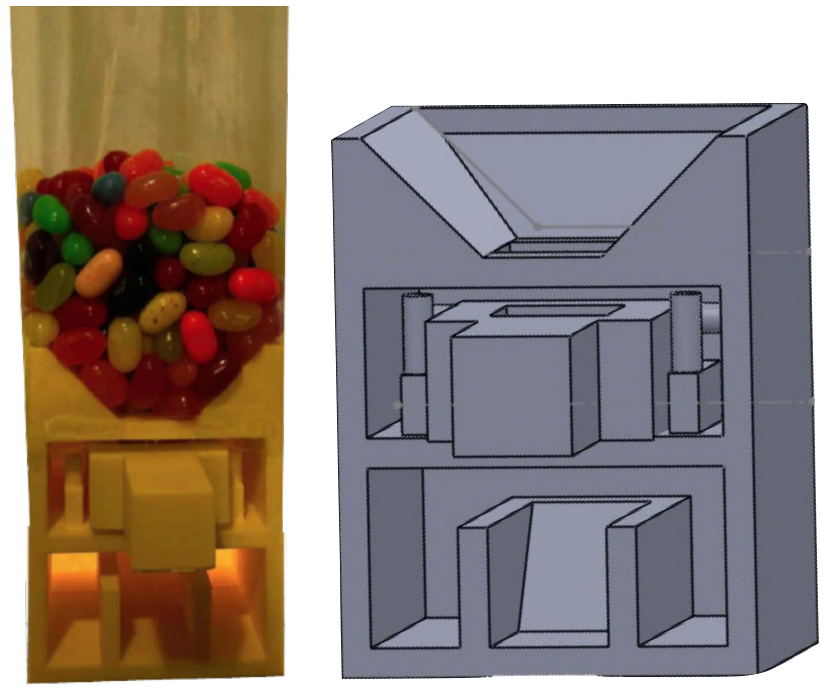
Img [8-2]
Team photo at Final Competition

Team Members: Amro Alshareef, Enes Kocabey, Fayed Ali, Ihssan Tinawi, Marwa AlAlawi.

Miscellaneous Maker Projects



Img [9-1]
Functional Printed Circuit Board USB used for programming other microcontrollers.

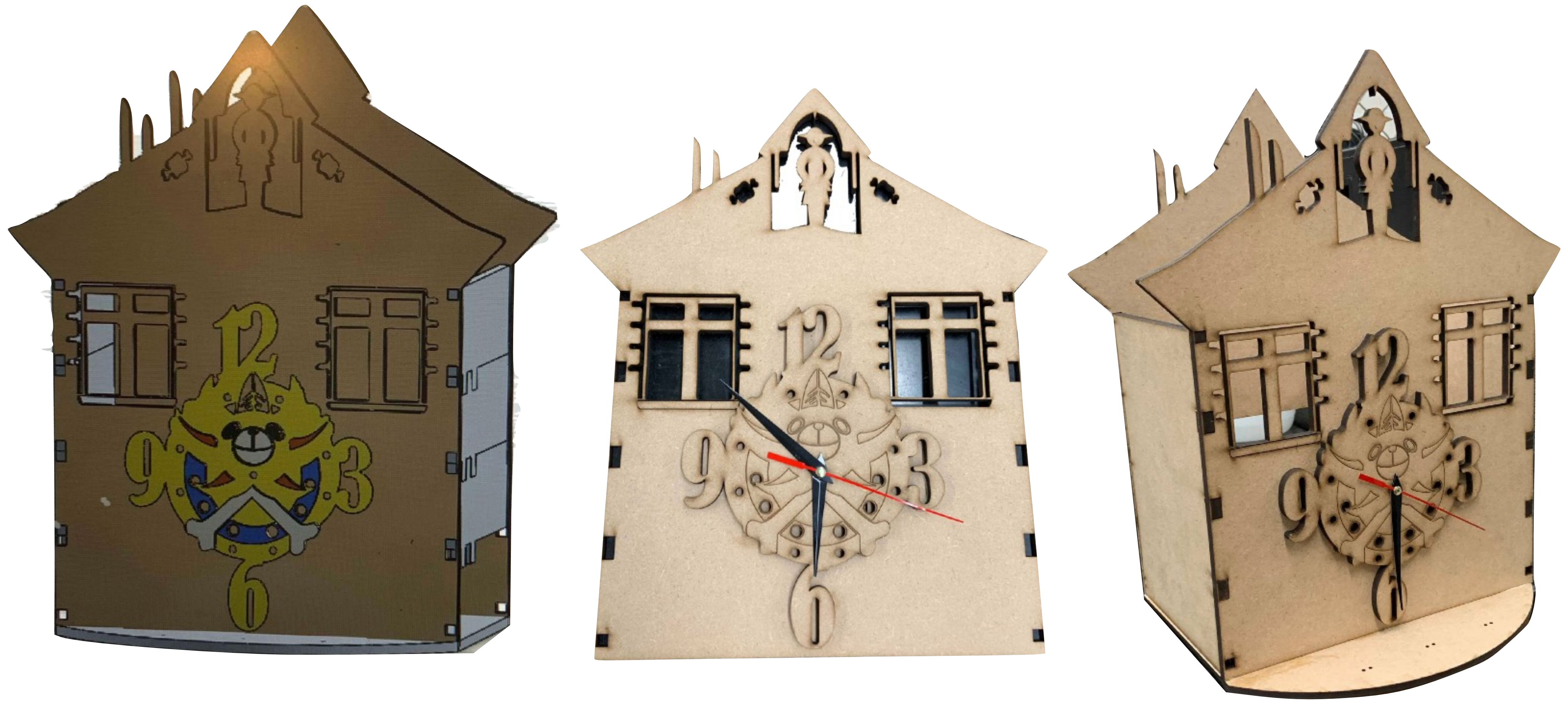


Img [9-2]
3D printed candy dispenser. Inner mechanism includes two springs for recoiling purposes.

Img [9-3]
Original mold design of original comic characters. Positive mold made by wax and CNC. Negative mold made using food safe resin.

Img [10-1]
Original design of palm tree bookshelf. Manufactured using OSB wood and Shopbot.

Img [10-2]
Lasercut baby cradle for giveaway.



Img [10-3]
One Piece anime themed clock and book organizer.

Virtual Reality

Img [11-1]
Graphic for the game I developed with GREE. Game title is "Tsuki no Ookisa wo Kanjiyou", which translates let's experience the size of the moon.

Virtual reality educational game created at GREE Japan as part of my 10 week internship using Unity and HTC VIVE. The game was developed for a joint VR exhibition/ gaming attraction (Arienai Lab) between GREE and Japan's aerospace company, JAXA. The theme of the exhibition was around the moon, and the purpose of the exhibition was to educate Japanese children about certain aspects of the moon. Aside from game development, I voice acted a game character's role, Maru, in Japanese.

Img [12-1]
Game played at Arienai Lab

Img [12-2]
Logo for the Moon Kidsworkshop attraction, which the game I developed was featured in.

「月面キッズキャンプ」ワークショップ内容

感じて知る月面VR体験「ありえなLAB」

グリーは2018年より"ありえない"実験を先進技術を用いることで実施可能にする体感サイエンスツアー「ありえなLAB」を開催し、たくさんの子どもたちにVRを活用した月体感学習の機会を提供しています。月面キッズキャンプでは、地球と月では環境がどう異なるかについてVRで体感しながら学習してもらおうと、4種類の学習コンテンツをご用意しました。

（1）月ロケットツアー ～ 月の大きさを感じる旅へ！～

ヘッドマウントディスプレイを装着しVR空間に入ると、そこには宇宙に向かうジェット機が待っています。ジェット機に乗りながら、月と身近な物の大きさを比べることで月の大きさを体感することができます。 体験時間：約15分 対象年齢：7歳以上

Img [12-3]
Article about the game featured in Japanese website.

Img [12-4]
Group photo with co-workers and supervisors during last day of internship.

"Ryou Oniisan"

Visual Novel Game

Ryou Oniisan is a visual novel game based developed by Marwa AlAlawi, Brianna Ignibosun, Muntaha Sultan. The game revolves around the story of Ryou, an aspiring manga artist who finds two orphaned siblings, Maru and Kou, and takes them in.

During this project I have taken the following roles: **Logo design, UI design, game script writing and storyboarding, coding (with Unity), animation creation, inking and coloring of all character art and cutscene graphics, and managing overall project.**

Img [13-1]
Screenshot of Ryou Oniisan game (scene 1-1)

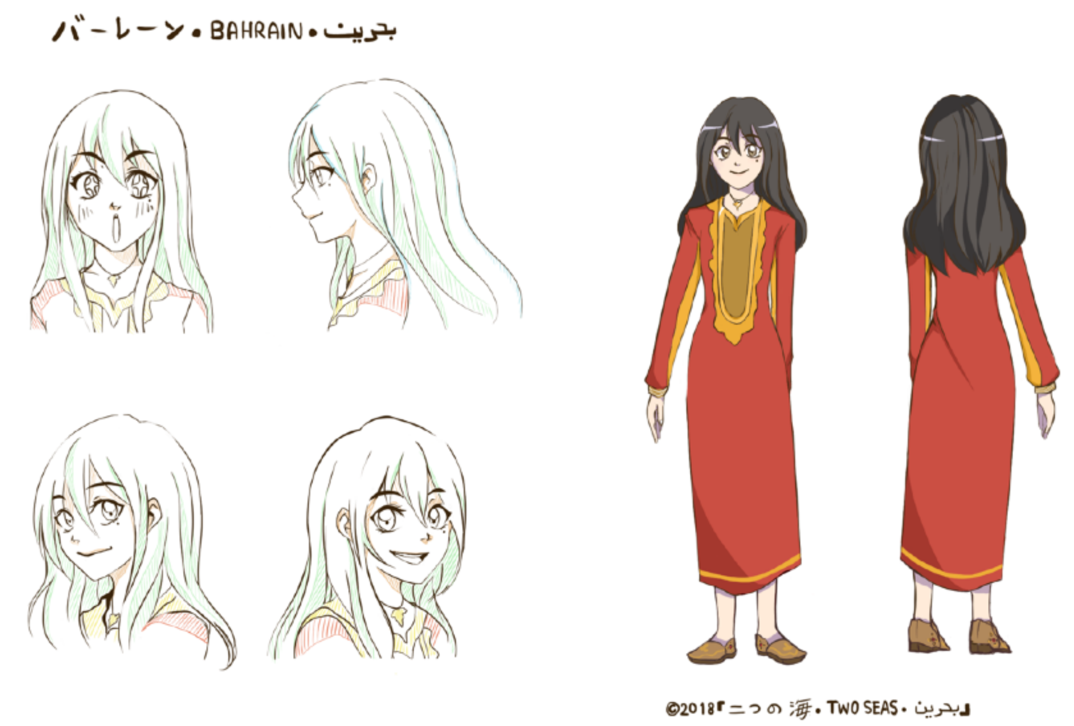
Img [14-1]
Compilation of selected character art (Maru)

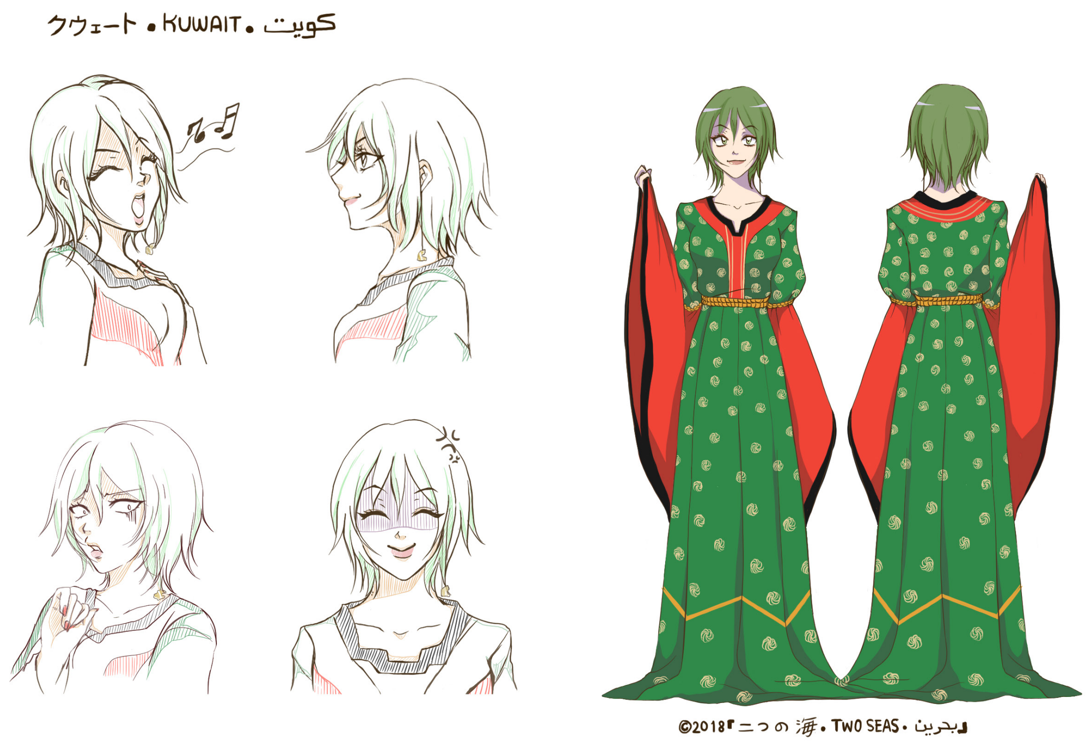
Img [14-2]
Compilation of selected in-game cutscene graphics

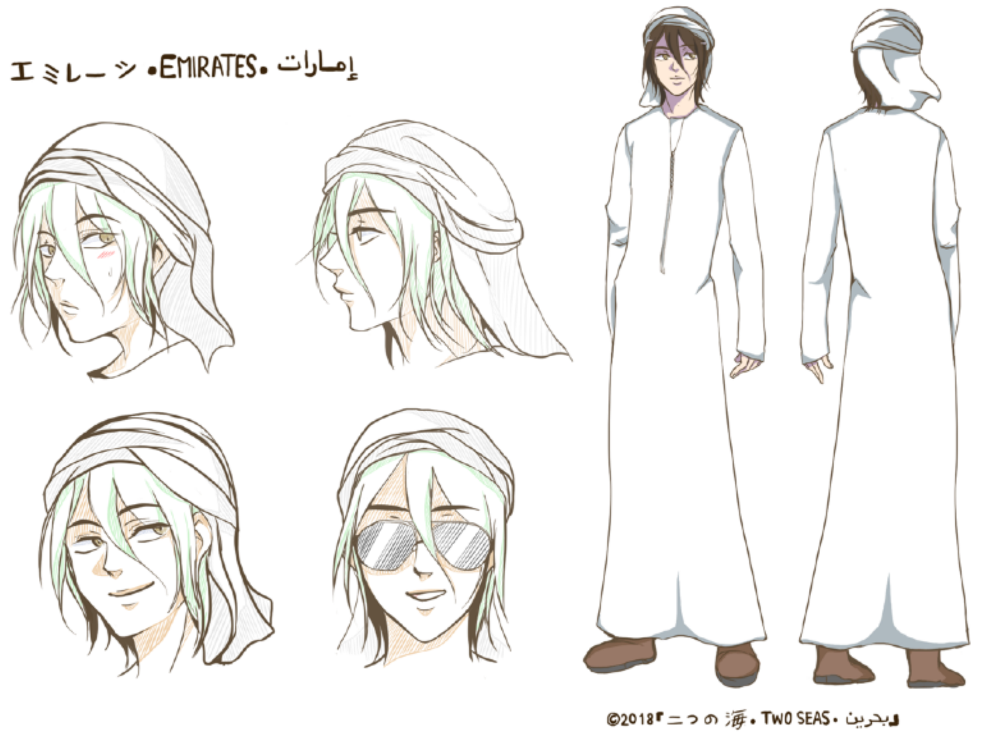
08

| ART

Digital Art







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