MARWA ALALAWI

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YEAR: 2020
MONTH: September

“HELLO WORLD! I AM MARWA,”

and I am very passionate about problem solving and design. I love being in creative environments, especially those at the intersection of human-machine interaction and experience design (2D and 3D). With my discipline in mechanical engineering, and my experience in XR development, I hope to expand on the field by bringing the digital closer to the physical.

Outside of academics, I am a professional commissioned illustrator, comic artist, and animator.

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KEYWORDS: Mechanical Engineering, Experience Design, Art, Animation

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A mechanical beehive system eliminating heavy box lifting from beekeeping

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Design for virtual and physical stage for MIT 2.s009 theme reveal

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Design of theme reveal costume for Professor David Wallace for MIT 2.s009 theme reveal

ANIMATION

Compilation of 2D animations for clients, video games, and hobby

ILLUSTRATION

Compilation of 2D art (raster and vector)

KANKAN

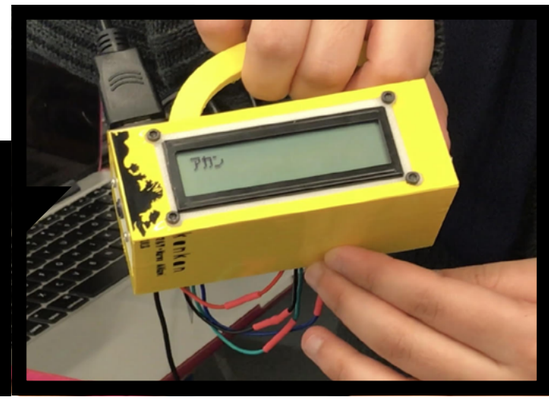
"KanKan" is an individually built device, from scratch, to aid Japanese language learners like myself through converting Japanese Kanji charcaters to Japanese Katakana characters. KanKan utilizes Optical Character Recognition by taking pictures of the printed Japanese kanji text, and returns on an LCD screen the same word but expressed in the phoneticized Katakana Japanese characters . For this product, I used a combination of the Tesseract OCR platform, a PCB designed by me including an ATMega, a RPI, a RPI Camera Module, and an LCD screen. The primary computer language used for coding was python, and I used it primarily for the OCR manpulations as well data refinement of Japanese XML datasets. KanKan was displayed and live demoed at the MIT Media Lab, and received the praise and recognition of Media Lab Professor Neil Gershenfeld.

FULL DOCUMENTATION

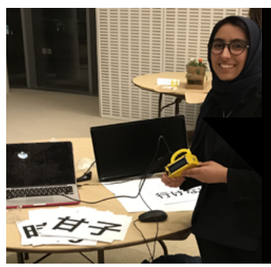
Read the full documentation of my fabrication journey of KanKan on my FabLab website: http://fab.cba.mit.edu/classes/863.18/EECS/people/marwa/FinalProject

CONVERTED TEXT DISPLAY

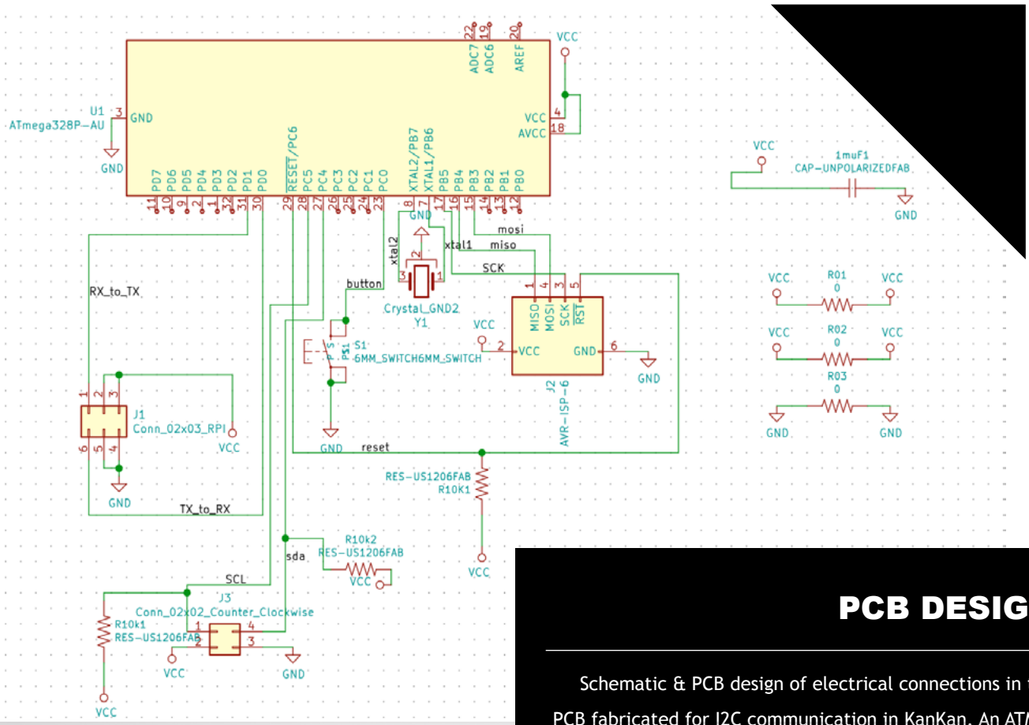
Japanese Katakana text displayed on LCD screen. RPI camera captures printed Kanji text, then OCR converts printed text to digital text that is looked up in XML dataset



TESTING IN LAB

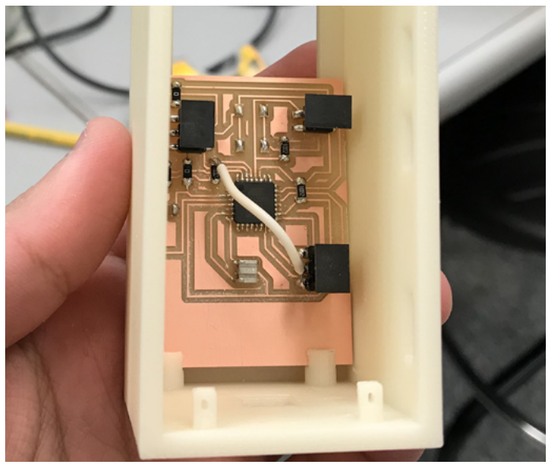


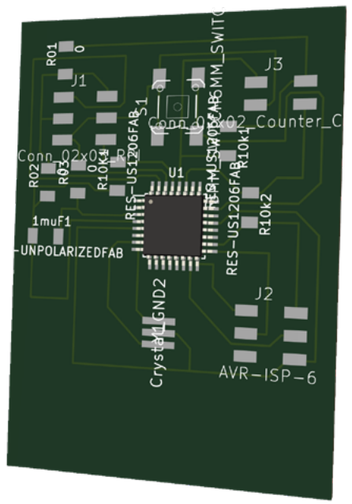
DEMO AT MIT MEDIA LAB



PCB DESIGN

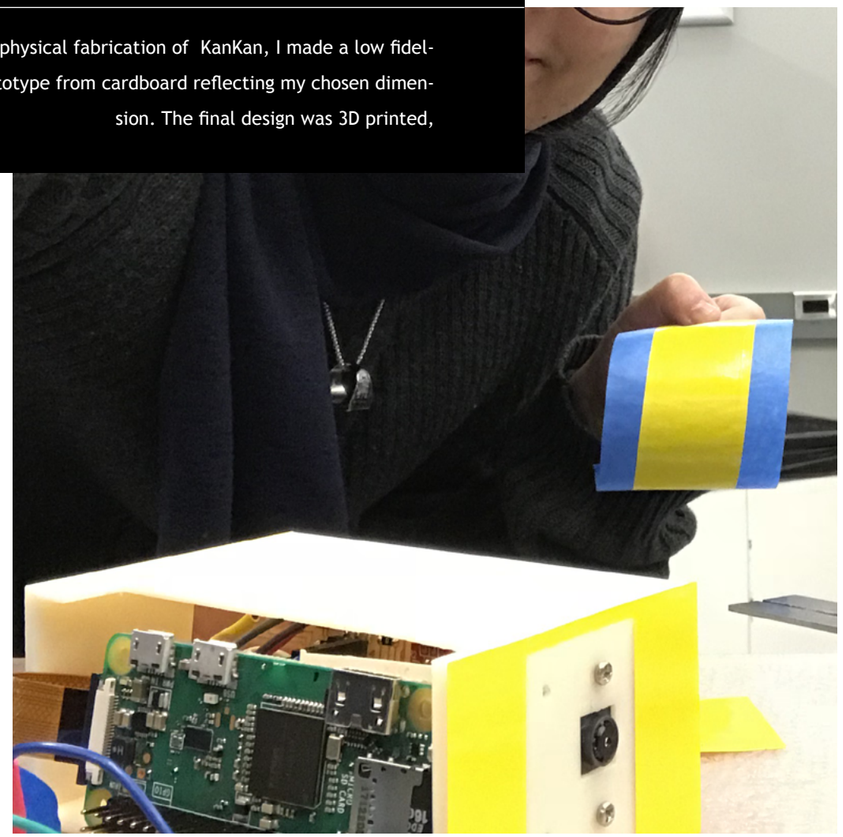
Schematic & PCB design of electrical connections in the PCB fabricated for I2C communication in KanKan. An ATMEGA was used.

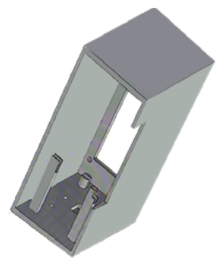


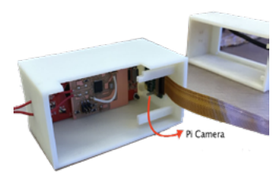


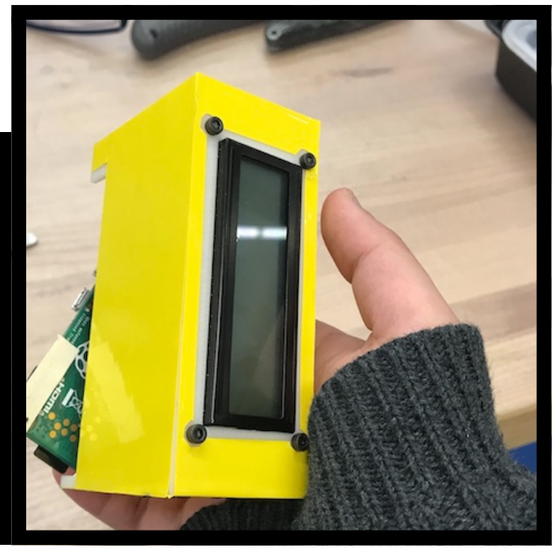
FORM & PROTOTYPING

Prior to physical fabrication of KanKan, I made a low fidelity prototype from cardboard reflecting my chosen dimension. The final design was 3D printed,





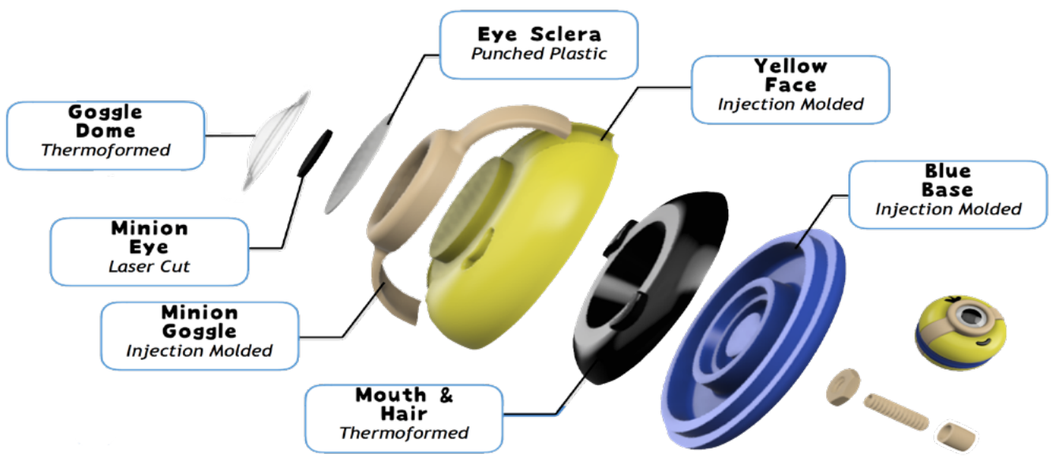




MINION YOYOS

Team Members : Marwa AlAlawi,Benjamin Gutierrez, Lily Mueller, Jonathan Sampson

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 face of the yo-yo (see diagram). Designing this part proved trickier than the other yoyo parts because it interfaces with both base goggle. Hence, needing to adjust mold design dimensions according to plastic shrinkage percentages for both post injection molding. (Other tasks included laser cutting, punching, thermoforming and milling other molds).



BLUE BASE

Injection molded piece of 5 degree draft angle and 1.5% plastic shrinkage

MOUTH & HAIR

Thermoformed piece based on 3D printed die

YELLOW FACE

Injection molded piece of 5 degree draft angle and 3% plastic shrinkage

MINION GOGGLE

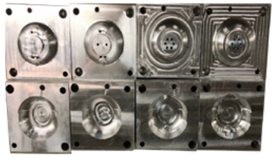
Injection molded piece with 1.5% plastic shrinkage

SIDE VIEW

Side view of yoyo, showcasing the screw bolt

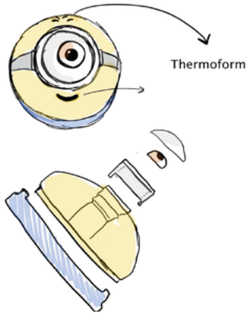
FRONT VIEW

Front view of yoyo showcasing the sclera (thermoformed) and the eye pupil (lasre cut)



MOLDS

Molds iterations (cavity and core) for the yellow piece. Different mold designs were created to account for plastic shrinkage since the yellow part inerfaces withe the blue base and goggle



SKETCH

Initial draft sketch of minion yoyo showng number of parts to be man-ufactured

50 MINIONS READY

After injection molding ,thermoforming and laser cutting 50 pieces of each of the yoyo compoenents, the yoyos were assembled by my team members and I

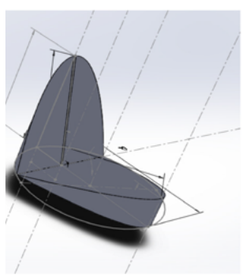
SHARK SPLASH

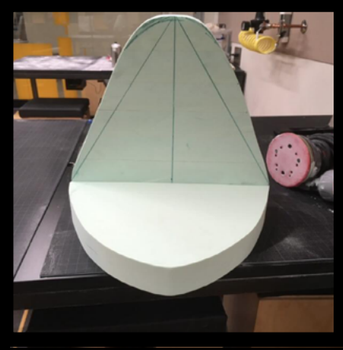
Team Members : Marwa AlAlawi, Danny Gelman, Katie Henshaw, Shannon Hwang, Jake

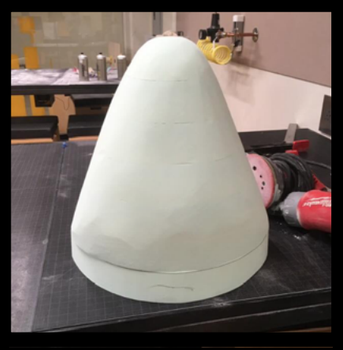
2.00b is an introductory mechanical engineering class at MIT. In 2.00b, a team of around five students collaborate for a whole semester to build a functional toy from scratch.

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 teensy 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.

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.







GREEN FOAM MOLDS FOR THERMOFORMING

Making of Shark Splash upper and lower mouth by creating green foam mold to use for ABS plastic thermoforming.

SHARK SPLASH IN ACTION

Shark splash splashing water at team member Katie upon pressing of trigger tooth

ARIS

Team Members : Ben Bennington, Caroline Jordan, Devon Goetz, Fiona Mckellar, Gabe Li, Hector Castillo, Jason Ai, Kevin Zheng, Kiera Gavin, Lucy Milde, Marwa AlAlawi, Neel Das, Raymoung Tse, Sam Ihns, Serena Le, Val Hunter, Valerie Muldoon

2.009, also known as Product Engineering Processes, is a capstone senior project class for mechanical engineering students at MIT. In my team of 17 students, we worked on creating Aris, a mechanical beehive system that eliminates heavy box lifting from beekeeping. In traditional beekeping that uses the langstroth hive, boxes are placed in a vertical orientation that align with bee natural activity and comfort. A hive would typically have 4 boxes on average, with the bottom two (brood boxes) housing the bees, and the two upper boxes carrying the honey. The problem arises in routine checks that beekeepers perform that in order to check the two bottom brood boxes (which weight significantly less) but are in the bottom, and would require the lifting of the heavy upper two boxes which carry honey. This is where Aris comes in. It's a mechanical system that utilizes the concept of a four-bar linkage, and allows the boxes in the hive system to separate for easier hive access.

3D ANIMATION

I used the Unity Game Engine to come up with beautiful animations for our team's product during our product pitch. I applied materials and converted our Solidworks model to a format that is animation friendly to use in Unity

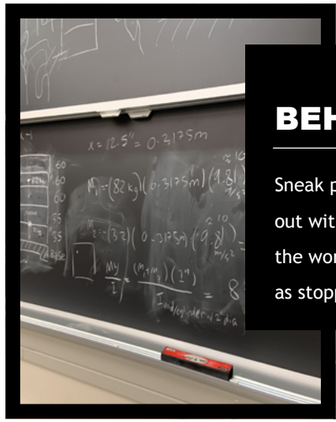
PITCHING

2.009 requires coming up with different product concepts. The picture here showcases my pitch on stage for one of our prototype product concepts "Port-a-pil" a smart portable pill carrier

ALPHA PROTOTYPE

Our alpha prototype presented at the 2.009 final presentatons in front of an audience of 110

fter coming up with different project concepts and researching them in terms of feasibility and market saturation, our team settled on creating Aris for our capstone project. I mostly worked on the mechanics and materials part of the project, where I performed several tests and calculations on failure modes, maximum loads, material selection, and determining dimensions of manufacturable parts aside from actual fabrication of the box holders. In addition, I designed the brand identity of Aris from logo to several graphics in the course, including the 3D animation shown in our final presentation (I used Unity for the animation).



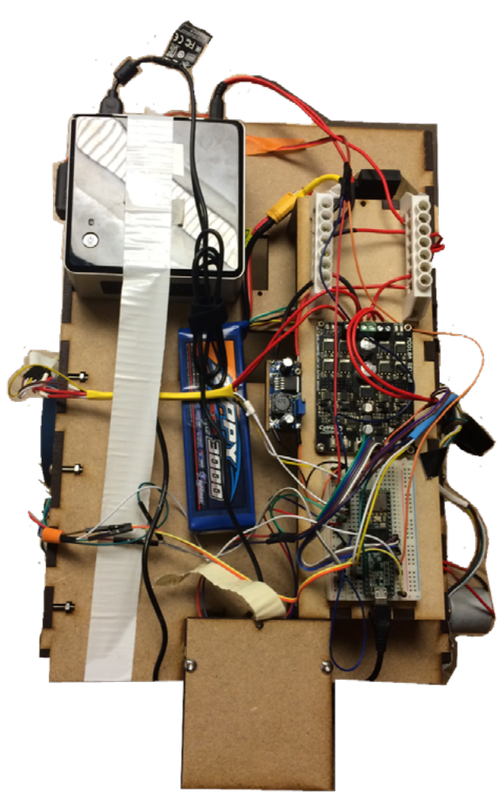
BEHIND THE SCENES

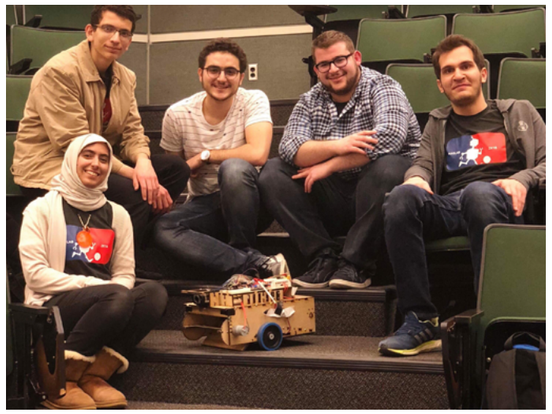
Sneak peaks from load and failure analyses that I carried out with my subteam of 2, as well as our alpha prototype in the works. Here we were experimenting with using cables as stoppers

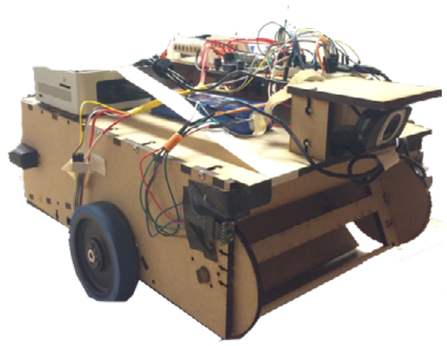
BALLE

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

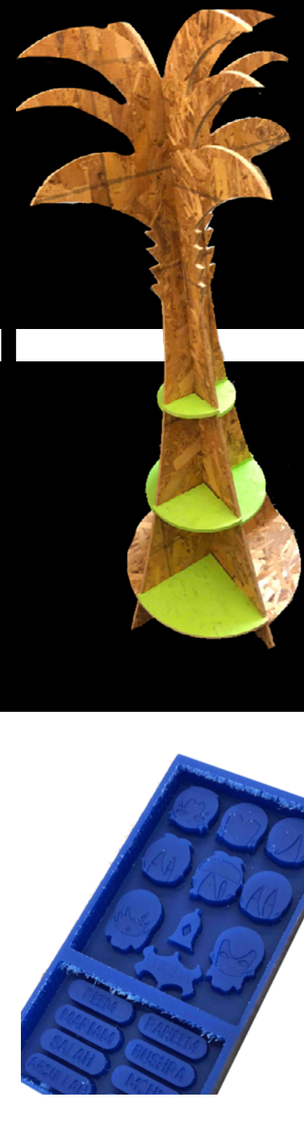
The Mobile Autonomous Systems LABoratory competition is an autonomous robotics competition held at MIT. During MASLAB, I worked in a team of five to design an autonomous robot. Our team's robot is named Ball-E, after the robot "Wall-E", because it is capable of autonomously collecting colored balls, 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 IDE, and I had to conduct a number of tests before acquiring accurate readings for red, blue and green colors at reasonable distances.

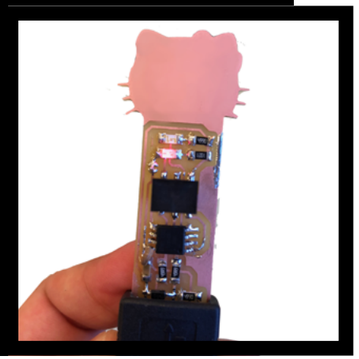




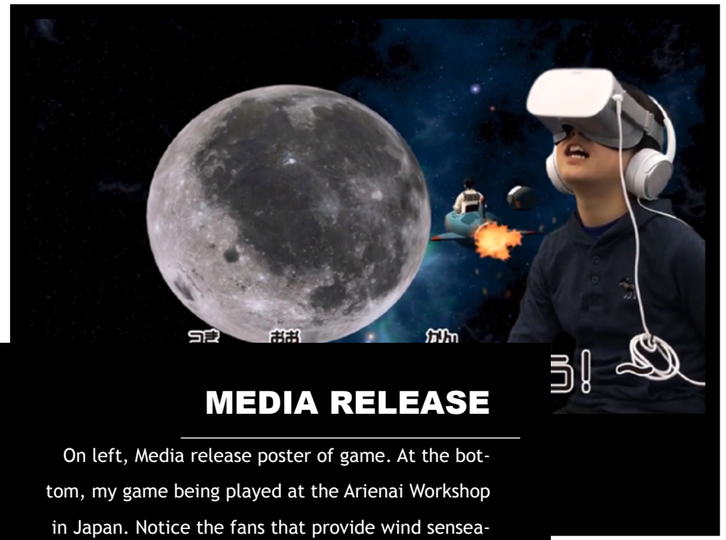


MAKER PROJECTS





VR: LET'S EXPERIENCE THE SIZE OF THE MOON



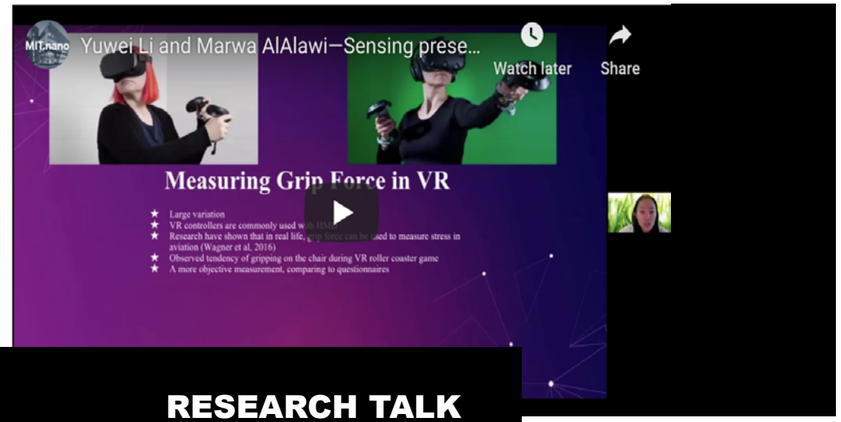
MEDIA RELEASE

On left, Media release poster of game. At the bottom, my game being played at the Arienai Workshop in Japan. Notice the fans that provide wind sensation for the journey on the rocket.

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..

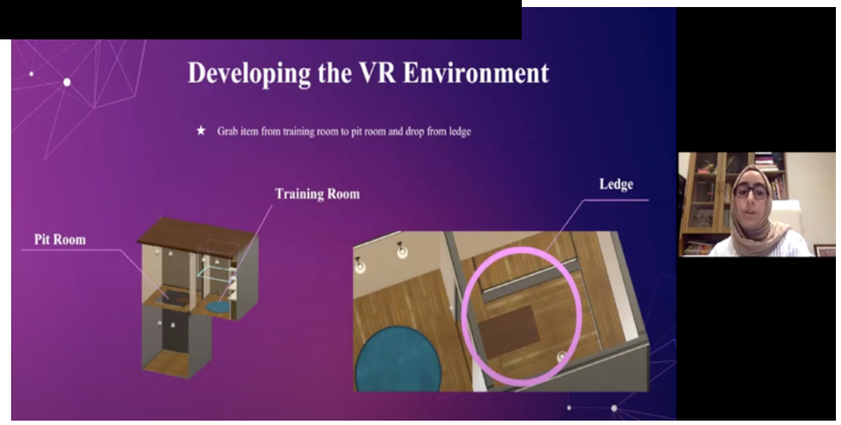
VR: DESIGN FOR USER PRESENCE EXPERIMENT

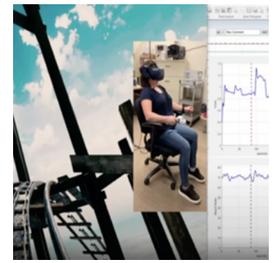
Worked on yearlong User Presence research at Device Realization Group at MIT along with graduate student Yuwei Li. Our research focused on the design of VR environment for physiological measurement in VR using grip force. Involvement resulted in undergraduate SB thesis and research talk at MIT Nano Sense Talks. Around 80 people attended talk virtually. Human testing halted due to COVID-19

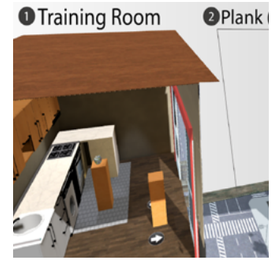


RESEARCH TALK

Watch the full video of my research talk as part of MIT Nano Sense Talks : https://youtu.be/-







GAME DEV: RYOU ONIISAN

Team Members : Marwa AlAlawi, Brianna Igbinosun, Muntaha Sultan

Ryou Oniisan is a visual novel game based on a webcomic created in 2015 by instagram artists Marwa AlAlawi (Bahrain), Budoor Al Mahri (United Arab Emirates), and Muntaha Sultan (Saudi Arabia). 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: Project Management, Overall game design and meachanics, UI/UX design, In-game Script Writing and Storyboarding, C# Coding (with Unity) for dialogue and minigames, Animation Inking and coloring, Inking and Coloring of all in-game character art and cutscene graphics, Minigame Pixel Art Creation. The Game is still ongoing development and will be availbale on Steam for downaload once completed.

CHARACTER SPRITES

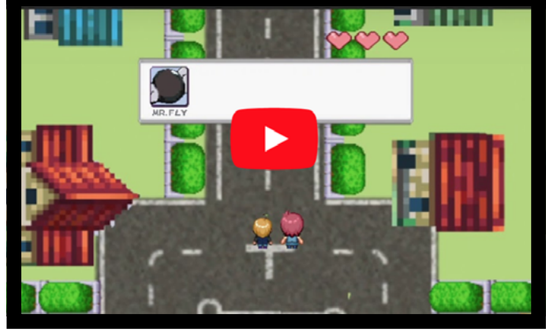
Compilation of selected character art (Maru). Muntaha Sultan was the lead on drafting the character expression sprites, while I corrected the sketches, inked, and colored them

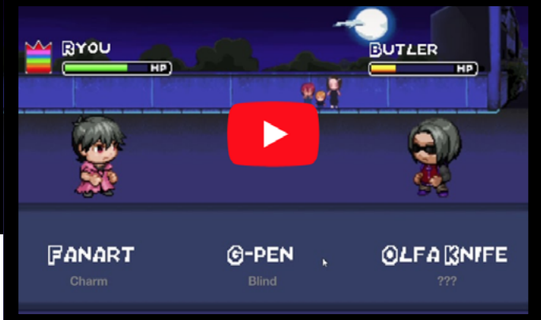
GAME LOGO (AR)

Arabic logo of game designed by me in Adobe Illustrator

SPEECH UI

Current iteration of game's speech UI



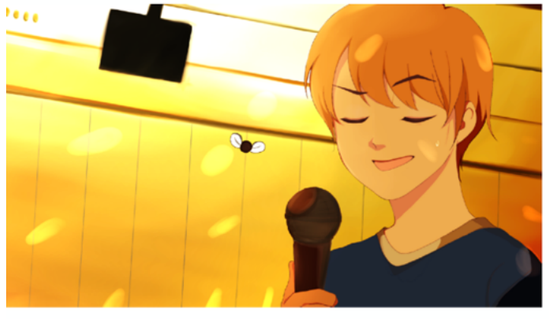


MINIGAMES

Our visual novel games has 6 minigames in total. Find teasers of three of them here: malalawi.github.io/MarwaAlAlawi/game.html

CUTSCENES

Compilation of some cutscene graphics from game.



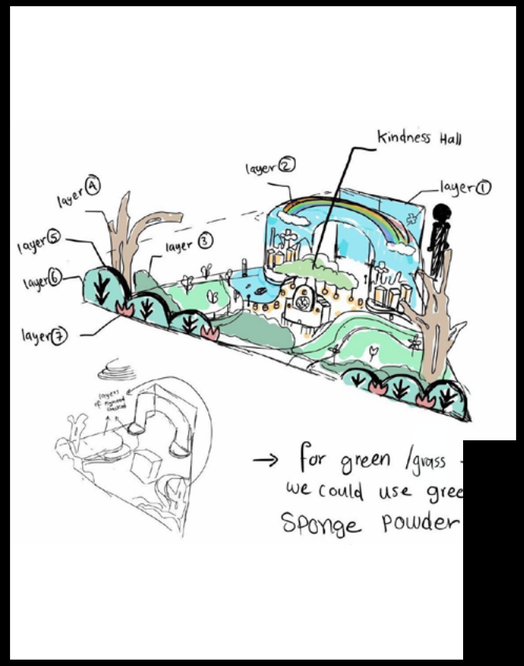
STAGE DESIGN

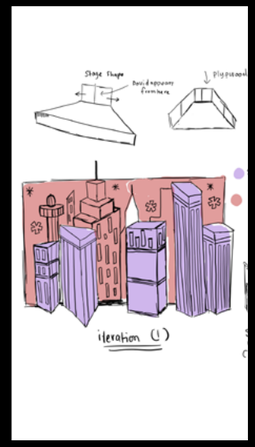
Team Members : 2.s009 Staff, ICE9 Productions

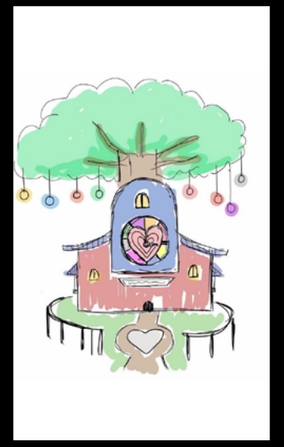
As part of my part time job as a lead creative for stage, costume, and animation design for the MIT class 2.s009, I came up with the concept for the class's theme world "Kindtopia". The stage I designed for the virtual theme reveal was then used by ICE9 Productions to create the 3D version of the stage. Additionally, at the first stages of brainstorming and possibility of a physical stage at the MIT Killian Court, I was in charge of coming up with the design of the physical stage. However, we were not given permission to do that on MIT campus due to COVID restrictions, and opted for a virtual theme reveal.

KINDTOPIA

On top: the 2D Kindtopia design I created and drew for our theme reveal 2D animation and transtion to 3D virtual theme stage. At bottom: 3D iteration of my 2D stage design as rendered by ICE9 Productions. I created the illustrator file that ICE9 used for their 3D modelling, based on my 2D stage design.







STAGE DESIGN

Early itertions of the physical stage design (designed by me). The idea was to cut layers out of plywood by a CNC

VIRTUAL STAGE

3D stage rendered by ICE9 Productions

COSTUME DESIGN

Here goes the description of the series. What it is about, or the place where you take this photograph. Anything you consider correctly. Offictis adist lacea asi tempore ped millam exerat. Ferchil et asitio mil imperat facesequatia velestia doluptas dolupie ndigene sectiis re offictur.Ignit alibusa eprese-quiae doloreh endelestem. Itatum ventia dolores dit recearum qui ulpa plabore ictatio. Otatus mollaud ictinci amenis dolor minvenis pa core doloreperro .Torit quaspe

THE DESIGN

On top, sketch of costume design. Bottom, Professor David Wallace wearing the costume at the 2.s009 Theme Reveal.

GAURDIAN

Close of up costume. Design inspired by Japanaese Gundam/Power Rangers concept.

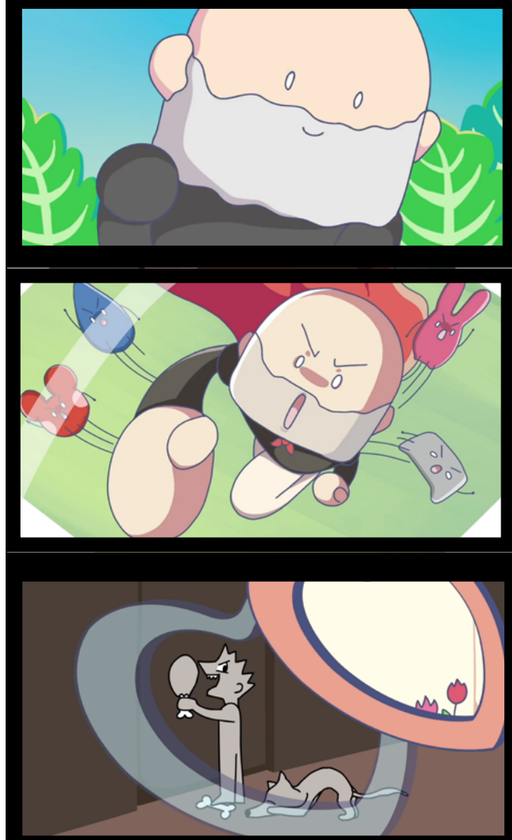
MIT MECHANICAL ENGINEERING DEPARTMENT CHAIR, EVELYN WANG, AND PROFESSOR OF MECHANICAL ENGINEERING, DAVID WALLACE

ANIMATION

2.S.009 THEME REVEAL

Animators: Marwa AlAlawi,Or Oppenheimer

Short animation made for MIT 2.s009 theme reveal. I was in charge of coming up with the storyboard, character design, color palette, key animations, as well as in betweens, coloring, and inking for half of the animated short.



FULL ANIMATION

Watch the full animation on my website: malalawi.github.io/MarwaAlAlawi/artanim

GAME INTRO

Animators: Marwa AlAlawi, Muntaha Sultan.

Animation intro for the video game “Ryou Oniisan”. I was in charge of storybaording, in between animation, coloring and inking of the frame-by-frame animated short in Clipstudio Paint.

FRAME BY FRAME

Frame by frame animation of the video game intro. A work still in progress

JUMPING ANIMATION

Frame by frame jumping animation created for the Ryou Oniisan Series using Clipstudio Paint.

HEAD TURN ANIMATION

Frame by frame head turn animation created for the Ryou Oniisan Series using Clipstudio Paint.

RUNNING ANIMATION

Frame by frame running animation created for the Ryou Oniisan Series using Clipstudio Paint.

ILLUSTRATIONS

PRODUCTS

Vector graphic designs with Adobe Illustrator made for personal brand Sakura. Poduct illustrated below is baby milestone cards. r

MARWA ALALAWI
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RESUME: malalawi.github.io/MarwaAlAlawi/cv
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