

MAGIC 2015-2016

End of Year Presentations

June 17th, 2016



Agenda - I

- **Julia Georgi** - Astrophysics, Exoplanet discovery program in Python
- **Marina Lee** - Application in Python to teach math
- **Cassandra Avila** - Girls Can Too campaign and information box
- **Joon Luther** - Electronic simulation of wilderness with Arduino, sensors, and plants
- **Lauren Taylor** - Travel website to document her journeys, using HTML, CSS, and JavaScript
- **Wynna Huang** - Hangman game developed in Python, with graphics.py library
- **Morgan Conner** - 3D animation (living room) built with Maya
- **Purva Joshi** - JavaScript game for a digital learning curriculum for dyslexic students



Agenda - II

- **Samantha Serrano** - Tic Tac Toe, Mad Libs, and Battleship games in Java
- **Diana Nguyen** - Personal website using HTML, CSS, and JavaScript, hosted on GitHub
- **Vasundhara Sengupta** - Cross-platform mobile application called MediAlarm, using Cordova (allows for mobile development with HTML, CSS, and JavaScript)
- **Kristina Mkrtchyan** - 2D puzzle platformer game, using Unity and C#
- **Esmeralda Leon** - Building catapults, making rock candy, and extracting caffeine from black tea
- **Iris Cheung** - Website for Jujubees Crafts, using HTML, CSS, PHP, and jQuery animations
- **Kim Ngo** - Ruby Goldberg machine using Legos Mindstorm EV3, Sphero, and a ping pong ball



Julia Georgi

6th Grade

Scotts Valley Middle School, Scotts Valley



About My Mentors



My mentor from October to March was Jessica Werk, Professor of Astrophysics at University of California Santa Cruz (UCSC). Jessica Werk is now an assistant professor at the University of Washington. She studies the extended gaseous components of galaxies and the role they play in galaxy formation and evolution!



Caroline Morley, Doctoral Candidate at UCSC took over as my mentor in March after Jessica took a job with the University of Washington. Caroline studies the atmospheres of exoplanets and brown dwarfs!



My MAGICal Experience

I learned a lot about astrophysics, exoplanets and python!

- I learned about computer programming for science, physics and math.
- I wanted to expand my game programing, animation and digital drawing skills and to learn a new programming language.
- I wrote programs to simulate the orbits of Jupiter's moons.
- I wrote my project on exoplanets first in Scratch then compared my code with Python.
- I began programming with Python.



What are Exoplanets?

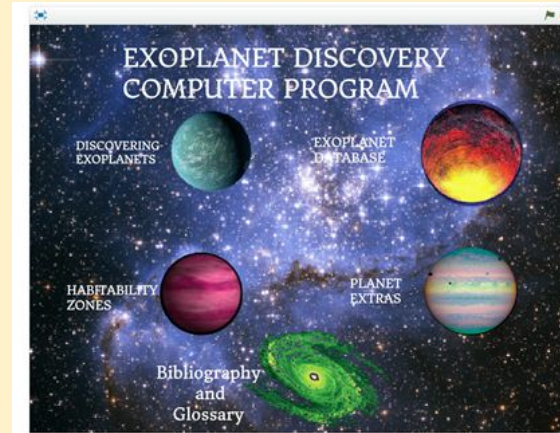
- Planets that are outside of our solar system
- Over 3000 exoplanets have been discovered!
- The biggest is nearly twice the size of Jupiter!
- The smallest is a third of the size of the earth



My Project

My Exoplanet Discovery Program has five modules:

1. Discovering/Learning
2. Exoplanet Database Search
3. Habitability Zone Calculator
4. Planet Extras
5. Bibliography and Glossary



- My program identifies possibly habitable exoplanets
- It uses the latest Kepler Space Telescope Data from NASA
- You can create millions of different search combinations



Exoplanet Astrophysics Learning Module

DISCOVERING EXOPLANETS

What is an exoplanet?
How are exoplanets discovered?
What is the habitable zone?
What is the Drake Equation?
What planets have been found?
How do we know a planet is there?
What is the Transit method?
What is the Radial Velocity method?
What is the Direct Imaging method?
What is the Astrometry method?
What is the Gravitational Microlensing method?
What is the Pulsar Timing method?
What is the Interferometry method?
What is the Spectroscopy method?
What is the Radio Astronomy method?
What is the X-ray Astronomy method?
What is the Gamma-ray Astronomy method?
What is the Neutrino Astronomy method?
What is the Cosmic Microwave Background method?
What is the Gravitational Wave method?

What topic do you want to learn? Type it's Letter.

An exoplanet is a planet that orbits a star other than our sun, in other words it is a planet outside of our solar system. Over 2000 exoplanets have been discovered. Some exoplanets are large gas planets, some are icy, some are rocky, and some are even covered in water or methane.

Click the screen to return to the menu

Radial Velocity method
As a planet orbits a star the star wobbles slightly. Telescopes can detect large planets using the wobbles.

The Transit method
The Transit method measures a drop in the star's brightness when a planet orbits in front of it.

The Direct Imaging method
The Direct Imaging method can only be used under the right conditions, when the exoplanet can be directly imaged around it's parent star.

The Astrometry method
The Astrometry method tracks a wobbling star's position.

Click the screen to return to the menu

The habitable zone around the Sun is the region where conditions are right for liquid water to exist. If we count the Sun as the only source of energy, the habitable zone looks like a ring around the Sun. Rocky planets and moons with an orbit within this ring may have liquid water to support life.

(Our habitable zone)

Click the screen to return to the menu

Stars are classified by their temperature. There are seven main types of stars. In order of decreasing temperature, O, B, A, F, G, K, and M. O and B stars are uncommon but very bright. M stars are common but dim. Most stars, including the sun, are "main sequence stars." For these stars, the hotter they are, the brighter.

Hottest Coolest

O B A F G K M

Click the screen to return to the menu

The Drake equation is an equation used to find an estimate of the number of active, communicative civilizations in the Milky Way galaxy.

$N = R^* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$

N = the number of civilizations in our galaxy with radio communication

R^* = the average rate of star creation in our galaxy

f_p = the fraction of those stars that have planets

n_e = the number of planets that can support life

f_l = the fraction of planets that develop life at some point

f_i = the fraction of planets that actually go on to create intelligent life

f_c = the fraction of civilizations that release signs of their existence

L = the length of time for which such civilizations release signals

Click the screen to return to the menu

In bubbling lakes of hot tar each gram of sticky black goo can harbor up to 10 million microbes.

The bacteria *Deinococcus radiodurans* can survive 1500 times more radioactive than humans.

Boiling underwater hot springs in the Pacific Ocean often teem with tube worms and giant clams.

The Atlantic variety is typically home to erpess shrimp and other extreme residents.

The Dead Sea is home to "halophile" microbes.

Click the screen to return to the menu

The Dry Valleys of Antarctica are so cold and dry but the soil there is full of microbes. Microbes can survive frozen for millions of years frozen in this ice within ice.

Scientists have found microbes that had been frozen for millions of years.

Hyper-salty mud on the bottom of the Mediterranean Sea, sulfuric acid that somewhat resembles polyfish sprouting from a conical shell have been found.

Scientists have found microbes floating in rocks up to several miles below the surface of the Earth in South African gold and platinum mines, as well as a mile beneath the surface, living at times with the aid of uranium.

Even the open and harsh vacuum found in orbit around the Earth, with all its deadly radiation, is now deadly enough for may night-lagged creatures known as tardigrades.

Click the screen to return to the menu

Johannes Kepler (1571-1630) was a German astronomer who worked with Tycho Brahe and corresponded with Galileo. His Three Laws state that:

The square of the orbital period of a planet "T" is directly proportional to the cube of the mean distance of the planet from the sun. In formula form: $T^2 \propto a^3$ where the orbital period "T" is the number of days a planet takes to rotate around its star and "a" is the distance from its star. I used two versions of Kepler's formula, the short version above, and the long version below:

$$\frac{T^2}{a^3} = \frac{4\pi^2}{GM}$$

Where M is the mass of the star, m is the mass of the planet, P is the orbital period, A is the distance, and G is the gravitational constant.

Click the screen to return to the menu

Annie Jump Cannon (1863-1941)
"Oh Be A Fine Guy Kiss Me"

Annie Jump Cannon developed the stellar classification system to classify stars according to their spectral types: O, B, A, F, G, K, M.

She came up with the mnemonic of "Oh Be A Fine Guy Kiss Me" as a way to help others remember her stellar classification system.

She worked for the Harvard University Observatory. She classified more stars in her lifetime than anyone else, with a total of around 500,000 stars! Her system is still used today and remains a standard method of classifying stars.

Click the screen to return to the menu

Johannes Kepler (1571 - 1630)
Kepler, for whom the Kepler Space Telescope is named, was a German mathematician, astronomer, and astrologer. A key figure in the 17th century scientific revolution, he is best known for his laws of planetary motion. His work also provided one of the foundations for Isaac Newton's theory of universal gravitation. He was hired as a mathematician by Tycho Brahe to assist in analyzing Brahe's lifetime of stellar observations.

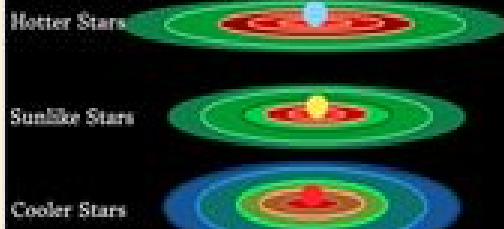
After Brahe's death, Kepler was appointed as Imperial Mathematician and used Tycho Brahe's data to develop his Three Laws of Planetary Motion.

Click the screen to return to the menu

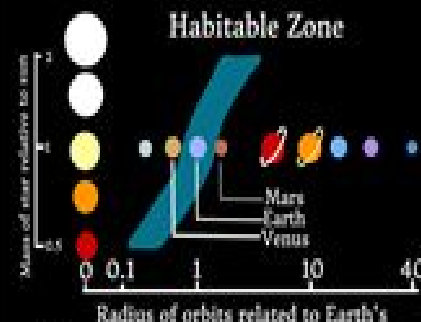
Tycho Brahe (1546 - 1601)
Tycho Brahe was a Danish nobleman known for his accurate and comprehensive astronomical and planetary observations. He was born in a part of Copenhagen, Denmark, and is now part of modern-day Sweden. Tycho was well known in his lifetime as an astronomer, astrologer, and alchemist. Tycho considered astrology to be a subject of great importance. In addition to his contributions to astronomy, he was famous in his own time due to his contributions to medicine; his herbal medicines were in use as late as the 1900s. The lunar crater Tycho is named in his honor, as is the crater Tycho Brahe on Mars and the minor planet 1861 Tycho Brahe in the asteroid belt. The bright supernova, SN 1572, is known as Tycho's Nova and the Tycho Brahe Planetarium in Copenhagen is also named after him.

Click the screen to return to the menu

Habitable Zones (green) shrink or expand according to the type of sun:



Click the screen to return to the menu



Click the screen to return to the menu

Factors that Affect the Habitability of an Exoplanet

Type of Star, Mass of the Star, Age of the Star, Luminosity of the Star, Temperature of the Star, Mass of the Planet, Gravity of the planet, Type: Gas, Rocky, or Water, Distance from its Star, Temperature of the planet, Orbital Period of the Planet, Atmosphere (CO₂, Methane, etc), Greenhouse effect, Density of the Atmosphere, Atmospheric pressure, Do Clouds Reflect Star's heat, Do Clouds Retain Planetary Heat, Degrees of Inclination (Tilted on its axis), Elliptical or circular orbit, Moons which could affect tidal forces, Age of the Planet (enough time for life to form), Proximity to Stellar Objects (Binary Stars, Black Holes, Novas, Gas Clouds)

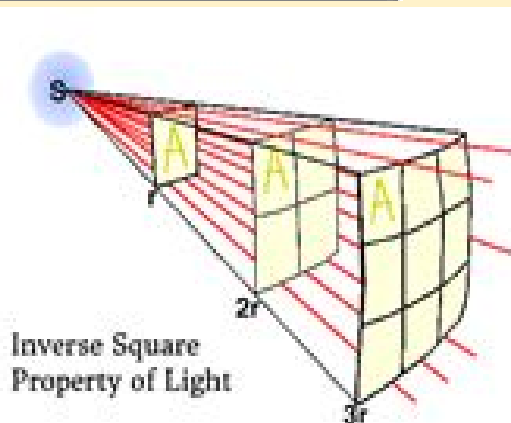
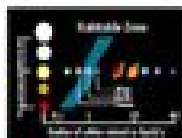
Click the screen to return to the menu

My Habitable Zone Calculations

1. Calculate Exoplanet Distance using Kepler's law
2. Divide Exoplanet Orbit days by 365
3. This equals the percent of an Earth year
4. Square the resulting percent
5. Find the luminosity of the Exo Star from Kepler database
6. Calculate percent greater or smaller of our Sun
7. Find the cube root of the difference
8. Divide by 94 million km (earth orbit) to get AUs
9. Multiply by selected min and max HZ AUs
10. Check if Exo orbit is within the Min and Max HZ
11. Check if the Exoplanet Mass is greater than .2 of Jupiter mass
12. If it is then it is likely a gas planet so Mass= Neg
13. Check if Exoplanet Mass is greater than .3 of Jupiter mass
14. If it is then it is likely too heavy for life so Radius = Neg
15. If HZ, Mass and Radius are OK then add it to the Hab list

Estimates and Sources for HZ Boundaries

Min	Max	Star	Notes
0.725	1.24	None 1981	Used atmosphere and cloud reflection to place Venus just inside the zone
---	0.957	Budyko 1969	The point at which Earth would experience global glaciation
0.80	---	Raper 1959	The minimum distance at which Earth would form oceans
0.65	1.41	Ward et al. 1979	From computer modeling of the evolution of the Earth's atmosphere
---	1.0	Kegg 1988	Used the carbon cycle to delineate the outer edge of the habitable zone
0.65	1.07	Kasting 1988	Estimated the cooling effect of cloud reflection
---	1.0	Sagan 1973	Proposed that excessive liquid water is possible in this field
0.75	---	Adams 2011	Found that desert planets "could" have water at the poles and be closer to the Sun
0.81	1.1	Ward 2012	Estimates using atmospheric pressures
0.65	1.68	Kopparapu 2013	Estimates using greenhouse and water loss
0.5	---	Darm 2013	Estimates using atmospheric composition, pressure and humidity
0.67	---	Ramirez 2013	Applies to planets with Earth-like atmospheric composition and pressure
0.688	1.68	AVERAGE	



Inverse Square
Property of Light

Estimates of the Minimum habitable-zone boundaries of the Solar System

Inner HZ (AUs)	Notes
0.5	Using atmospheric composition, pressure and humidity
0.725	Using atmosphere and cloud reflection
0.75	Estimates that desert planets could have water at the poles and be closer to the Sun
0.80	Using atmospheric pressure
0.88	The minimum distance at which Earth would form oceans
0.89	From computer modeling of the evolution of the Earth's atmosphere
0.90	Using the cooling effect of cloud reflection
0.97	Applies to planets with Earth-like atmospheric and pressure
0.99	Using greenhouse and water loss
0.839	AVERAGE

Estimates of the Maximum habitable-zone boundaries of the Solar System

Outer HZ (AUs)	Notes
1.01	From computer modeling of the evolution of the Earth's atmosphere
1.1	Using atmospheric pressure
1.04	Using atmosphere and cloud reflection
1.07	Using the cooling effect of cloud reflection
1.091	The point at which Earth would experience global glaciation
1.688	Using greenhouse and water loss
1.6	Estimates that excessive liquid water is possible in this field
1.6	Using the carbon cycle
1.58	AVERAGE

Input Screens

Planet Radius

Step 1

Use the sliders below to select the minimum and maximum radius(km) of the exoplanets you wish to find. Examples of radiuses using our solar system are provided below.

Hint: most NASA exoplanets (found so far) are larger than the earth.

0.8 Earth 1.0X Neptune 1.75X Neptune Saturn Jupiter and >

SL min PL Radius : 1120

SL max PL Radius : 8140

Enter 1 to save your choice or 2 to skip this factor

Save or Skip 0.1.0

Planet Mass

Step 2

Use the sliders below to select the minimum and maximum mass of the exoplanets you wish to find. Examples of planet masses using our solar system are provided below.

Pluto To Saturn Jupiter 1.5X Jupiter 2X Jupiter or greater

SL min PL mass : 0.2

SL max PL mass : 0.5.0

Enter 1 to save your choice or 2 to skip this factor

Save or Skip 0.1.0

Orbital Period

Step 3

Use the sliders below to select the minimum and maximum orbital period for the exoplanets you wish to find.

<1 day >30,000 days

SL min orbit days : 1.0

SL max orbit days : 8443

Enter 1 to Save your choice or 2 to Skip this factor

Save or Skip 0.1.0

Orbital Distance

Step 4

Use the sliders below to select the minimum and maximum distance from their stars in millions of km for the exoplanets you wish to find. Examples of distances using our solar system are provided below.

Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune Pluto and >

SL min PL distance : 0.3

SL max PL distance : 3000

Enter 1 to Save your choice or 2 to Skip this factor

Save or Skip 0.1.0

Star Temperature

Step 5

Use the sliders below to select the minimum and maximum temperature for the stars you wish to find. Hint: Most stars are "M" type stars, whereas our sun is a "K" type star.

Cooler Hotter

M K G F A B O

SL min star temp : 1074

SL max star temp : 6414

Enter 1 to Save your choice or 2 to Skip this factor

Save or Skip 0.1.0

Star Mass

Step 6

Use the sliders below to select the minimum and maximum solar mass for the suns you wish to find. Examples of stellar masses using our sun are provided below.

Red Dwarf .3X Orange Dwarf .75X Our Sun 1.5X Giant Sun 2X or more Super Giant

SL min stellar mass : 0.2.0

SL max stellar mass : 1.0

Enter 1 to Save your choice or 2 to Skip this factor

Save or Skip 0.1.0



SAMPLE OUTPUT SCREENS

My program will now search the NASA exoplanet database to find any planets and stars that match the data you have entered. Your results will be displayed below.

Results

403 PL Name: Kepler-97 b Discovery Method: Transit PL Radius J 0.132 PL Mass J: 0.011 PL Orbit Days: 2.58664 ST Radius: 0.98 ST Mass: 0.94 ST Brightness: 12.872 ST Optical Band: Kepler-band ST Temp: 5779 Distance from the Earth: Est PL Distance From Its Star: 0 Est PL Temp: 0

404 PL Name: Kepler-99 b Discovery Method: Transit PL Radius J 0.132 PL Mass J: 0.019 PL Orbit Days: 4.60358 ST Radius: 0.73 ST Mass: 0.79 ST Brightness: 12.97 ST Optical Band: Kepler-band ST Temp: 4782 Distance from the Earth: Est PL Distance From Its Star: 0 Est PL Temp: 0

405 Thanks for searching the database!

length: 405

record counter

1801

Press 0 to Exit

Planets Matched

404



My program will now search the NASA exoplanet database to find any planets and stars that match the data you have entered. Your results will be displayed below.

Results

369 PL Name: UZ For b Discovery Method: Eclipse Timing Variations PL Radius J PL Mass J: 6.3 PL Orbit Days: 5840 ST Radius: ST Mass: 0.7 ST Brightness: ST Optical Band: ST Temp: Distance from the Earth: Est PL Distance From Its Star: 846740358.5423806 Est PL Temp: 0

370 PL Name: UZ For c Discovery Method: Eclipse Timing Variations PL Radius J PL Mass J: 7.7 PL Orbit Days: 1916.25 ST Radius: ST Mass: 0.7 ST Brightness: ST Optical Band: ST Temp: Distance from the Earth: Est PL Distance From Its Star: 403072851.1171424 Est PL Temp: 0

length: 372

record counter

1801

Press 0 to Exit

Planets Matched

371



Thank you!



Marina Lee

6th Grade

Henry E. Huntington Middle School, San Marino



About My Mentor

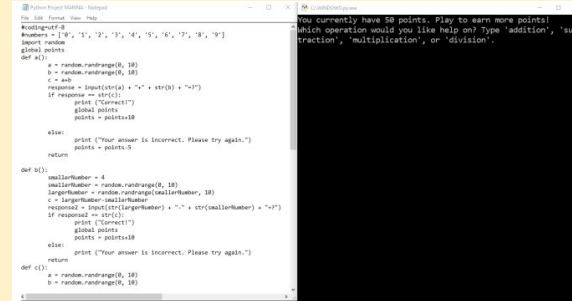
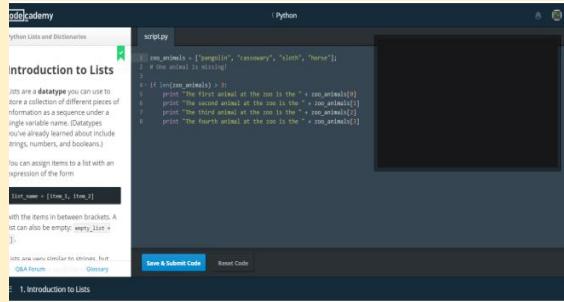
My mentor from November to June is named Jen Tannenbaum. She works at the United States Automobile Association (USAA) and is an iOS developer.



My MAGICal Experience

We have worked on:

- CodeMonkey
- Codecademy (python tutorial)
- Worked with python



My Project

- *Making a program to teach math*
- *Example: “Which operation would you like help on? Type ‘addition’, ‘subtraction’, ‘multiplication’, or ‘division’.*
- *Earn points if you get it correct, and lose points if you get it wrong*



Sample Input Screens

```
C:\WINDOWS\py.exe
You currently have 50 points. Play to earn more points!
Which operation would you like help on? Type 'addition', 'subtraction', 'multiplication', or 'division'
.addition
7+7=?14
Correct!
You currently have 60 points.
```

```
C:\WINDOWS\py.exe
You currently have 50 points. Play to earn more points!
Which operation would you like help on? Type 'addition', 'subtraction', 'multiplication', or 'division'
.subtraction
4-3=?3
You guessed too high! Please try again.
You currently have 45 points.
```



Thank you!



Casandra Avila

7th grade

Home-schooled, Whittier



About My Mentor



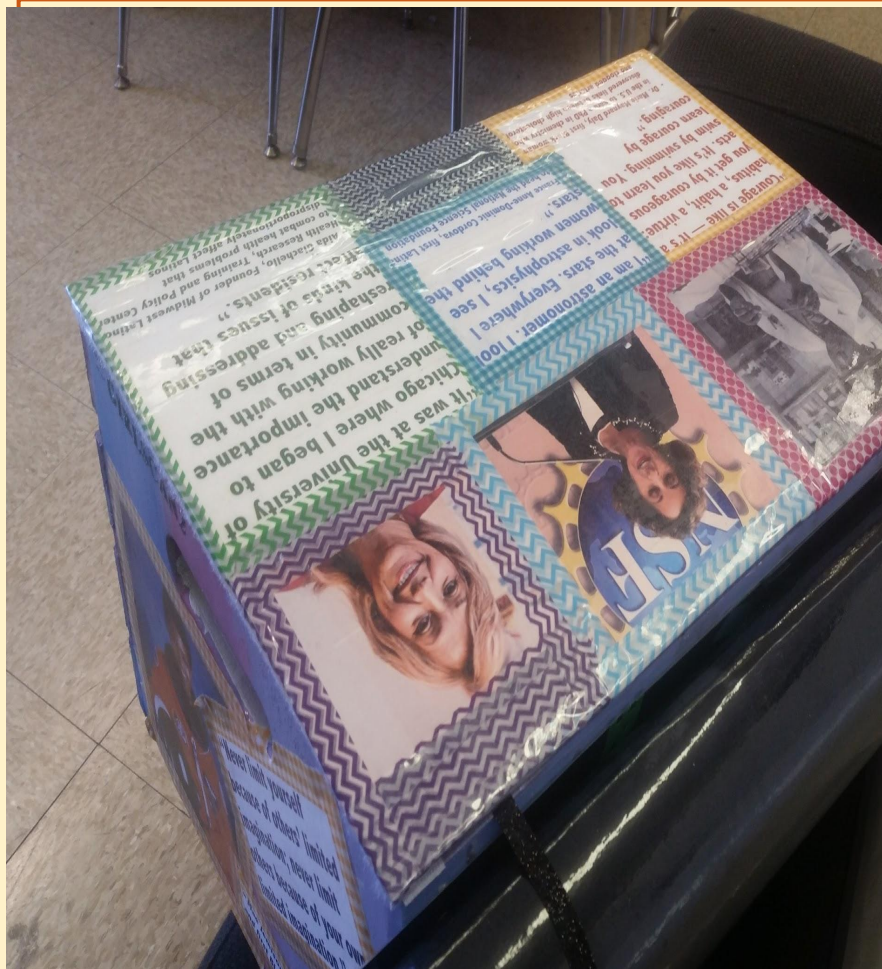
My MAGICal Experience



Dr. Lucy Jones









My Demo

- <https://play.kahoot.it/#/intro?quizId=a65fef6e-8365-481c-8df0-8c72c71ff476>

Is it true that only one in every thousand girls becomes a scientist?

29



True



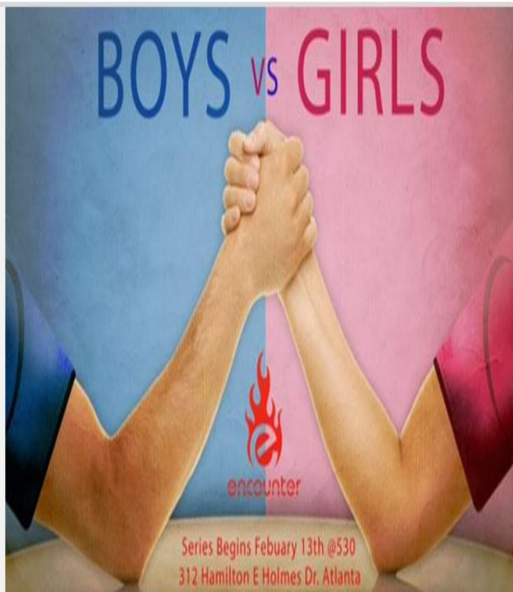
True



False

Do women who want to be in STEM careers face discrimination because of their gender?

27



0

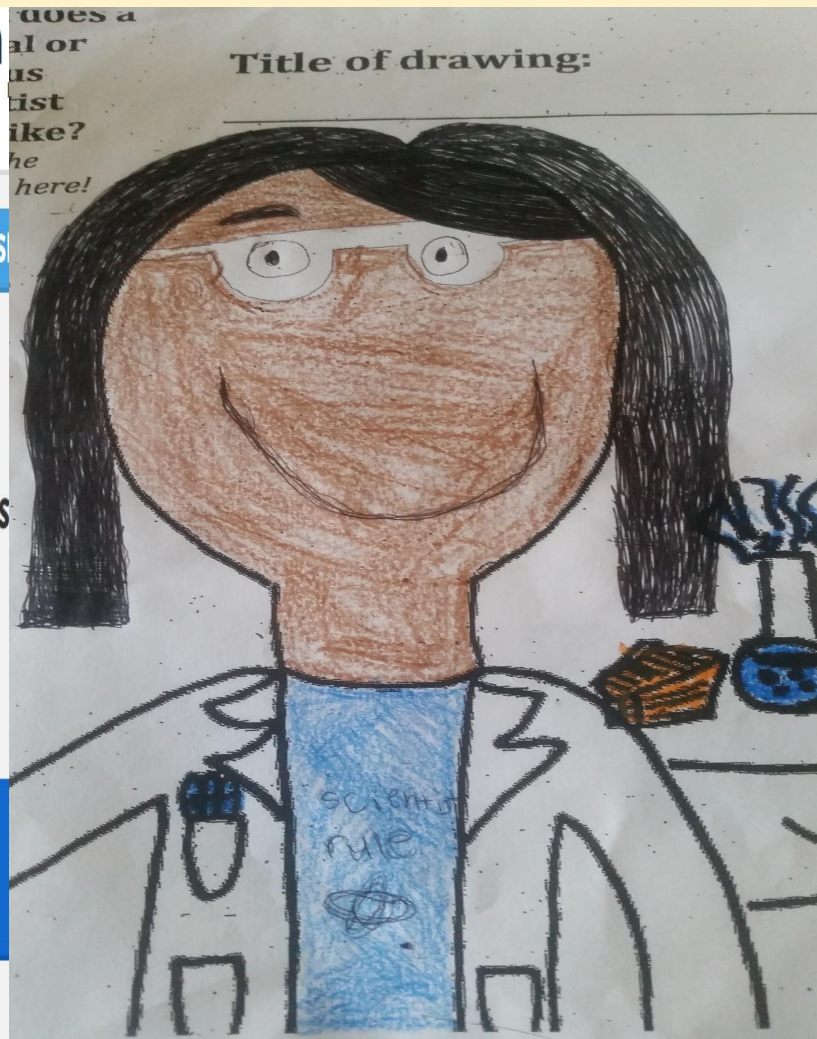
Answers



yes



no



Thank you!



Joon Luther

7th Grade

Peach Blossom School, Santa Clara



About My Mentor

- *Neetu Jain*
- *IBM Software Engineer*
- *10 years in the industry and NPOs*
- *Passionate about “technology for good”*



My MAGICal Experience

- *Freedom*
- *Weekly chats helped in bringing things together*
- *Done, To-do, and Blockers list for mentee and mentor*
- *Remote troubleshoot*



My Project

- *Elec-terrarium (Electronic simulation of wilderness)*
- *Inspiration: Alan Rath (Electronics artist)*

<http://alanrath.com>



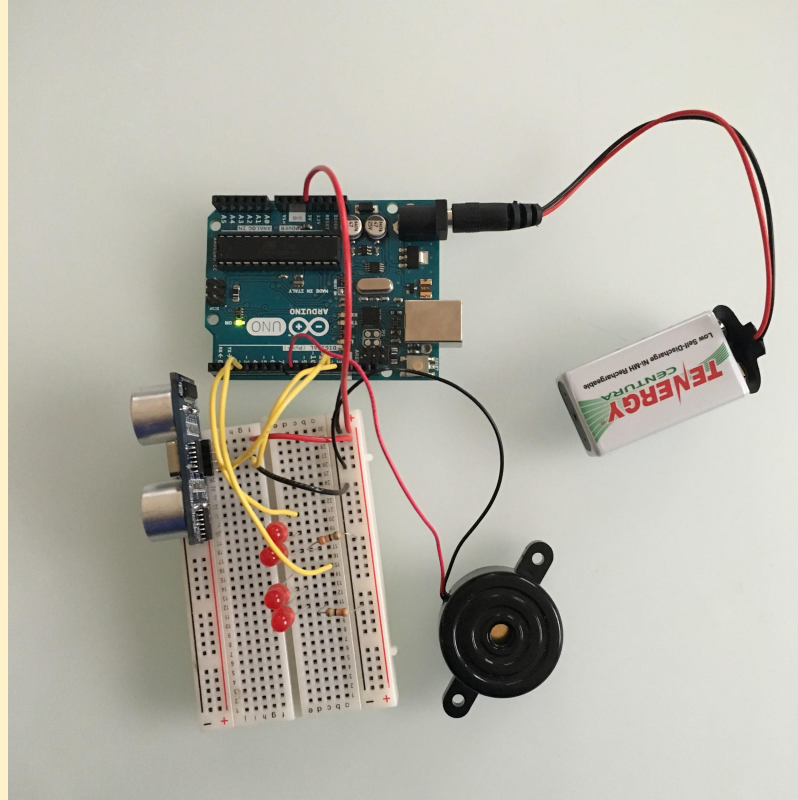


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My Project Components

- *Glass Bowl*
- *Ceramic plant forms*
- *Arduino Uno*
- *Ultrasonic Distance Sensor*
- *LED lights*
- *Piezo Element*





My Demo

- *What to expect:*
 - *The animal presence through the lights*
 - *Different tones and durations of the sound*
 - *“Animal’s” reaction to close or distant objects*



Thank you!



Lauren Taylor

7th Grade

Orinda Intermediate School, Orinda



About My Mentor

My mentor's name is Lakshmi she is a computer science engineer with an MBA in Systems and Finance and is currently head of the Business Engineering division at Object Edge.



My MAGICal Experience

- *A lot of fun!*
- *Coding challenges*
- *Block coding using scratch*
 - *Number guessing game*
 - *Computing factorials*
- *Web development*
 - *HTML, CSS, and Javascript on codecademy*
- *My website*

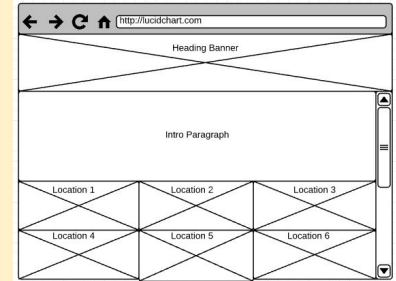


My Project

Travel guide providing information about different locations to people.

- *Wireframes*
 - *Lucidchart*
- *Building the website*
 - *HTML, CSS, and Javascript*
- *Development & Hosting*
 - *Cloud9*
- *Website content*

```
homepage.html x location.html
1 body{
2 }
3 ul {
4   list-style-type: none;
5   margin: 0;
6   padding: 0;
7   width: 200px;
8   background-color: #f1f1f1;
9 }
10
11 li a {
12   display: block;
13   color: #000;
14   padding: 8px 0 8px 16px;
15   text-decoration: none;
16 }
17
18
19 li a:hover {
20   background-color: #555;
21   color: white;
22 }
```

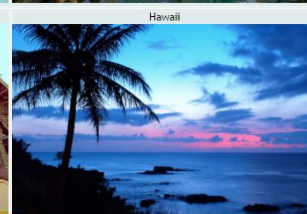
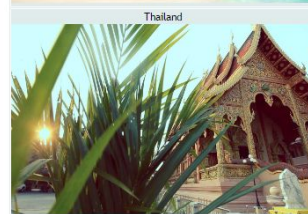
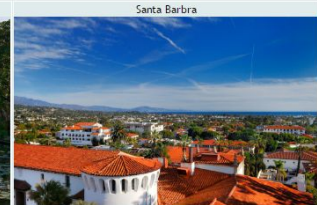


My Demo



Homepage

- *Homepage listing all locations*
- *Clicking on a location will show you the details*



Lauren Taylor

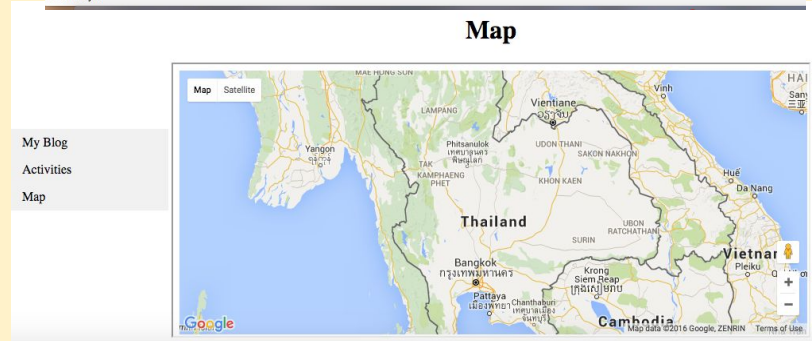
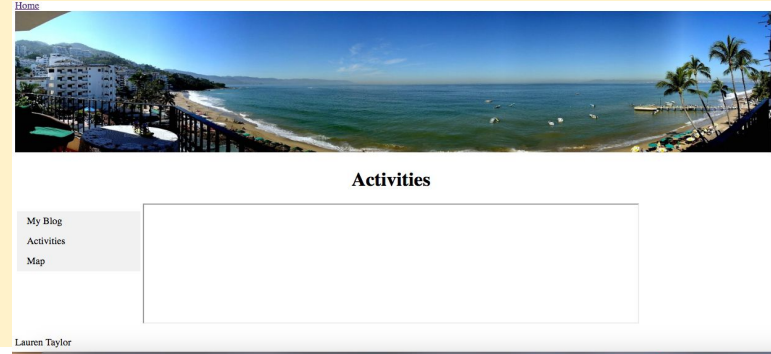
Contact information: laurenvtaylor@gmail.com



Location Pages



- *Single dynamic location page HTML*
- *Content & images for each location*



Next Steps

1. *Better formating*
2. *Responsive*
3. *Photography*
4. *More locations*
5. *Add onto writing*



Thank you!

Travel guide: <http://travelguide-laurentaylor.c9users.io/homepage.html>



Wynna Huang

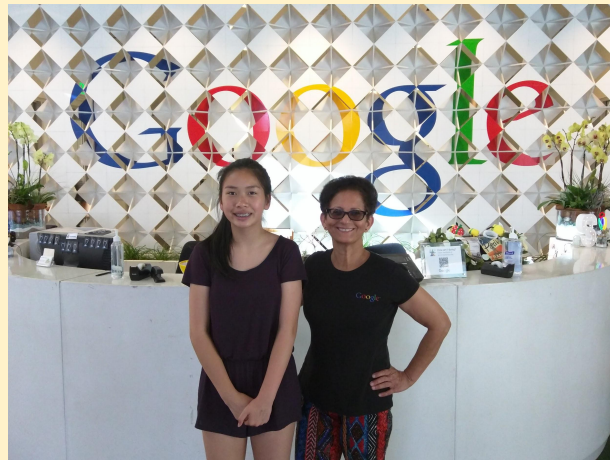
8th Grade

St. Simon School, Los Altos



About My Mentor

- Ira Pramanick
- Software Engineer at Google
 - Works on Personal Search
- Has a Ph.D. in Electrical & Computer Engineering
- Loves to read when she can find the time!



My MAGICal Experience

- I started MAGIC in the middle of March 2016
- Summer camp in C++ in 2014 (Rising 7th grader)
- Worked on Python
 - Codecademy
- Design a game
 - Used `graphics.py`
 - Simple to use graphics library written by Prof. John Zelle



My MAGICal Experience

- Basic programming concepts
 - Conditionals, Loops, Functions
 - Getting user input, Error handling
 - Animation, Non-blocking code
- Github repository
 - Project code on github



My Project

- Designed and implemented the hangman game in Python
- Three levels
 - Word gets longer with each level
- User can make up to 5 mistakes
- Includes fun graphics



My Demo

Game Procedures

1. Guess the letters that go in the given blanks
2. If the letter is wrong, then a part of the figure will be drawn.
3. If you guess the word before the entire figure is drawn, then you pass.
4. If not, then you have to restart.
5. Have fun!

Click to move on

LEVEL 1

Type "e" for easy level

LEVEL 2

Type "m" for medium level

LEVEL 3

Type "h" for hard level



My Demo

Level 1

Wrong Letters:

— — — —

abcdefghijklm
nopqrstuvwxyz

Level 1

Wrong Letters:

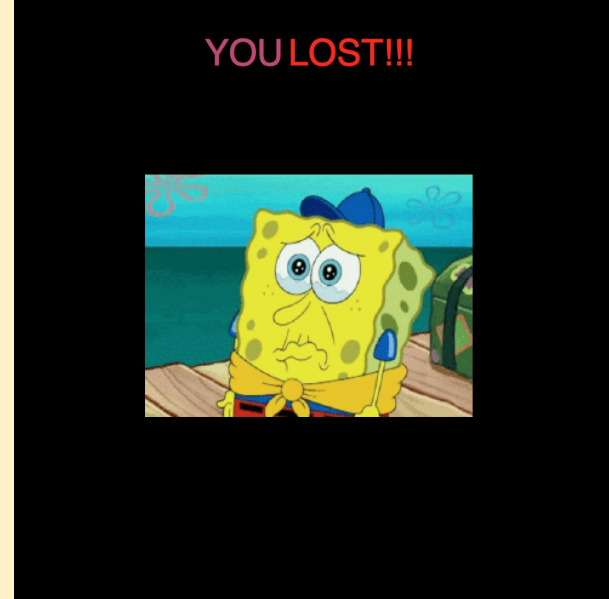


— a — r — d —

abcdefghijklm
nopqrstuvwxyz



My Demo



Thank you!



Morgan Conner

9th Grade

Oak Grove High School, San Jose



About My Mentor



- *Magreth Mushi*
- *Full time mom in transition:-)*
- *She is a mother of three, and graduated her PhD in June 2016!*
- <http://www.magrethjmushi.com/>



My MAGICal Experience

- *My Mentoring experience was amazing. We ended up picking my project by me pitching an idea of digital animation.*
- *We used a program called Maya.*
- *What was hard about the project was figuring out solutions to problems I've never faced before in a new software, but that's what became easy in the end.*
- *What I enjoyed the most was getting to work on it with my mentor so if either of us got stuck then we could help each other out.*
- *I think I could have branched out in the project a little more since it was really a simple idea.*

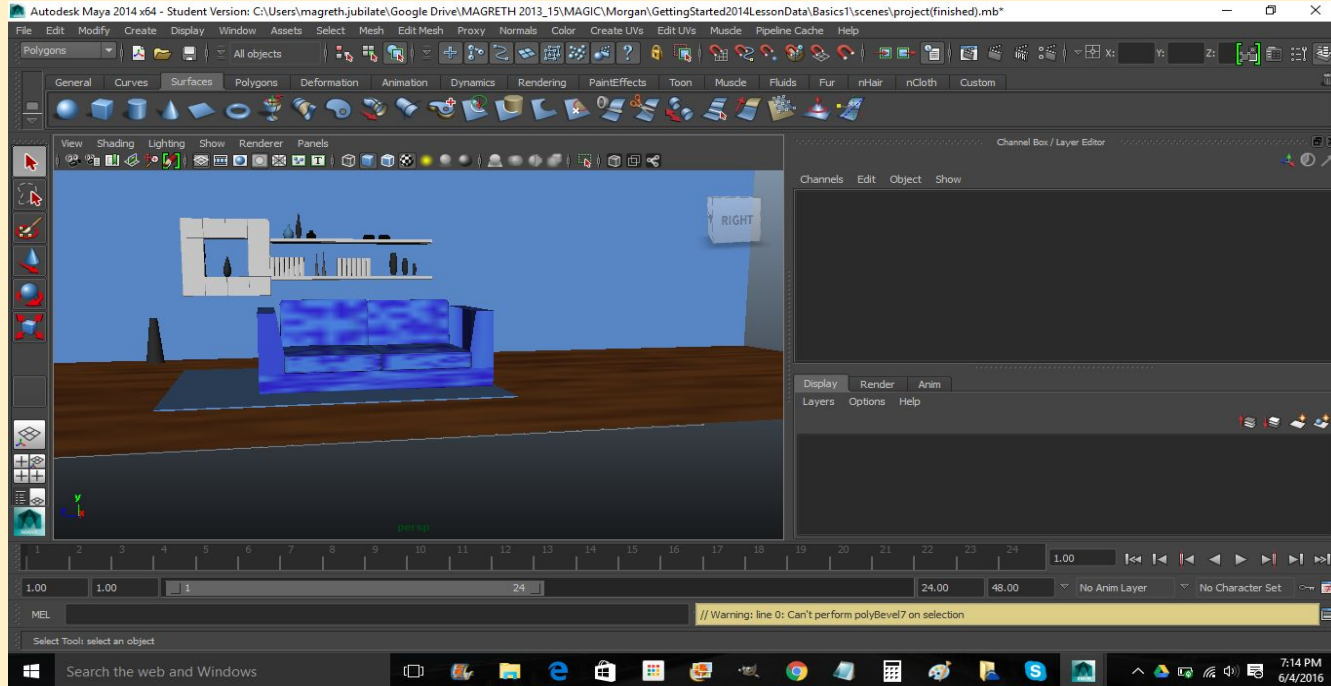


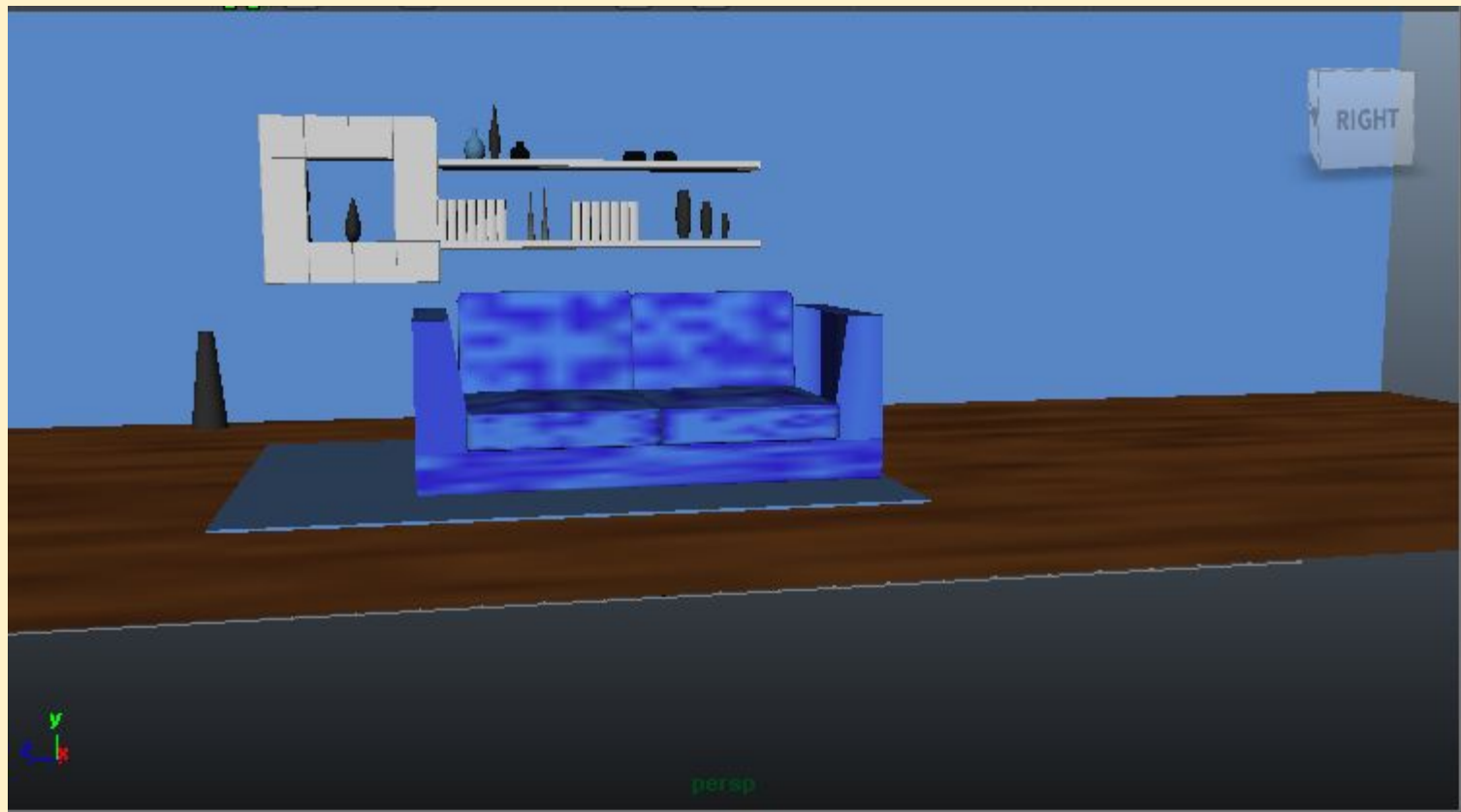
My Project

- *Our project was going to be in the subject of 3D animation.*
- *We found an animation program called Maya.*
- *We started to learn the basics of the program and then started to look at tutorials to help us on what to build for the project.*
- *We ended up building a living room out of polygons, and we wanted to build a whole house, but each room took a long time so we only got the living room done.*
- *It was task that needed a lot of time since working with a foreign program for both of us was quite hard, but I figured out solutions along the way so we could keep working, and soon finish the project*
- *We ended our project with just a living room, but I plan to finish the house.*



My Demo





ma9ic

Thank you!



Purva Joshi

9th Grade

Sacred Heart Cathedral, San Francisco



About My Mentor

- *My mentor is Helen Kang. She is a software engineer at Google.*
- *She works on civic related projects to improve various cities!*
- *She has three cats!!!*



My MAGICal Experience

- *My mentoring experience was exciting and I learned so much!*
- *My mentor and I picked up a project that intertwined studying dyslexia and learning coding (HTML, CSS, and jQuery).*
- *The most difficult part was learning and getting used to the coding since it was my first time using it as extensively as I did. I made a lot of errors but I had a great mentor who was extremely patient and so the project began to come along extremely well!*
- *If I could do anything better it would have to be practicing the coding more often and trying more demos.*



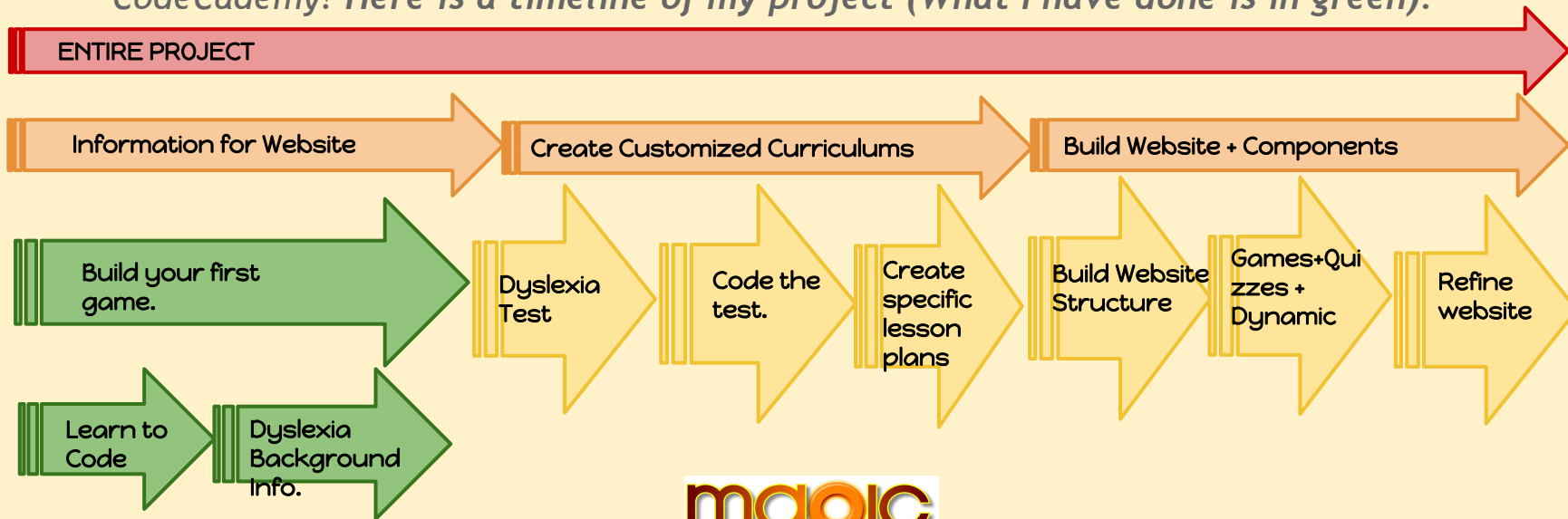
My Project

- ***What is Dyslexia?***
- *Dyslexia is a condition that changes how the brain understands language (oral and written). Dyslexia is categorized as a “cognitive disorder” or one that affects the brain. Some things affected in a person with dyslexia are:*
- Reading
- Writing
- Speaking
- Memory
- Socializing
- Navigation
- Time Management



My Project

- **My Goal:**
- *With my entire project I want to create an additional resource for dyslexic students. I want it to be a digital learning curriculum like Khan Academy, Duolingo, Quizlet, and CodeCademy! Here is a timeline of my project (What I have done is in green):*



My Demo

Here's the first website page I coded. It is made of HTML and CSS:
file:///Users/purva/Desktop/Project%20Dyslexia/flashpage.html

ABOUT SEARCH

SIGN UP LOG IN HELP



**You are different,
you are unique,
and that is why
you are YOU.**

1 in 10 people have dyslexia. You are
one of the many who will be helped.

[Learn More](#)

About Dyslexia

Many people are not sure where to help their children who have dyslexia. This program aims to help these students, so they can excel in the competitive world just like any other student while having fun.

Dyslexic children use the right side of their brains more than the left. As you can see the right side is where creativity lies and the left is where they process most academical needs. That is why students with dyslexia are known to be extremely creative, though they need help with learning how to process information with the left side of their brain as well.



Dyslexia Test

Fill out the dyslexia test to see if your child has dyslexia and what type of dyslexia they have. The test will then create a specialized curriculum for your child which you can choose to continue after signing up.

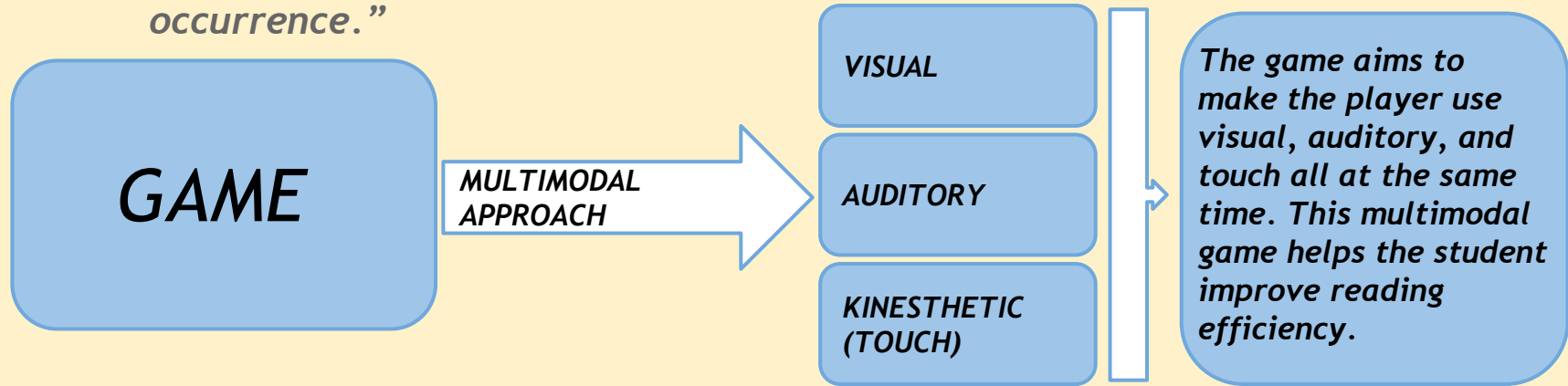
More Resources

- Mayo Clinic
- Understanding Dyslexia
- Dyslexia at Wikipedia
- Dyslexia Reading Well
- The Yale Center for Dyslexia and Creativity



My Demo

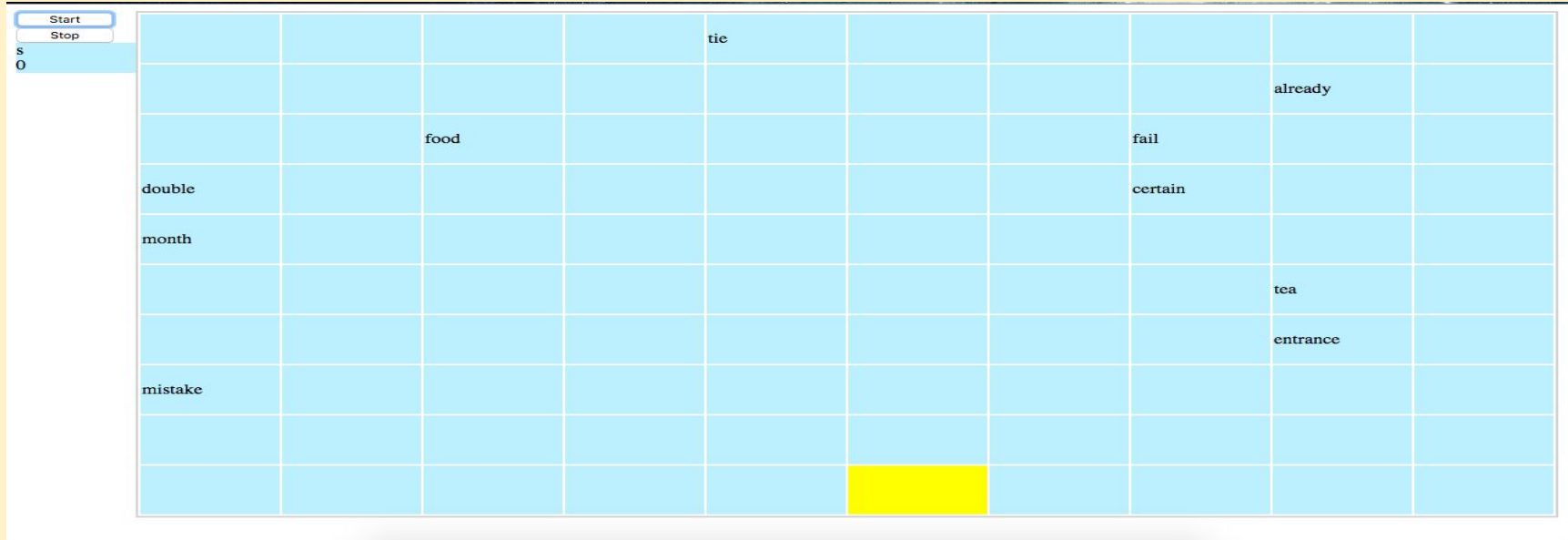
- *As of right now I am creating one of the games from the project. It focuses on putting into action a **multimodal** technique used to teach dyslexic students.*
- **MULTIMODAL:** “characterized by several different modes of activity or occurrence.”



My Demo

Here's a snapshot of the game we made:

file:///Users/purva/Desktop/Project%20Dyslexia/Game%201/game.html



Thank you!



Samantha Serrano

9th grade

Cerritos High School, Cerritos



About My Mentor

- *My mentor's name is Tanya Gupta*
- *She works at google*
- *Tanya lives in the bay area*
- *Tanya is working on a project called Voice Actions*



My MAGICal Experience

- *This is my first year with MAGIC*
- *I learned about the program through a friend and applied in summer of 2015*
- *Before this experience I didn't know anything about programming.*
- *As part of MAGIC, I learned how to program in Java*
- *Throughout the year I worked on several projects including tic tac toe, mad libs, and battleship*



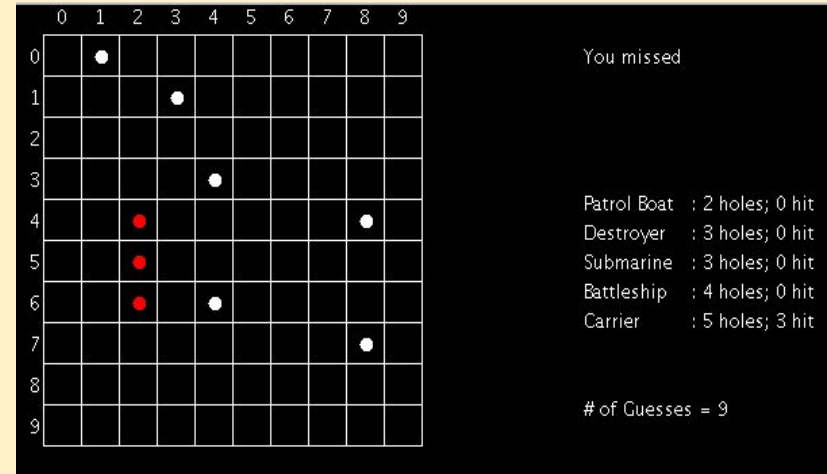
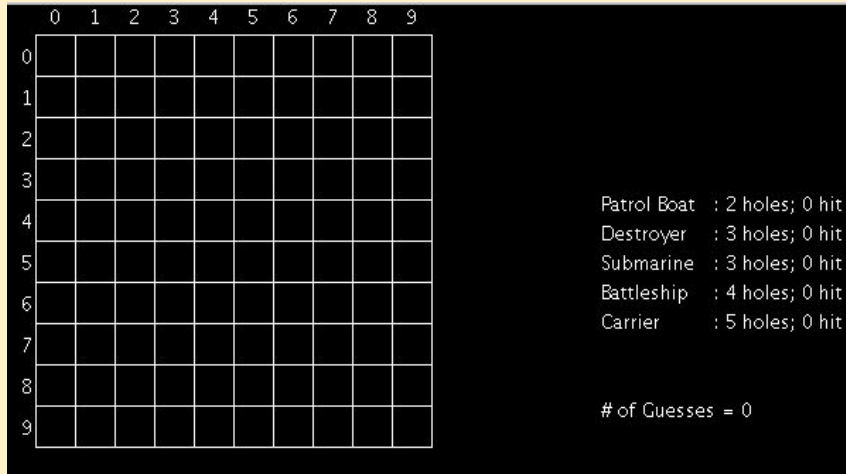
My Project

- *My project was the battleship game*
- *This project took about six sessions to make*
- *I programmed this project using eclipse*
- *I wrote the core logic*
- *For this i used for-loops , if statements , and arrays*



My Demo

- Come and play battleship and beat the highscore which is 59*



Thank you!



Diana Nguyen

10th Grade

Oak Grove High School, San Jose



About My Mentor

- Name: Roshni Chandrashekhar
- Occupation: Software Engineer at Google (for Identity and Authentication)
- What she enjoys: animals, exploration, gardening, hanging out with friends, board games, giving back to the community
- Interesting Facts:
Went to NIT, Karnataka before UCSD
Has a Masters in Computer Science at UC San Diego
Speaks 4 Indian Languages
from Bangalore



My MAGICal Experience

- *Motivation: to gain knowledge and understanding on what is behind everyday use of the internet.*
- *Goal: To create something on my own, I.E., a website. Also, learning what and how coding works.*



My MAGICal Experience

- **What I enjoyed**: getting to know myself and my mentor along the journey, learning new codes and gaining a perspective of how the web is built, the trial and error while working on the website, and the feeling of accomplishment after successful trials.
- **Difficulties**: learning where to start, learning multiple new coding languages, and how to utilize and apply them as a whole.
- **What Could Have Worked Better**: I don't think I would change anything.



My Project

- Website Hosted on GitHub

What is GitHub? - Repository hosting service that allows code sharing and publishing rights. Projects are created and can be worked on from anywhere using Git as a command tool.

A Profile Page about myself and my coding journey!

- Features:

*6 tabs: Home, Profile, Repositories, More, Contributors, & Contact
Slide Show*

Banner

Embedded Form

Embedded Youtube Videos



My Project

- Resources:
 - code.org
 - codecademy.com
 - codeschool.come
 - pencilcode.net
- What I learned:
 - HTML
 - CSS
 - Javascript
 - Website Hosting - Github

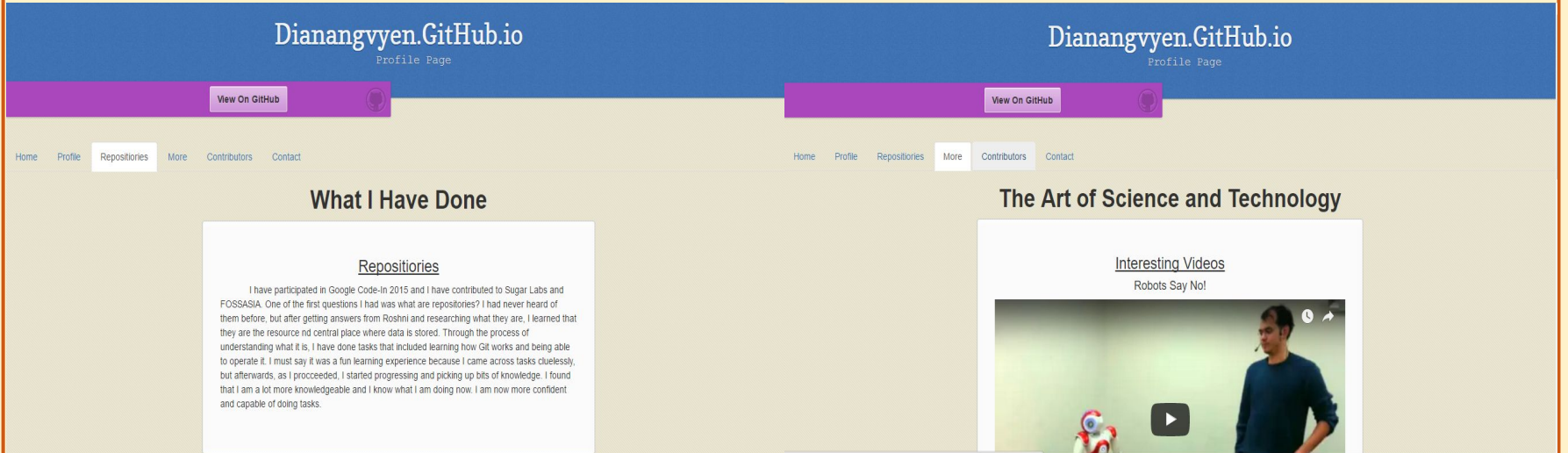


My Demo

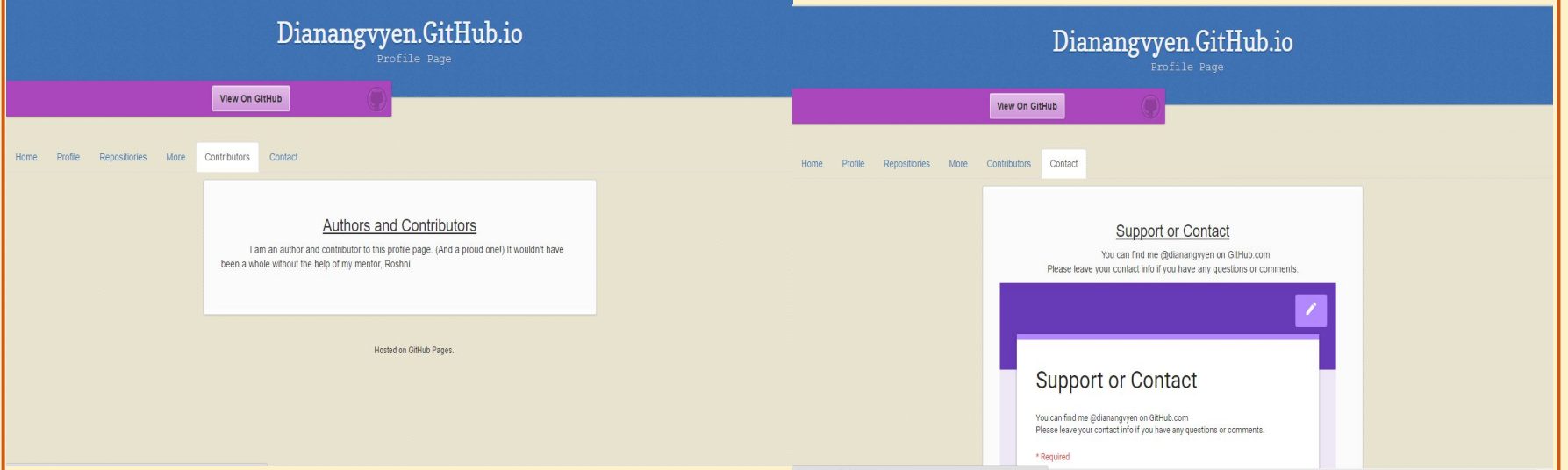
- *My own webpage hosted on GitHub.io : dianangvyen.github.io*
 - *Simple but actually more complex than it seems*



My Demo



My Demo



Thank you!



Vasundhara (Diya) Sengupta

10th Grade

Westview High School, San Diego



About My Mentors



Jaelle Scheuerman currently attends Tulane University to pursue a PhD in Computer Science. In addition to avidly celebrating Mardi Gras, Jaelle participates in many programs involved with promoting STEM.

Soja-Marie Morgens graduated from Stanford University and currently works at Nest Labs as a software engineer. At first she aspired to major in Genetics, but then changed her career choice. She's a big fan of Garfield and chocolate desserts.

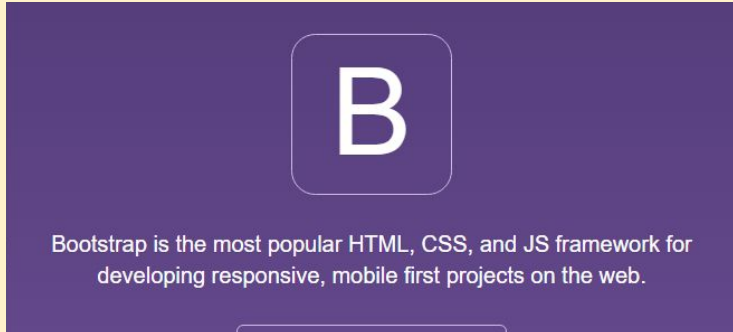


My MAGICal Experience

- *Learned how to code in Javascript (jQuery), HTML, and CSS*
- *Originally, my idea was to develop a website geared towards helping seniors in my community. However, I realized it would be much more beneficial to develop an app*
- *When trying to develop code for app, 'tried using a virtual machine to code Swift but, there was too much lag and was difficult to troubleshoot.*
- *Found Cordova PhoneGap as the solution. It's a platform that allows flexibility over all languages.*
- *Worked on many tutorials related to functions that my app would later implement.*
- *My MAGICal experience has inspired me to get the app published!*



My Project



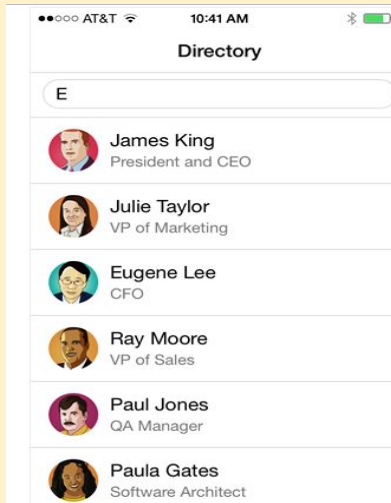
- Originally designed to be a website
- Coded on Cloud9 and tested on Chrome browser
- Used Bootstrap to make things mobile-friendly

```
1 <html>
2 <head>
3   <meta name="viewport" content="width=device-width, initial-scale=1">
4   <!-- Latest compiled and minified CSS -->
5   <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/css/bootstrap.min.css">
6   <!-- Optional theme -->
7   <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/css/bootstrap-theme.min.css">
8   <link rel="stylesheet" href="style.css">
9   <!-- Latest compiled and minified JavaScript -->
10  <script src="https://ajax.googleapis.com/ajax/libs/jquery/1.11.3/jquery.min.js"></script>
11  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/js/bootstrap.min.js"></script>
12  <script src="rows.js"></script>
13 </head>
14
15 <body>
16   <div class="container">
17     <div class="row">
18       <div class="col-xs-12" align="center"><h1>List your Medication</h1>
19     </div>
20     <div class="row">
21       <div class="col-xs-6"><strong>Name your Medication</strong></div>
22     </div>
23     <div class="col-xs-6"><strong>Add an Image</strong></div>
24   </div>
25 </body>
26 </html>
```

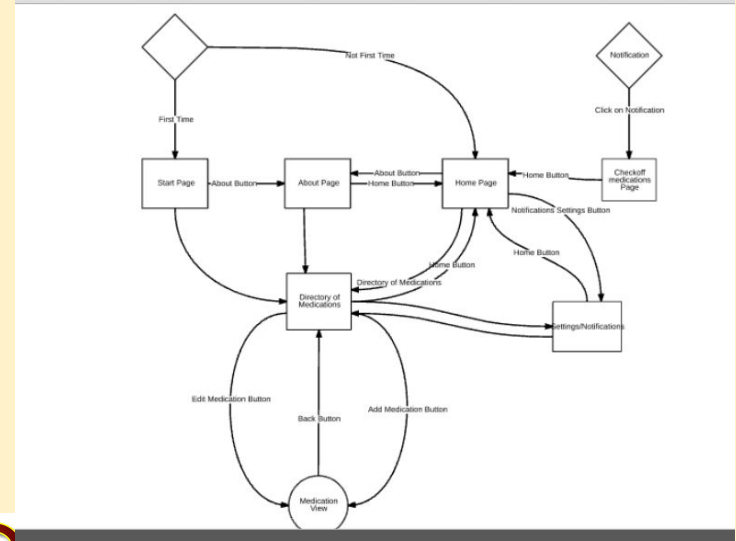
A screenshot of a web application titled "List your Medication". The page has a light purple header. Below the header, there are three input fields, each with a number (1, 2, 3) in a small box to its left. To the right of each input field is a small image of a pill bottle. At the bottom of the form, there is a row of buttons: a blue button with a "+" sign, and three red buttons labeled "Done", "Load", and "Home". On the far right, there is a red button labeled "Change pic".

My Project

- *Post finalization of the app idea, planning stage involved UML diagrams*
- *Worked on tutorials to code functions, later used in my app*
- *Cordova PhoneGap allowed dual programming in HTML and JavaScript, but the app works on both iOS and Android!*



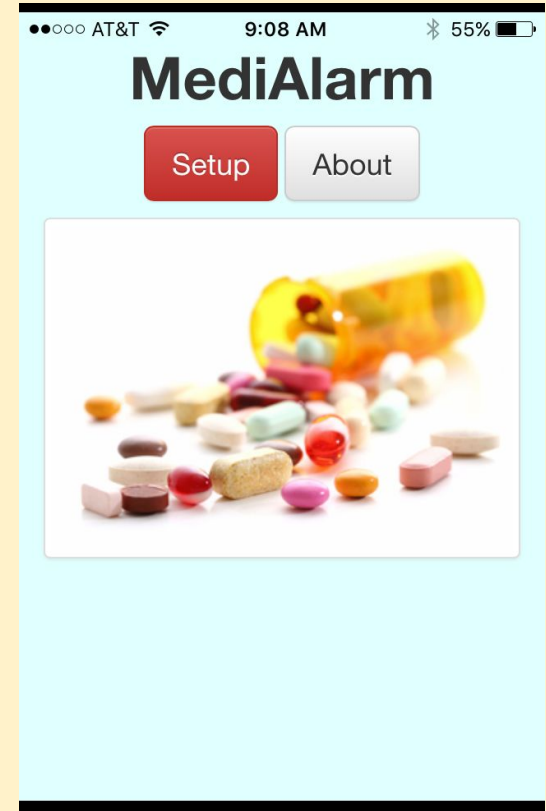
Zombie tutorial





My Demo

- *App is called MediAlarm!*
- *App has a simple 3-step process to make things easy for users.*
- *App logo designed using Designapp.io*



●●○○ AT&T 12:29 PM 46%

About Page

With over 43 million senior citizens in the USA alone, 92% of them suffer from a chronic condition. In order to treat these conditions, seniors are prescribed various medications of different shape, size, and color, and it often becomes difficult to keep track of when to take each one.

MediAlarm to the rescue!

MediAlarm is a simple, user-friendly app that allows users to enter in their prescribed medication, a picture of the medication, and the days and times they are required to take it. The app saves this data and sets up notifications for the user, equipped with sound and text

features

My Demo

●●○○ AT&T 12:29 PM 46%

Why should you use this?

MediAlarm provides a simple way for users to keep track of their medications. If you find yourself forgetting when to take your medication, this "alarm clock app" notifies you when to take it so, you don't have to rely on others for help.

Any ideas to make it even easier to use?

Yes! MediAlarm can be taken further so that even doctors or senior care pharmacists can wirelessly input data to phone. This makes the app even easier to use for users as the first two steps are taken care of.

Start Setup

Homepage



●●○○ AT&T 12:26 PM 46%

List your Medication

Name your Medication

Add an Image

1 Advil



2 Tylenol



3 Type here



4 Type here

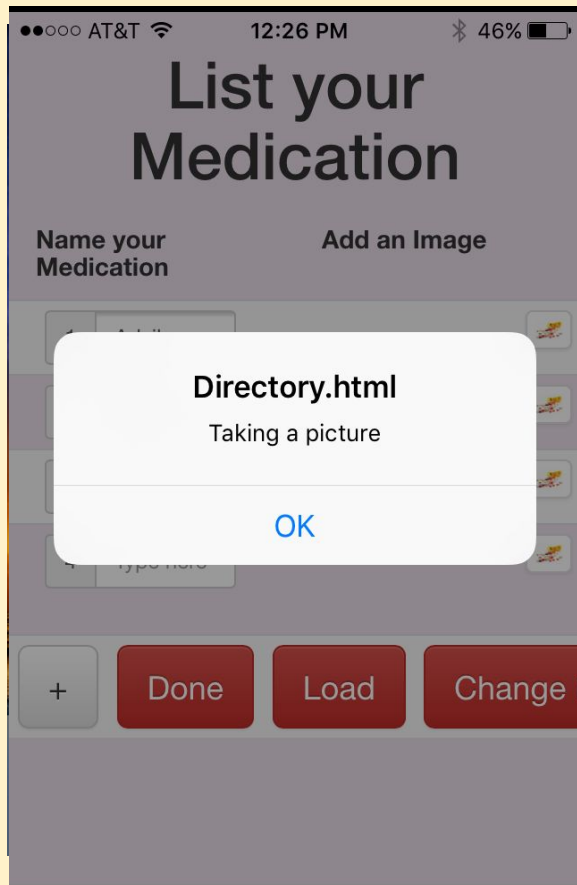


+

Done

Load

Change



My Demo

Names	Days							Times		
Name	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Morn	After	Even
<input type="text" value="Tyf"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LoadMedications <input type="button" value="+"/> <input type="button" value="Done"/>										



Thank you!



Kristina Mkrtchyan

11th Grade

Burbank High School, Burbank



About My Mentor

Hema Hariharan

- Hardware engineer at Google
 - Builds chips
- Likes:
 - Indian classical dance
 - Travel
 - Reading



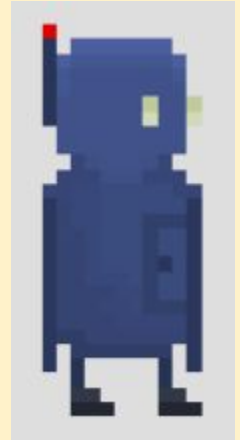
My MAGICal Experience

- Goal: Build a level of a game
- Originally using Python & Pygame - issues
 - Version compatibility
 - Missing documentation
- Explored using Graphics.py module
- Switched to Unity & C#
- Learned how to pull together coding skills to create a complete level of a game
- Experience helped make things more manageable and less daunting
 - Components of the game
 - Planning
 - College

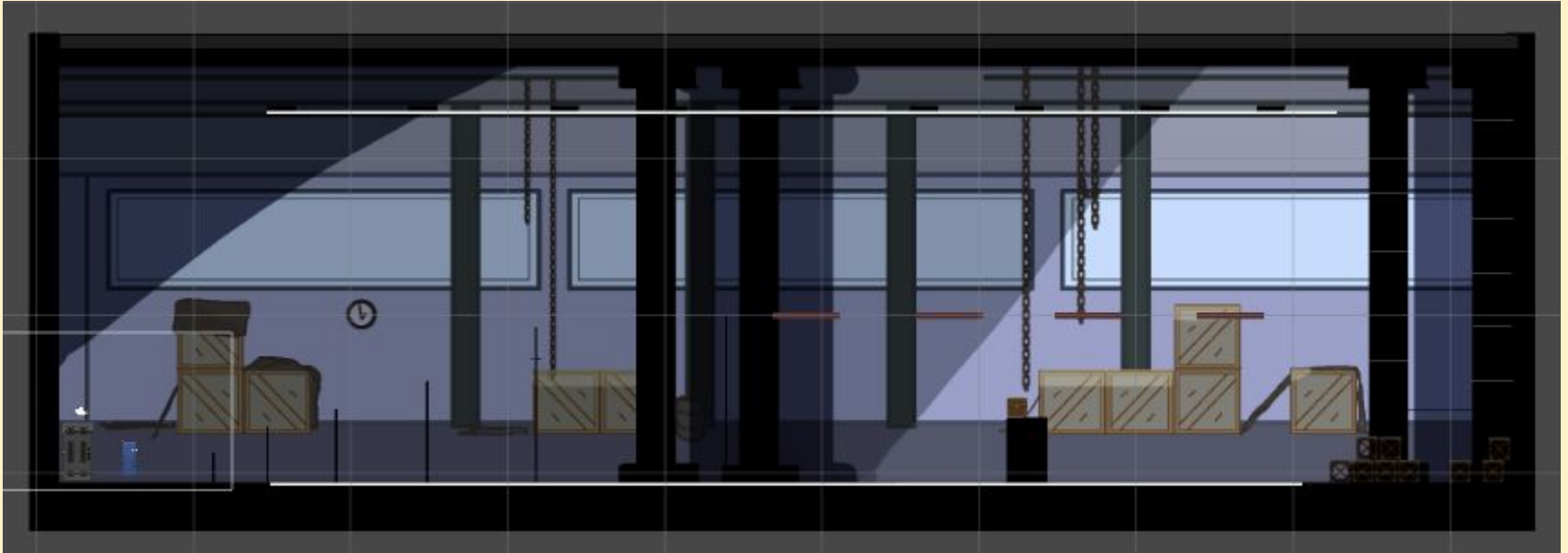


My Project

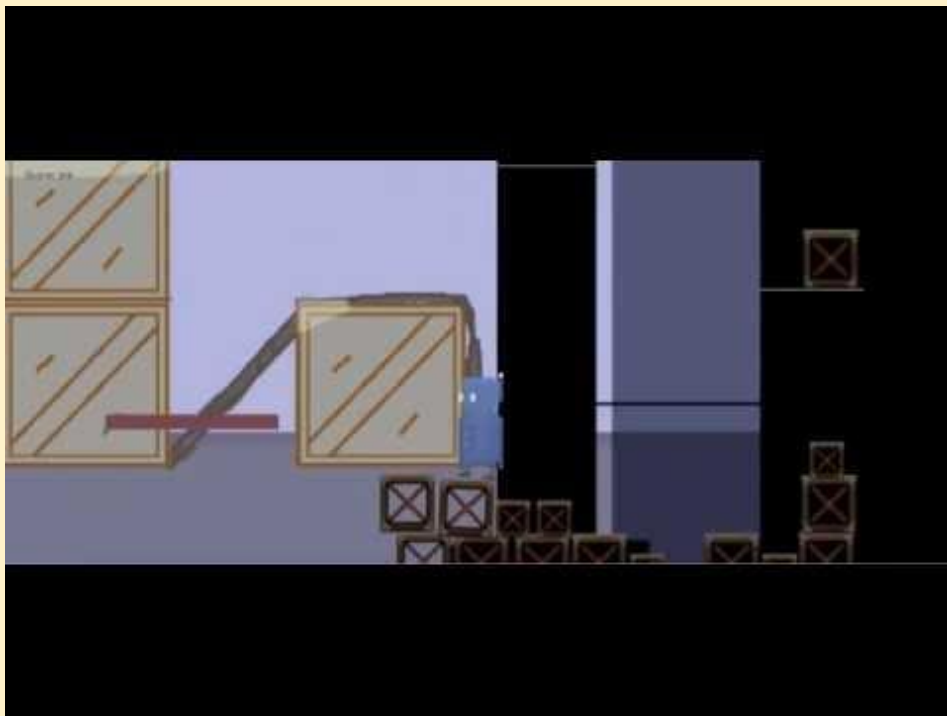
- 2D puzzle platformer
- Built using Unity
 - Programming - supports C# and Javascript
 - Game development environment
 - Supports multiple platforms
- Worked for 3 weeks to build 1 level
- Plan to expand
 - More levels, storyline, timer, and inventory system



My Project



My Demo



Thank you!



Esmeralda Leon

12th Grade

Oak Grove High School, San Jose



About My Mentor

- *Anurupa Rao*
- *Grew up, and studied in India*
- *Enjoys reading, singing, and making things*
- *Mechanical Engineer, Product Design Manager at Amazon*



My MAGICal Experience

- *At first, I was nervous*
- *Field trip was the kick off*
- *Very comfortable afterwards*
- *Bloomed into a great mentorship!*



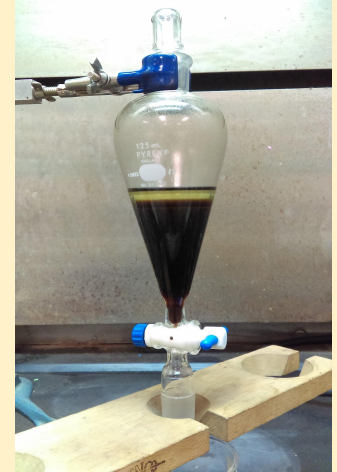
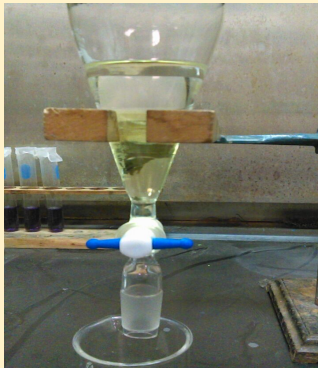
My Project

- *Difficult to choose, so I chose 3!*
- *Catapults: Very first experiment, didn't go exactly as planned*
- *Rock Candy: Went pretty well, formed perfect cubic crystals. A typical supersaturated solution*



Caffeine Extraction

- *Used 3 tsp Black tea, boiled for about ten minutes*
- *Filtration filtration filtration!*
- *Separated miTured about three times,*
- *Finally, used sublimation apparatus to crystallize the caffeine*



My Demo

Three different batches:

- *Control, normal recipe: <http://allrecipes.com/recipe/10813/best-chocolate-chip-cookies/>*
- *Same recipe, but with 1.5 tsp of baking powder instead of .5 tsp*
- *Also same as control, but with one cup flour instead of 1.5 cups*



Experiment 1



Experiment 2



Thank you!



Iris Cheung

12th Grade

American High School, Fremont



About My Mentor

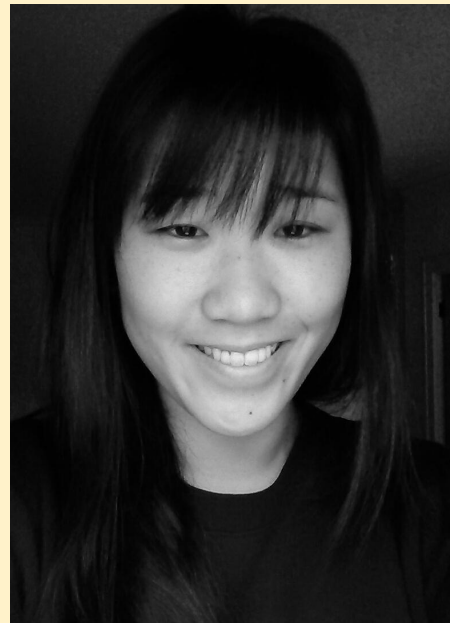
Name: Catherine Wah

Occupation: Software Engineer at Google

Enjoys: food, photography, running, rock climbing

Interesting Facts:

- Has a PhD in Computer Science
- Has a twin sister who also has a PhD in Computer Science
- Grew up in Illinois



My MAGICal Experience

- *Motivation: create something that would be useful for people around me, thought of friend's business*
- *Goal: To create a website for [Jujubees Crafts](#) to sell and promote its products, while learning and improving my coding skills.*



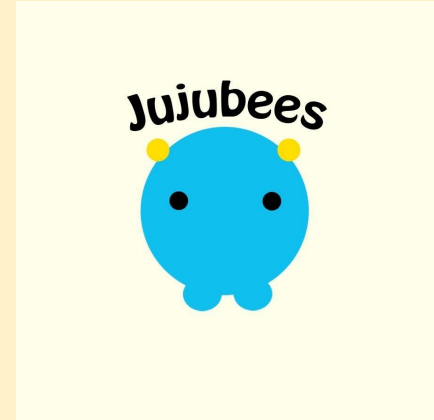
My MAGICal Experience

- *What I Enjoyed: the feeling after successfully debugging, learning new languages, side conversations with my mentor*
- *Difficulties: Learning how to approach debugging, application of newly learned languages*
- *What could have worked better: spent more time on aesthetic and design/user interface*



My Project

- Website for Jujubees Crafts
 - Small business established in 2015
 - Only sold to friends at school
 - Keychains, jewelry
- Features:
 - Homepage
 - About (introductions, mission statement)
 - Order (Google order form, product display)
 - Contact (contact form)
 - Footer (links to email, Facebook, Instagram)



My Project

- Codecademy Tutorials
 - Make an Interactive Website
 - PHP

- What I learned:
 - CSS elements
 - HTML links
 - PHP forms
 - jQuery animations
 - Fonts
 - Website hosting



Contact us here!

* required field.

Name: *

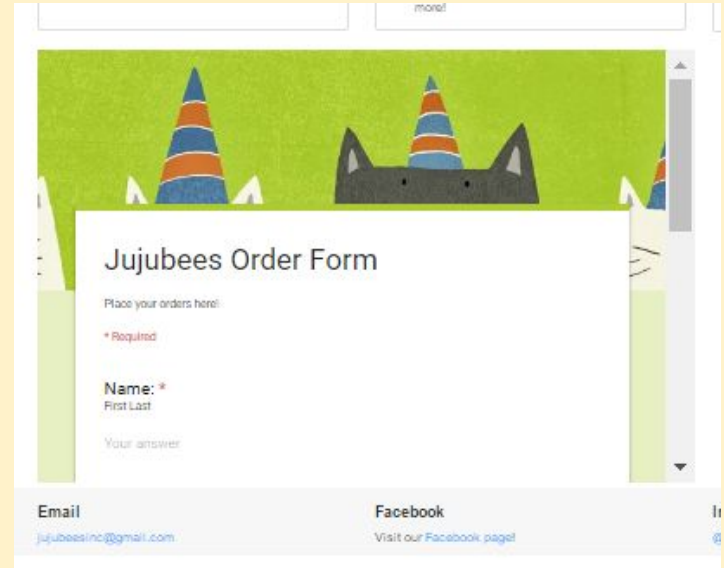
E-mail: *

Comment:

My Demo

- jQuery animations on the navigation bar
- PHP contact form
- Embedded Google fonts and form
- It's a live website!

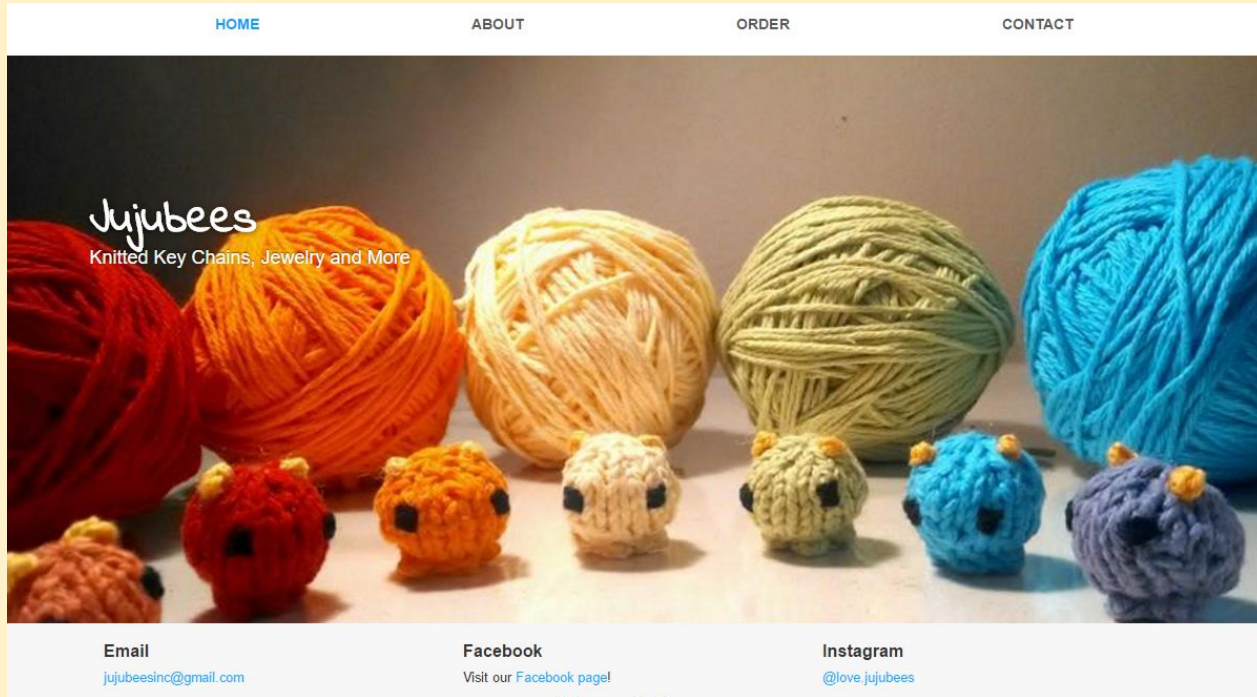
--> www.jujubeescrafts.com



The screenshot shows a web browser window displaying the 'Jujubees Order Form'. The header features a green background with a black cat silhouette wearing a blue and orange striped party hat. Below the header, the text 'Jujubees Order Form' is centered. Underneath, it says 'Place your orders here!'. A red asterisk indicates a required field. The 'Name:' field is labeled with a red asterisk and has sub-labels 'First' and 'Last'. Below this is a 'Your answer' label. At the bottom, there is an 'Email' field with the placeholder 'jujubeesinc@gmail.com' and a 'Facebook' link that says 'Visit our Facebook page!'. The browser's address bar shows 'more!'. The footer of the browser window displays the 'magic' logo, which is stylized in orange and yellow.



My Demo



Thank you!



Kim Ngo

12th Grade

Oak Grove High School, San Jose



About My Mentor

- *Roshni Chandrashekhar*
- *Google software engineer*
- *UCSD graduate*
- *Dog lover*
- *Coffee and tea drinker*
- *Married last June*
- *Favorite holiday is Tiwali*



My MAGICal Experience

- *Wanted a more hands-on and physics-oriented project*
- *Inspired by this video*



My Project

- *Ruby Goldberg machine using the Legos Mindstorm EV3, Sphero, and a ping pong ball*
- *Many, many failures and retrials as ping pong balls are annoying*
- *Also difficulty in setting up a chrome extension to code EV3 and Sphero*



My Demo

Video of my project (up to date):



Thank you!

