Date: 4/28/18

Duration 9:30 AM – 4 PM

<div align="center">Hagley Makers' Fest outreach</div>

Participants - Marcus, Connor, Patrick, Bryan, Sean, Paige, Kyle, Zach, Ian

Mentors - Mr. Prettyman, Mr. Price

At the Hagley maker's fest, we brought our Relic Recover robot, our velocity vortex robot, and our batter bot. We also brought the field tiles, velocity vortex center vortex, glyph and jewels and a jewel holder for Relic Recover and a wooden bat tee and whiffle ball for the batter bot. The Hagley Maker's Fest was at the Soda House in Hagley Museum in Wilmington De. This was an event were makers of different products or creation could come to show other people the creation or product they made or make.

- For our team we had two shifts that we could work at. One at the start of the Maker's Fest, 9:30 a.m. to noon and then the second shift was from noon to the Closing of the Event, 4 or 5 p.m.
- Our robotics team demonstrative our robots that we brought to people how came to our booth/station. We also show kids how to drive the batter bot and then let them drive the robot and swing the bat on the robot at a whiffle ball that was on a tee, that a person put on the tee after they kid hit the previous ball off the tee.
- Are team member and our mentors answered questions that parents asked and if the person that tries to answer the person's question cannot, then they get someone else to answer the question. We also talked about the different components of the robots.

- When there was no visitor at our station, we played with the robots and created things.
  - We used the Velocity Vortex robot to shot the whiffle balls at the center vortex.
  - We used the Velocity Vortex robot to shot the whiffle balls at people and team members to catch team
  - We made the batter bot spin the bat around in a circle really fast.
  - Zach used some of the extra foam tiles to make a circular barrier around the foam tile robot area so that the whiffle balls did not roll out of the foam tile area, because the place where we were place was slanted down to one side. We also used the circular barrier to create a whiffle ball place where when they roll down, they can collect up down there.

- o Zach also worked on whiffle ball tee mount to the front of the robot. it was made of two ion the peg on the basket of the Velocity Vortex center vortex that was duct tape to the robot and then there was the jewel holder from Relic recover tape to the end of pegs. With this creation we could put two whiffle balls on it but it was getting too heavy with two whiffle balls and something it would fall of the robot.

- Through this event, we educated parents and their children about the First community, how our robots worked. Our effect also was that we might have encourage the children how came to our station to join the First Community and join a team or start a new team.

Dover Stem Maker Fest
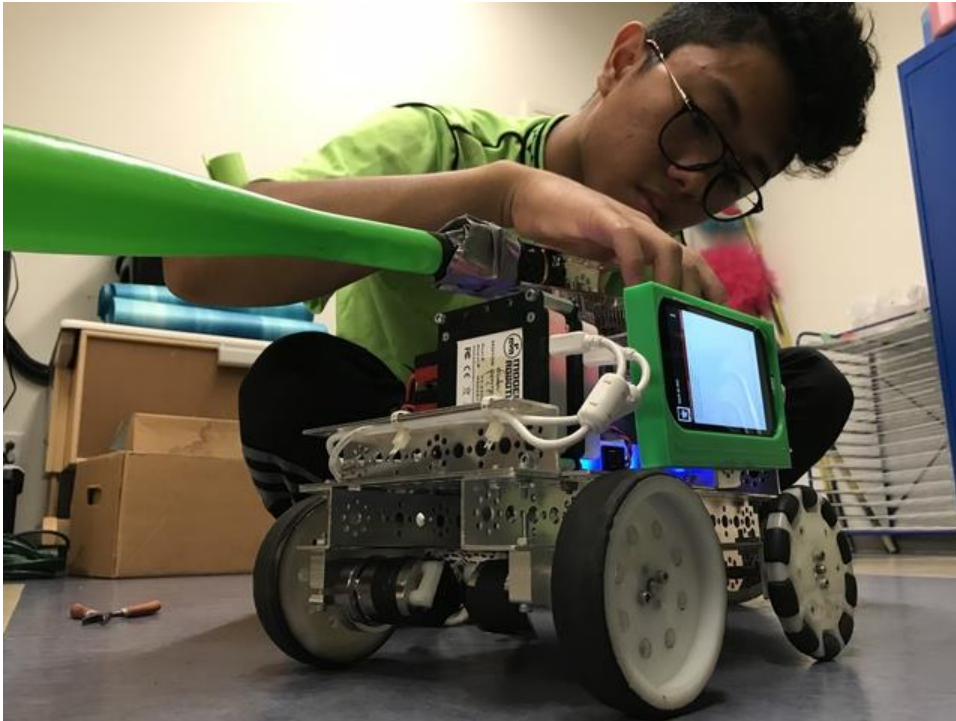
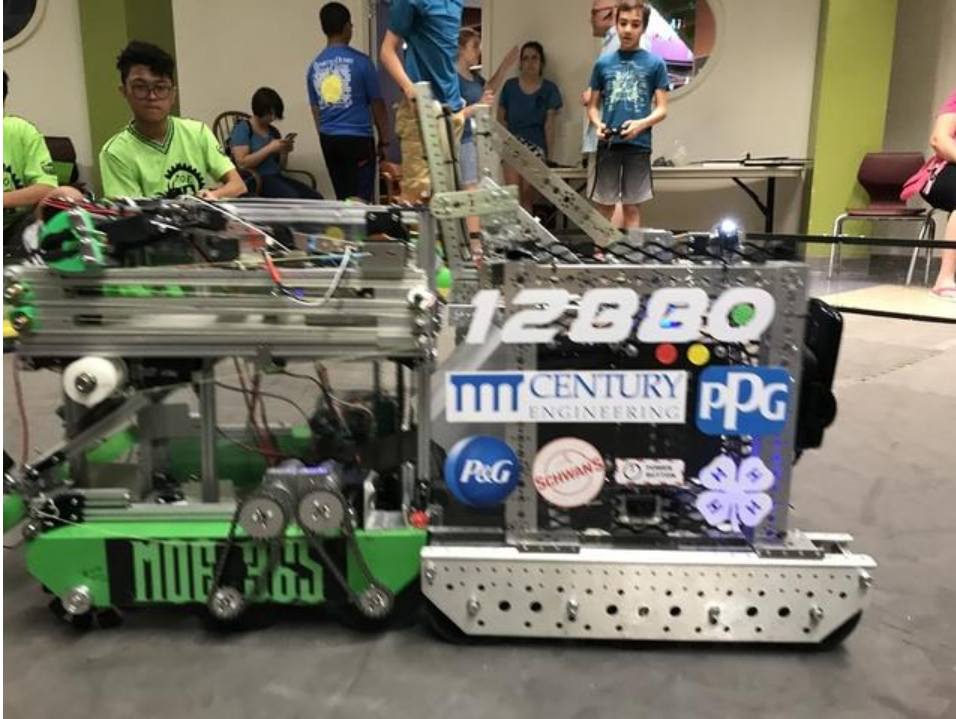**Attendees: Patrick Tiamson, Bryan Tiamson, Jonas Ho**

Date: June 9th, 2018

Duration: 10:00 AM - 2:00 PM

Event Description:

Our team worked with team 12880 Razor Steel at Dover Public Library to showcase our robots to many families. We used the Relic Recovery field and also put on some smaller robots in the field for little kids to drive around.

Reflection:

We were able to connect with another Delaware FTC team through this outreach by working together as we set-up and continuing to work together throughout the whole event. We spread the FIRST program to the Dover area, to people with low exposure to robotics and to kids who were eager to learn how robots work. Many of the kids got to play with the robots, and they took turns on the controllers. One of the kids showed interest in shadowing us as we fixed problems we were having and as we did overall general maintenance on the robot.

End-of-the-Year Team Picnic

Attendees: Connor, Ian, Patrick, Bryan, Paige, Zach, Kayla, Katy, Sean, Arnav

Date: 6/19/18

Event Description:

After a good season with the game Relic Recovery in the 2017-2018 season, MOE 365 FTC had their end of the year picnic on June 19th, where we went on a water tour on the Chesapeake canal by the Chesapeake Water Tours company. When everyone arrived, then the boat set off. While on the cruise, the team enjoyed the food that was brought and used the time to have some team bonding with each other. We also got the opportunity to fly a drone and get overhead footage of the boat.

After eating, then two members from our team, Patrick and Bryan, started to give speeches to give awards. They recognized our two seniors that were sadly leaving, but moving on to another chapter in their lives, Zach and Kayla. Then they recognized and thanked Mr. Ron Prettyman for being a great mentor that helps with a lot with the team.

Philidelphia Mini Maker Fair

Team Attendees: Patrick, Bryan, Zach, Jonas, Mr. Prettyman (mentor), Mr. Szeto (mentor)

Audience: Interested Families and Students

Summary:

The Philidelphia Mini Maker is a family-friend event showcasing many STEM related projects to be demonstrated to any interested and curious people. The event took place on Sunday, June 24th from 10 AM to 5 PM. We shared a booth with FTC Team Razer Steel Robotics in a classroom. We brought our Relic Recovery bot and our Velocity Vortex bot, along with a robot with a bat built for outreach events that we call the Batterbot. Razer Steel Robotics brought their Relic Recovery bot and brought some tiles and built a smaller version of the Relic Recovery field to fit in the classroom. We brought a small makeshift Velocity Vortex *Vortex to score in.*

Our booth attracted many children, for we let them drive the robots if they wanted to. We also explained how each robot works by going through the electronics and mechanisms, although the kids mostly enjoyed chasing around the robots. Many parents had questions about our team and the FIRST program, and we taught them about the 4 levels of the program that could introduce their children to the STEM field. Our booth attracted hundreds of parents, students, and children.

Key Outcomes:

Through this event, we got many kids interested in the STEM field. The variety of robots peaked their curiosity, and the children were able to learn how robots work. Young kids saw the fun and excitement that came with robotics. Parents were given information on the FIRST program, as well as different resources to use for further research. Middle school and high school students were also exposed to the FTC program, inspiring them to join a team.

This event was greatly successful; we got a high traffic of interested parents and students.

Gravity Festival

Attendees: Katy Gu, Connor Nagle, Paige Morrill

Date: July 11th, 2018

Time: 12:00-4:00 PM

Event Description

MOE 365 FTC held a robotics outreach at the Gravity Festival for underprivileged elementary school students. Overall, the Gravity Festival was designed the enrich students about STEM opportunities and help inspire their interests in the sciences. The team set up in the gym, and groups of students came in intervals to play with the robots and learn about the basic functions of our robot. Since the kids were still too young to learn about the specific details of the FIRST© Program and the parents were not there, we talked to the chaperones and told them about good STEM opportunities for the students. We also explained the build and programming process for the robot, and answered any questions about robotics. The kids really enjoyed the experience, this festival probably being when they first saw a real robot. Many of them stood in line to hold the controller and learn how to drive the robot, and the smaller kids followed the robot around the gym. There were around 100 kids that came to our station, and there was also someone who worked at a community center took interest in MOE FTC, giving us her contact information for a possible future outreach.

Reflection:

Overall, the experience was extremely beneficial for the team and the kids. It was my (Katy's) first outreach event, and it was extremely surprising for me to see how genuinely excited the kids were to see and play with the robot. Not only did we get to inspire the next generation to be more aware of the real-world STEM experiences, it was also great to see our team's impact on the community. We as a team also got practice with public speaking and learning how to explain clearly. This outreach event reaffirmed the benefits of helping and contributing to the community, and we hope that we helped to raise interest of STEM in the kids' minds.

Delaware Museum of Natural History

Attendees: Connor Nagle

Date: 8/8/18

Event Description

MOE 365 FRC held a robotics outreach at the Delaware Museum of Natural History for summer camp students. Connor Nagle from our team participated in the event along with a few FRC students. First, we went outside and FRC demonstrated their robot caMOElot to the children. This robot could launch balls. The FRC students talked a bit about how they made their robot, and the FIRST® Program in general.

Then we came inside and started the main activity. The kids split up into 4 teams. The FRC students and Connor Nagle also split up to mentor the teams. First, we named our teams and designed team T-shirts. We then introduced a simple game to the kids that involved using the robot to pick up objects and push them around a field. The robots were pre-built, but the mentors discussed strategies with the kids and prepared for the game. Then the kids played the game, with an emphasis on having fun and learning about robotics over winning. After the game, we gave a presentation on what a robot is, explaining different types of robots, how they can work, and how they are used in life.

Brandywine Hundred Library Vex IQ

Attendees: Connor Nagle

Date: 1st and 3rd Mondays of the month in June-August 2018

Event Description

I helped mentor a Vex IQ robotics team at the Brandywine Hundred Library. Vex IQ is a robotics program for elementary and middle school students similar to First Lego League. Each week about 6-10 students came to the meeting. In some meetings they built robots from instructions to understand structural concepts. In other meetings they looked at sensors and what they can be used for. They also explored the Vex IQ Modkit, which is basically block programming for Vex. They used this to make both autonomous and driver-controlled robots
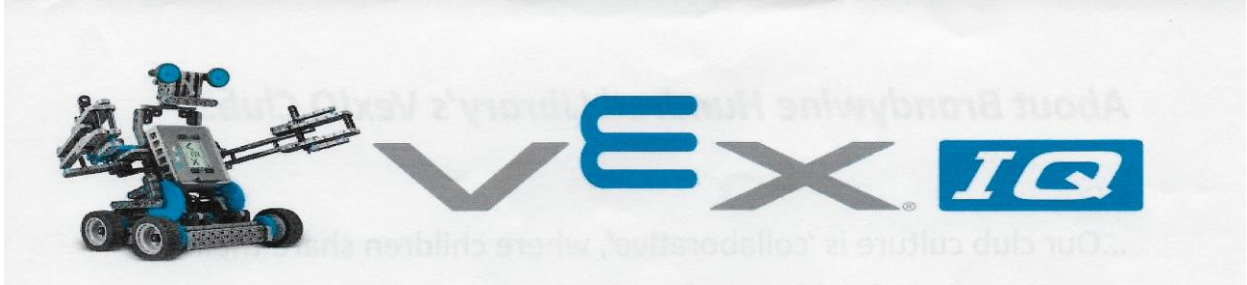
My Internship At CERN: An Incredible Experience
**Through the perspective of Rohan Kanchana**

The moment I set foot into CERN, I was awestruck.

Seeing the large Globe of Science and Innovation, the sudden reality of being in Switzerland, and the prospect of learning more about the place made me look forward to what was coming next.

I spent 2 weeks as a high school intern at CERN and was generously given the opportunity to come by Dr. Archana Sharma. I spent the duration of my time working under Dr. Jeremie Merlin, whose lab dealt with the development, production, and quality testing of the new Gas Electron Multiplier or GEM detectors (GE 1/1 and upcoming GE 2/1 detectors) to be installed on CMS.

The first day I came to the lab, I spent most of my time becoming oriented as to the whereabouts of everything, and the basics of how the lab operated. After reading parts of Dr. Merlin's thesis, which dealt with the GEM detectors, I was given my first task. There were small, yellow fiberglass sheets that were used in the production of the detectors made at CERN. However, since these sheets were made in external facilities, checks needed to be done to determine whether the sheets matched their specified dimensions. The standard deviation was calculated on each sheet to see how even it was across all regions, as well as a comparison of how well it matched its original dimensions. For example, a height of 3.01mm would be a measurement taken when comparing against the specified height of 3.00mm.

The second day, I was put with the group working on Quality Control 5 (QC5). Here, I met Ph.D. student Balashangar Kailasapathy and University of Toronto student Abhinav Bhargava, both of whom graciously introduced me to what was going on at QC5. In the lab, there is a standard protocol followed when testing the quality of each detector produced or brought to CERN. There are a series of several checks, each done in a specific order to catch flaws in the detector effectively and early. The group I was with, QC5, primarily focused on measuring gain in detectors. The gain was taken at different voltage setpoints and was checked to see if they fell in an expected range of values. This was verified by looking at the characteristics of a graph created from the output of the test. Occasionally, a Gain Uniformity test would be done to measure how uniform gain is across a detector. Although gain levels might seem good for a detector, the uniformity—or standard deviation—also has to be even. A beam of X-ray photons is passed through the detector, with the gain recorded at the region the beam passes through.
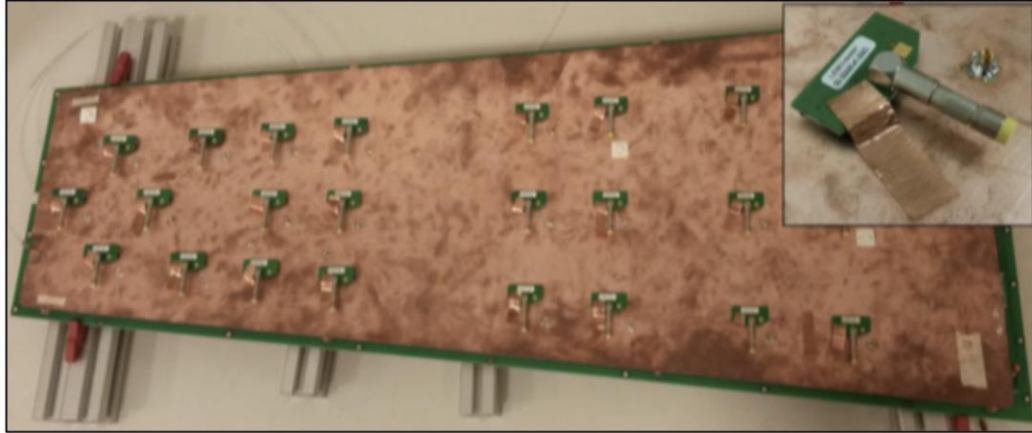
Fig 1. One example of the possible testing setups for a detector.

Even though the theory and mechanism behind the testing done at QC5 were fascinating, the method by which the testing was done was rather straightforward. One person was managing controls on a computer, inputting and recording values, while the other was handling controls and switches that controlled testing parameters. The person on the computer side had to manually select files to which output was being recorded to, configure inputs within a LabView program, and wait for a few minutes during each reading that took place. Utilizing my knowledge of computer systems and programming, I wrote a Python script that automated the bulk of the procedures done on the computer side. Now, a person was not required on the majority of the QC5 computer side!

During the lunch break, I was better able to get to know many of the people in my lab. There were people from different, diverse backgrounds; people were from all around the world. I was surprised to see that very few people were from the United States! I met college/university

students from Qatar, Tajikistan, Canada, and more. Unfortunately, I missed some of the fun activities before my arrival at CERN, especially the CERN Hardronic Music Festival held at Prévessin. This was fine since I was able to meet such amazing people over the course of my time at CERN.

Going back to what I did at the lab, I was later assigned the task of writing programs to help better analyze the gain and gain uniformity tests. Dr. Merlin, after outlining what I had to do, introduced me to ROOT, a C++ HEP-focused data analysis framework used and created at CERN. It was a collection of libraries and packages to ease the process of creating data analysis/visualization programs. As my days in the lab passed, ROOT became essential to what I was doing, and I eventually created models that allowed us to analyze the gain tests more effectively.
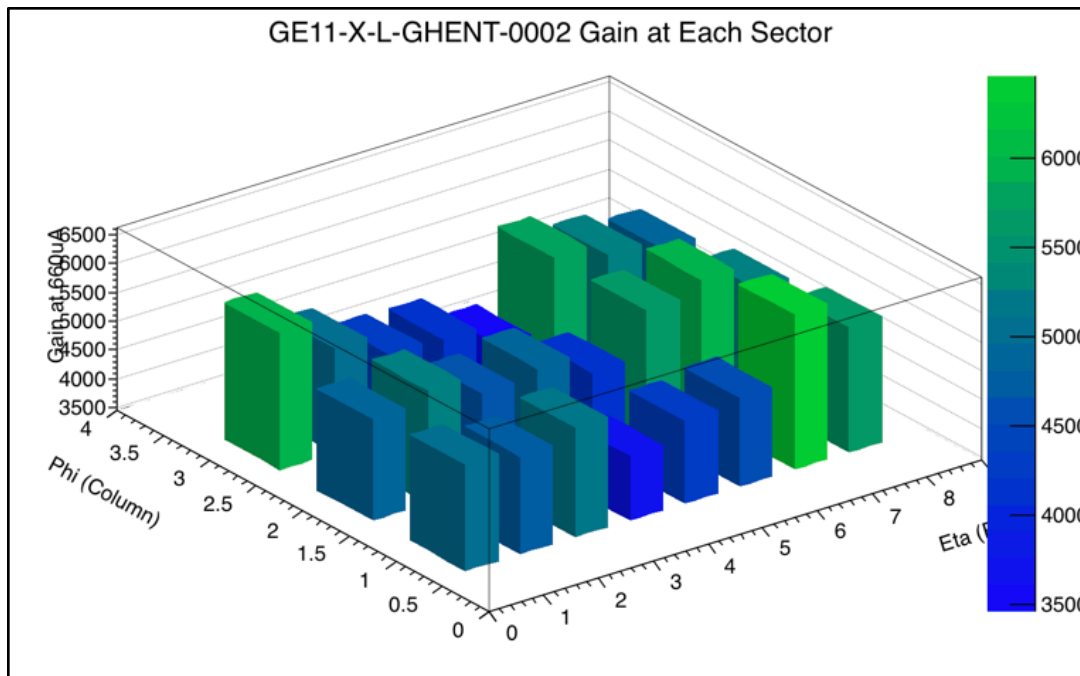
Fig 2. Example of a model produced by initial ROOT analysis.

As time progressed, further tests and analysis had to be done to make further conclusions about the detectors.

My group received results from a Planarity Test held in the Meyrin site. In a nutshell, the test measures bending across the detector. Through the use of a laser, which is passed over row by rows on the detector, the physical bending of the GEM foils—or multiplication layers—are measured. What we were trying to find out is whether there was a correlation between the gain of a detector and its bending.

When we received the data, it was given as a raw text file. Before coming up with a way to visually describe the data, some corrections needed to be made. One inherent flaw with the method in which the Planarity Test is done is the possible rotation of the detector while being measured. While the bending measurements are taken, the detector is held upright, but there is not a set process in place to guarantee that the detector is perfectly parallel. There could be slight degrees of rotation, of which was reflected in the data. To solve this issue, the data was initially plotted on a simple line graph and rotated until the starting and ending points were parallel to the x-axis. All the values would be rotated in the same way, effectively canceling out the rotation error during the Planarity Test.

After these software corrections were applied, the data was plotted on a model, of which was shaped to look like a detector (To accomplish the graphing, I programmed small lines on a 2D graph. When viewed on the canvas, the lines would appear to make a full model). The model

would allow us to map bending values to physical points on a detector spatially. When making the comparison, the original gain model shown above (Fig. 2) was converted into a different form. It was shaped like a detector since any kind of correlation would be easier to see and be better established.
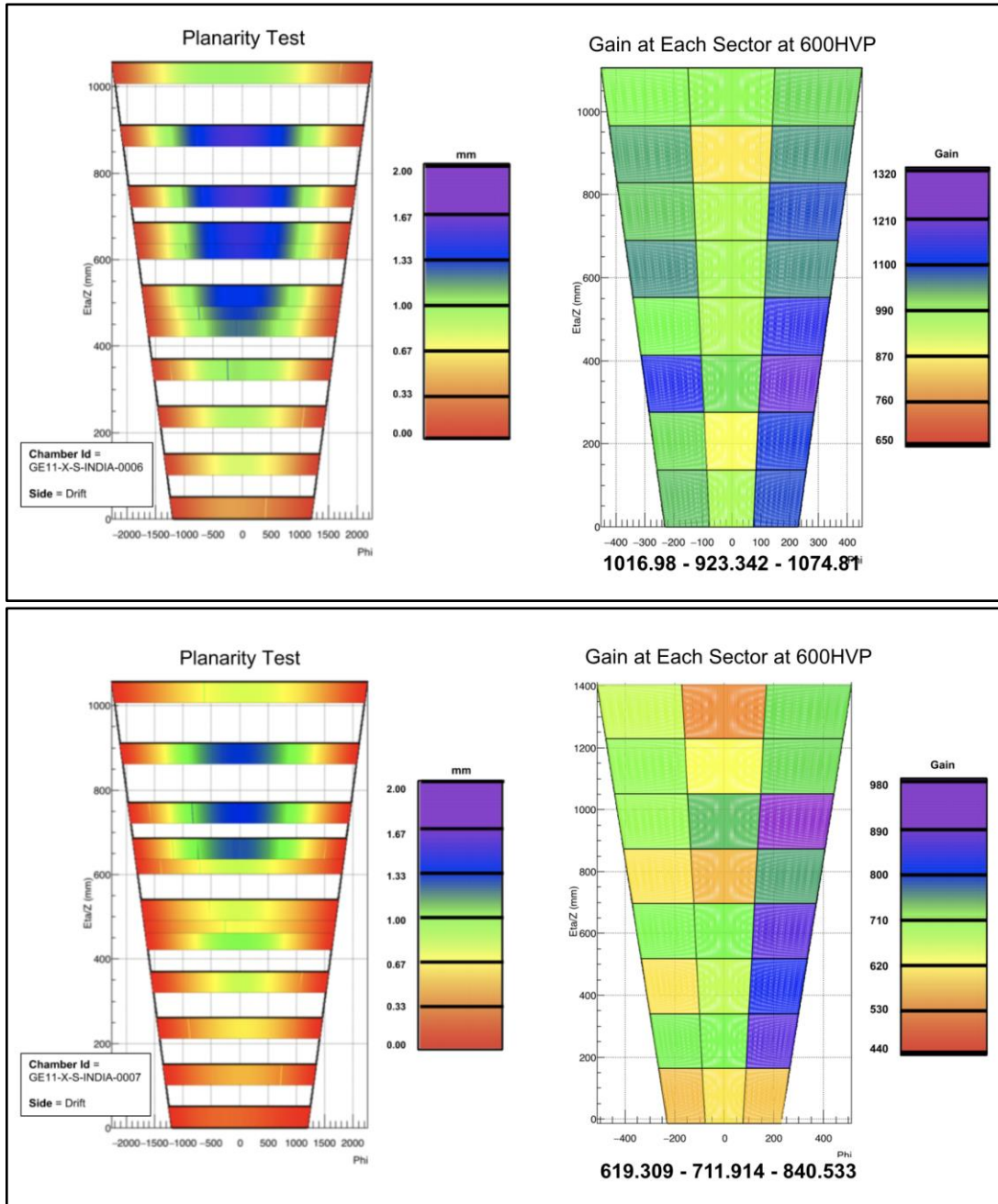

Fig 3. Planarity vs Gain comparison of GE11-X-S-INDIA-0006 & 0007 detectors, respectively.

Looking at the Planarity Test results, both models follow a convex, or "hill" shape. The bending is lowest on the outer edges as it increases the closer it is to the center area. The effect is more

strongly noticeable in the 0006 detector. On the gain model, the gain is lowest in the middle column but is higher on the left and right columns for the 0006 detector. Unlike the 0006 detector, the 0007 is less even. Its gain is highest on the right column, similar to the 0006 detector, but the middle and left columns—albeit lower than the right column—are still roughly the same.

In this comparison, there is not much of a clear correlation. At a closer glance of the 0006 detector, when observing the middle column of the gain model, the bending is also highest at the middle column of the bending model. This trend does not appear in the 0007 detector. There could be a possible correlation between the two, but more tests would need to be done on more detectors.

Another possible trend I was able to explore was the correlation between the gain and the voltage setpoint. At a higher voltage, there would be a stronger electric field within the foils of a GEM detector, allowing for greater amplification of a signal through a detector. This topic was easy to explore; I took gain values of a detector taken on different voltage setpoints. These measurements were already taken during the gain tests. By utilizing the previous programs I wrote, a comparison was quickly done.
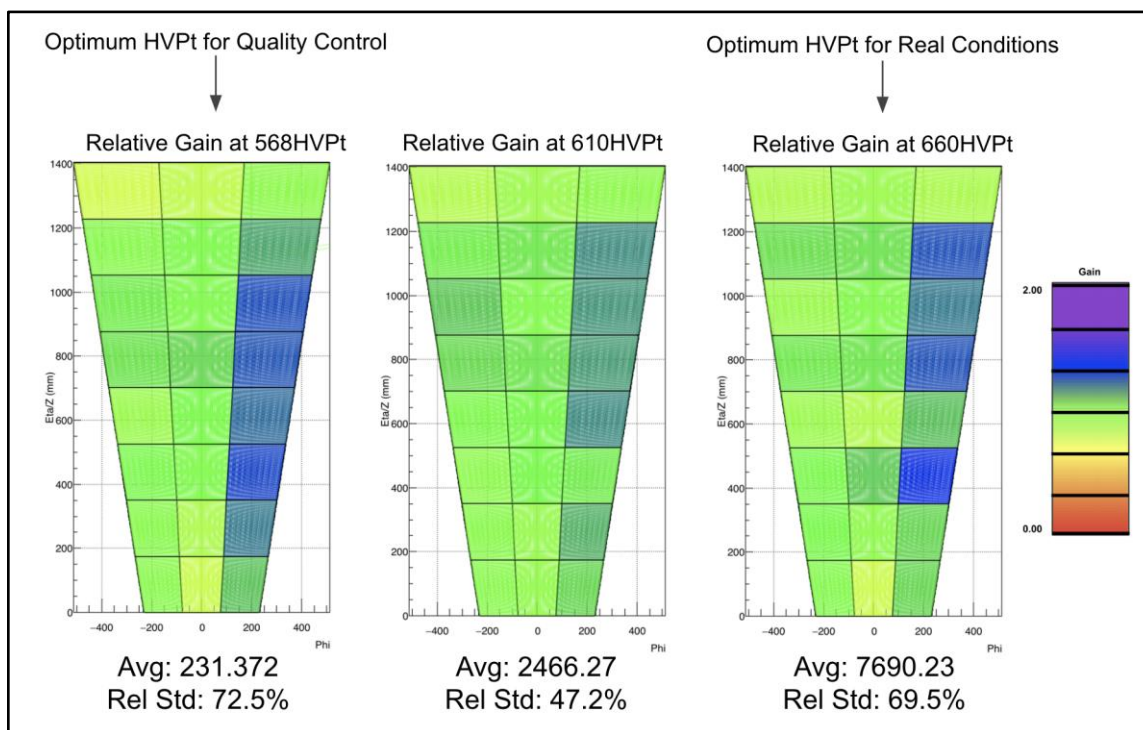

*Fig 4. Gain comparison between different voltage setpoints.*

In this test, some interesting results show up. The 568HVPt and 660HVPt models follow a similar trend; the gain is lower on the left and middle columns, while it is largest on the right

column. However, what is surprising is the fact that the 610HVPt model, which is a setpoint between 568 and 660, does not as strongly follow this trend. The gain is higher on the right side, but not as high as the 568 and 660 voltage setpoints. The relative standard deviation (shown below each HVPt graph) shows this as well. It is higher for the 568HVPt and 660HVPt models, while lowest at the 610HVPt model. These occurrences could be a natural property of the detectors, and more investigation and data would need to be taken to verify this.

A clear trend is that gain does increase with voltage. The average values below each HVPt model show a consistent increase.

Overall, this is a summary of the majority of my work I was able to do in the 2 weeks I had a CERN. On my last day, I gave a talk about the work I did, speaking alongside Abhinav Bhargava. Hearing all the other speeches was very interesting, as there was an incredible diversity in the range of topics discussed that day, ranging from telescopes to measurement systems to detectors.

In the end, I had a very enriching, informative experience. Particle physics is incredibly exciting to me, and CERN was the perfect place to get my introduction to the real world of it. Whether it was meeting the people, taking a tour of ATLAS, or getting my first experience in physics work, I thoroughly enjoyed my time. I bid my last farewell to the whole lab at R1 in Meyrin, afterward reflecting on my time here.
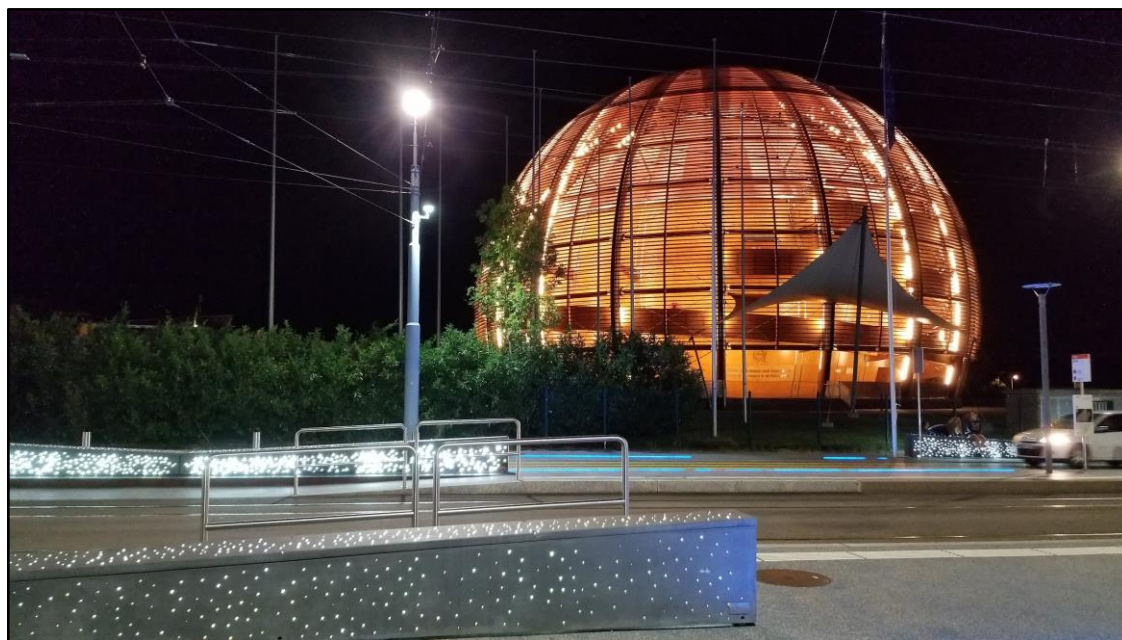
I would again like to thank Dr. Jeremie Merlin for being a great, supportive lab supervisor and helping me get experience in part of the work done in CERN, and Dr. Archana Sharma for providing this excellent opportunity.

Video link to my part of the presentation at Meyrin: https://youtu.be/Q5n4adY84dU

Horizons School of Technology Outreach

Attendees: Rohan Kanchana

Date: June 18th – August 3rd

Towards the end of the 2017-18 season of FTC, we received an email from the Horizons School of Technology. I was interested in this opportunity and decided to check it out. After filling out the online application, they invited me to join the program, a grueling 6-week bootcamp on full-stack software development. People came from all around the world, including Russia, Japan, India, and all over the United States to create a learning environment that was completely unique. Every moment had something new and interesting to take from.

Program Overview:

- **Week 1: JavaScript & Fundamentals**
  - Object Oriented JS
  - Algorithms 101
  - Data Structures
  - GitHub & Source Control
  - Developer Tools
  - JS Libraries
- **Week 2: Frontend Web Development**
  - HTML, CSS
  - jQuery, AJAX
  - Event Driven Programming
  - API Usage
  - Sample Projects: Twitter Feed Clone, Real Time Chat
- **Week 3: Backend Web Development**
  - Node.js
  - Express.js
  - MongoDB
  - Templating
  - Build your own API
  - Mailers, Delayed Jobs, Webhooks
  - Sample Projects: Kickstarter Clone, Trello Clone, Multiplayer Real-Time Blackjack
- **Week 4: Web Security**
  - Authentication Strategy with Passport.js
  - OAuth 2.0, Facebook Login
  - Web Security Vulnerabilities
  - Encryption, Hashing
  - Sample Projects: Hack into vulnerable websites, Build security measures to prevent hackers
- **Week 5: Databases, Scaling, Performance**
  - Keys, Foreign Keys

- o Indexes and Query Performance
- o Schema Design
- o Caching and Redis
- o Deployment and Heroku
- o Sample Projects: Yelp Clone, Ecommerce Site
- **Week 6: Frontend & Hybrid Mobile Application Frameworks**
  - o React JS
  - o Client-side Templating
  - o Promises
  - o Github & Source Control
  - o Developer Tools
  - o JS Libraries

Over the course of the program, I was able to live independently for 6 weeks in dorm-like accommodations. The program took place in San Francisco, close to the center of the peninsula the city encompasses. The learning hours were similar to school; from 9am. until 5-6pm. on most weekdays. Unless there were days given off (like for July 4th) or a special event was occurring, these were the usual hours for lessons. Additionally, Horizons often hosted speakers from various areas of the tech industry, including people in Artifical Intelligence, CEOs of startups, established business leaders, programmers, and of various other backgrounds in technology. There were hackathons that we participated, and had the very interesting experience of beta-testing a new and experimental PaaS (Product as a Service) and programming language known as Dark.

Github page:

Some of the more interesting projects made in the process:

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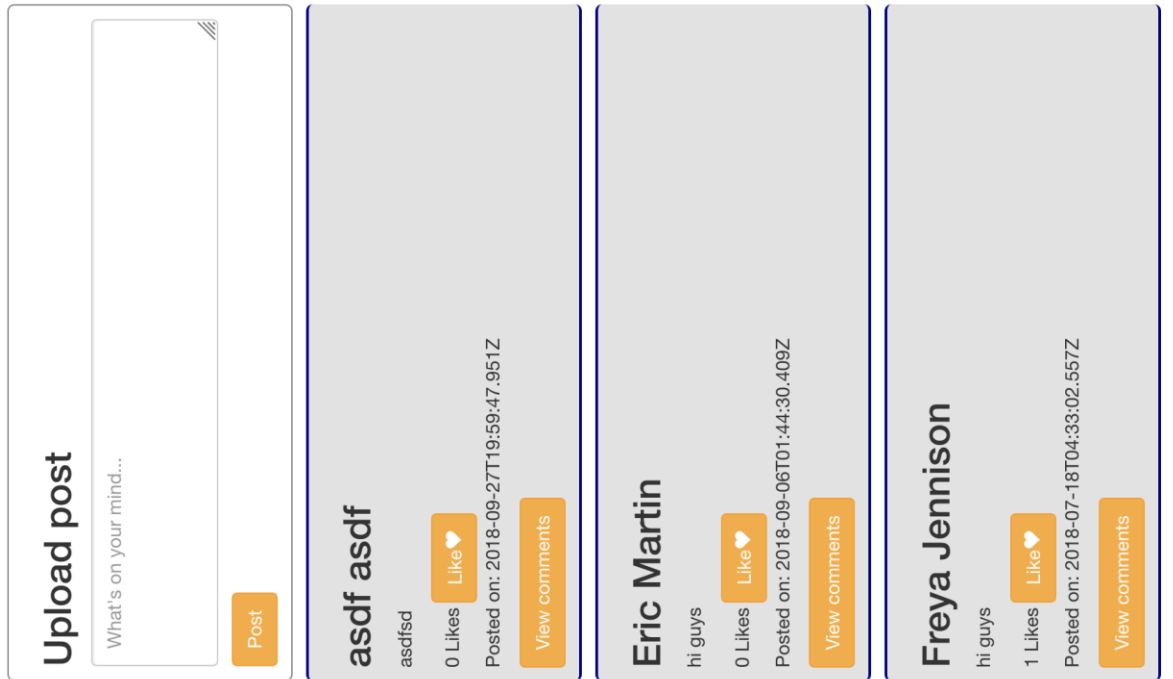
Title: Facebook Clone

Description: An online application that allowed users to register & create accounts, login, and view other people's posts. People could like and comment on posts as well, utilizing AJAX and using simple CRUD operations. and The software protected against some simple web attacks.

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Title: Twitter Clone

Description: An online application that allowed users to register & create accounts, login, follow each other and follow each other back. Additionally, people could use profile pictures and view other people's profiles.

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Title: Slapjack

Description: A WebSockets application that lets 2 or more players play slapjack in **real time**. They could be anywhere, and the game of slapjack will continue in real time with WebSockets technology that allows for fast, real-time communication between the two computers.

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```
[
  {
    _id: "5b466bbaa8d1e5f167cf8d42",
    Name: "Stephen Curry",
    Points: 25.3,
    Rebounds: 4.5,
    Assists: 6.6,
    __v: 0
  },
  {
    _id: "5b466bbaa8d1e5f167cf8d41",
    Name: "James Harden",
    Points: 29.1,
    Rebounds: 8.1,
    Assists: 11.2,
    __v: 0
  },
  {
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    Name: "Lebron James",
    Points: 26.4,
    Rebounds: 8.6,
    Assists: 8.7,
    __v: 0
  },
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    Rebounds: 8.3,
    Assists: 4.8,
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  {
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    Name: "Rohan Kanchana",
    Points: 1000,
    Rebounds: 1000,
    Assists: 100000000,
    __v: 0
  }
]
```

Title: NBA Mongoose

Description: A JSON (JavaScript Object Notation) based viewer to allow NBA players and stats to be recorded and viewed.

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Yo
- Goal: 9
- Description: asdf
- Start Date: Thu Jul 12 2018 17:23:10 GMT-0400 (Eastern Daylight Time)
- End Date: Thu Jul 12 2018 17:23:10 GMT-0400 (Eastern Daylight Time)
- Category: Select a category

Go to individual project page!

Contributions:

Total: 0

Goal Progress

asdfaaa
- Goal: 5
- Description: asdf
- Start Date: Thu Jul 12 2018 16:35:14 GMT-0400 (Eastern Daylight Time)
- End Date: Thu Jul 12 2018 16:35:14 GMT-0400 (Eastern Daylight Time)
- Category: Current Black Presidents

Go to individual project page!

Contributions:

Total: 1

Goal Progress

- rohan : 1

david's money
- Goal: 10000
- Description: money
- Start Date: Wed Jul 11 2018 21:28:34 GMT-0400 (Eastern Daylight Time)
- End Date: Wed Jul 11 2018 21:28:34 GMT-0400 (Eastern Daylight Time)
- Category:

Go to individual project page!

Contributions:

Total: 27000

Goal Progress

- rohan : 5000
- david : 2000
- rohan : 20000

Title: Kickstarter Clone

Description: An application that allows "mock" funding of other people's kickstarter projects. The amount of money and goals can be viewed for each person, and people can "give money" to projects they like.

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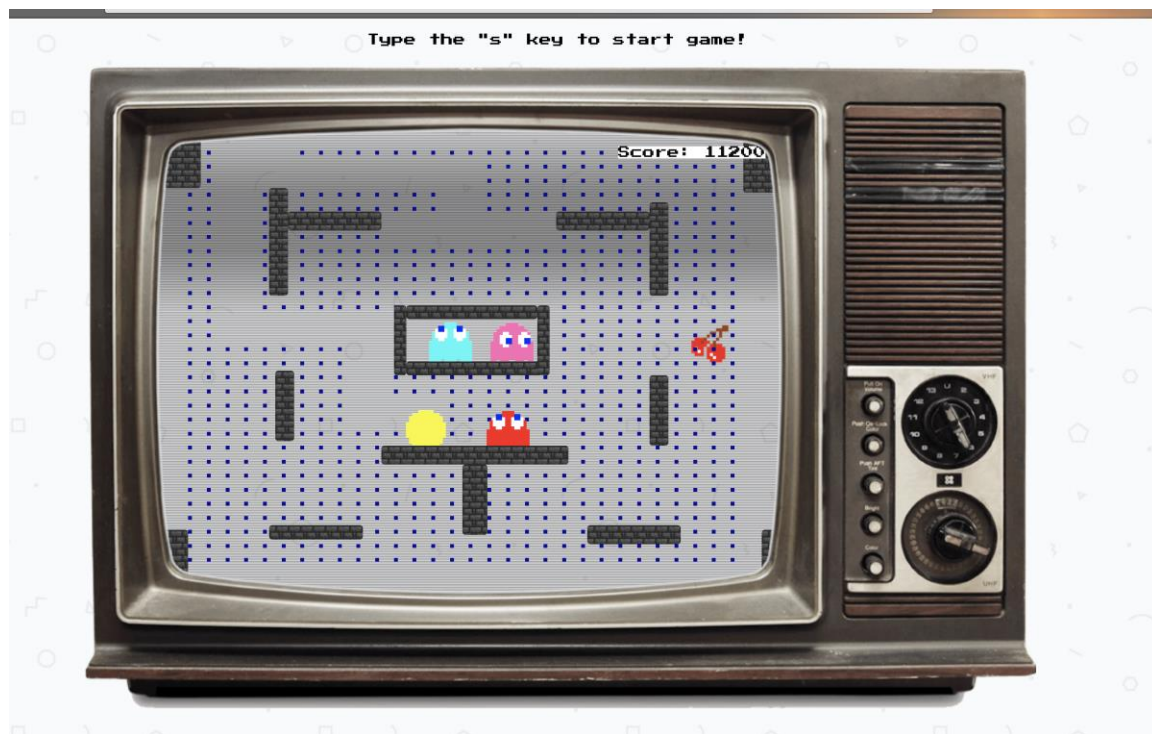
Title: Hacman

Description: A web-based version of the popular game Pacman that allows the user to play as Pacman on a TV. The ghosts have a unique attacking mechanism however:

- They will take the most efficient route to get to Pacman
- They will bomb through walls if they ever get stuck behind Pacman

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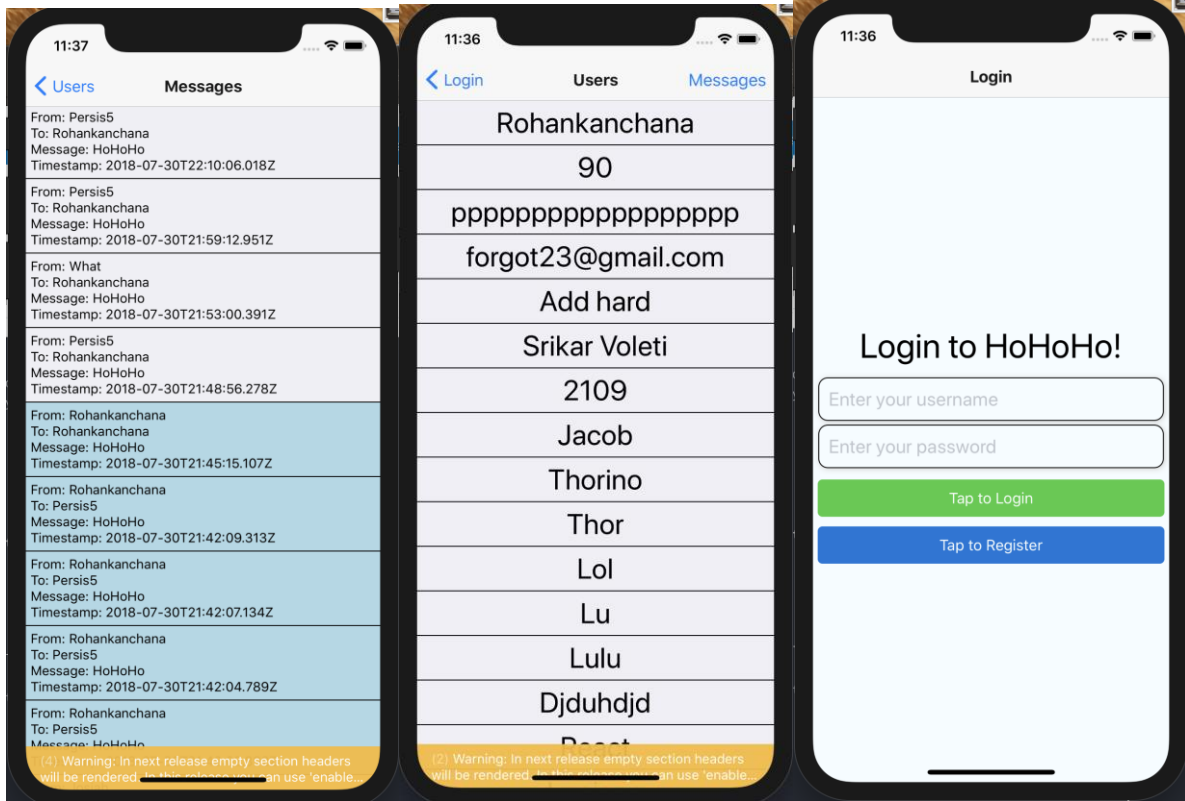
Title: HoHoHo Messaging App

Description: A messaging app built for mobile devices using the React Native JavaScript framework. People can message anybody in their contact list with *only one message: "HoHoHo"* and get a list of all their messages. Additionally, Login and Registration features are used.

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Data source

Results calculated for June 6th 2016 1700 GMT:
[Raw data](https://dumps.wikimedia.org/other/pagecounts-raw/2016/2016-06/pagecounts-20160606-170000.gz)

Part 1: Most popular pages

Language	Page	Visits
en	Main_Page	744393
en	Mexico_City	48773
de	Wikipedia:Hauptseite	34663
fr	Wikip%C3%A9dia:Accueil_principal	30510
ru	%D0%97%D0%B0%D0%B3%D0%BB%D0%B0%D0%B2%D0%BD%D0%B0%
D1%8F\ %D1%81%D1%82%D1%80%D0%B0%D0%BD%D0%B8%D1%86%D

Title: Wikipedia Parser

Description: A Wikipedia data cruncher that takes monthly data from Wikipedia, parses through it, and prints out interesting and useful findings.

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There are many more projects which I find of interest and showcase the different things learned at Horizons.

Overall, my experience at Horizons has been incredibly beneficial for my programming ability. It has also been an enjoyable experience where I met new people from all around the world, was able to stay indepdently, and enjoy many of the wonders of California. With the daily repeated practice of over 6 weeks, there was a definite improvement in my skills and efficiency. I was exposed to a large number of technologies used in professional software development, and am able to create web-apps and other such programs if need be.

First Responders Day

MOE Attendees: Karthik, Jonas

Participants: Event Attendees

Date:10/13/18

Duration: 12:30 PM – 5:30 PM

The First Responders Day event, located near Newport, was hosted by Hope St to celebrate First Responders and the help they contribute towards society. There were various activities going on, including live music, awards, and plenty of food. Our event was one of these. Our team had a table set up displaying our robot. Being that the average age group of the event was younger (between 4th and 7th grade), we choose to bring out one of our simpler robots. Codenamed "Batter-Bot," the robot was an Omni-wheel chassis with a rotating bat attached on the top. We taught kids how to drive the robot. We brought out whiffle balls and gave kids the chance to hit them using the robot.

Fixing the robot's batter arm after an

unfortunate accident

Our batter-bot preparing to hit the

 whiffle ball

A picture of our robot and the activities

going on at the event

The area that the event took place in

Date: October 20th, 2018

Duration: 8:00 AM -4:00 PM

Duel on the Delaware

Attendees: Paige Morrill, Patrick Tiamson, Bryan Tiamson, Rohan Kanchana, Karthik Kona, Ian Picho, Clare O'Dwyer, Jonas Ho

Event Description:

Workshops:

Write about: What you learned, what you plan to use in the future, why you chose to go to this workshop, what you would like to see in the workshop in the future

- Robust Robot Design

Robust Robot Design was a workshop about how to build a "crash proof" robot. Joe Perrotto was the one giving the presentation, and he talked about different causes of failures in robots, which were Static discharges in your robot and Wiring. He talked about what team can buy to help solve these problems and other things teams can do to prevent them and cause failures for teams' robots. He also talked about how FIRST are preventing these failures. Something else that I wished that I could learn in this workshop is

- Judging Tips & Insights

Judging Tips & Insights was a workshop about how to make a better notebook and presentation. Team #8528 Rhyme Know Reason was presenting, and they gave some tips and pointers for us to improve our notebook and judging presentation. They also gave us two activities to try it. They told us to make a design for a "robot" to fling a paper clip and get the closest to a taped line and write a notebook entry about how we can to the idea and agreed on it, the process, materials used, and failures. And the other activity was to make and present a judging presentation to Rhyme Know Reason. For the notebook, some tips were to make sure

to include failures, next steps, images, decisions, and processes. And for judging, some tips were handouts, pictures, speak clearly, have everyone speak, practice (DON'T wing it), and some sugar for judges.

- PTC Design

PTC design was a workshop for designing a structurally sound robot. We were taught how to add basic parts. We learned how to add constraints between different beams and the variety of constraints that could be added. We were shown how to add pins to test the rations of different gears. We worked to replicate a basic robot. Then we were taught how to properly sketch objects and convert them from 2D to 3D. Near the end of the workshop, the mentors showed us how to do stress testing and mechanical animations on the specific parts of a robot. This workshop wasn't perfect, as it was cut off shorter than expected.

- Java Basics for FTC

Java Basics for FTC was a workshop outlining the basics of programming using Android Studio. Rohan and Mr. Szeto hosted it and helped us and the other teams to set up Android Studio. They taught us how to get started writing both TeleOp and Autonomous programs. We ran through a program and then downloaded TeleOp code to a sample robot. We talked about different aspects of writing Java code and gained useful insight into learning more about programming in the future. We learned that neat code is important and that there are plenty of online resources (such as Codecademy) that you can use to improve upon your foundation of Java programming.

- 3D Printing Tips, Tricks, and Material Selection

This workshop was all about ways to make your 3D printed parts stronger, how to 3D print object know that the print would print well. The workshop was taught by Cliff Warner. One of the things he put a lot of enfaces on is to simulate your print to see how to printer will print it to see if there is any problem area before printing to part and to help debug failed prints. Another tip he talked about was to design the CAD file so that you can avoid support material as much as possible. You can do this by keeping overhangs stepper than about 45 degrees and

avoid shelves and ceilings. He also talked about infill, Fit Tolerance for Interlocking parts and infill types. He also talked about the pros and cons of different filament materials and when to use them. Something else that Ian wished that I could learn in this workshop is how to prevent other common printing failure. What also might have been helpful is if that Tips and Tricks could have been visually shown or the instruct used an example object to slice and demonstrate the tips he was telling use to follow to prevent failed prints.

Accomplishments:

- Created a Notebook Management Document to use to keep track of Notebook entries that aren't completely finished to make sure we keep our notebook in its best condition
  - Can be used in future meetings to make sure we are always updating the notebook
  - Creates an easier way to view uncompleted events instead of going through each notebook one by one
 - Easy-to-update

Notebook Management (created 10/20/18)

Meeting	Needed Information
9/22/18	10/20 Needs Dropping write up (Paige, Karthik, Clare) 10/20 Notebook Complete
9/29/18	10/20 Pictures of Shirt Design 10/20 Pictures Added 10/20 Hanging and Dropping Needs Pictures 10/20 Hanging and Dropping Complete
10/2/18	10/20 The CAD and Write up of the Mecanum Chassis is the EXACT as previous meeting 10/20 Deleted This and kept it on the previous meeting 10/20 Programming needs write up 10/20 Programming written up 10/20 Project Planning needs write up
10/6/18	10/20 Autonomous write up (A*) 10/20 Started Entry but not complete 10/20 Judging Presentation Pictures
10/9/18	10/20 Autonomous Write up
10/13/18	10/20 Autonomous Write up 10/20 Mechanical Detail (LLMS)
10/16/18	10/20 Autonomous write up 10/20 Mechanical seems like it details

- Team Marker Mechanism
  - Ian put together the servo to the servo mount and then mounted a servo horn to the servo. I tried to use a regular screw to put the servo horn because we did not bring a servo screw. But It was not going to work because the servo horn was too loose and a Mentor on Razer Steel said that can destroy the servo. He then gave me a servo screw.
  - Then, I put a rev extrusion beam on the servo horn.
  - Then, I put the Team marker mechanism on the robot chassis that we are going to use for competition. But then Mr. Prettyman said the mechanism should be on the programming robot because the competition robot will not be programmed for a while.
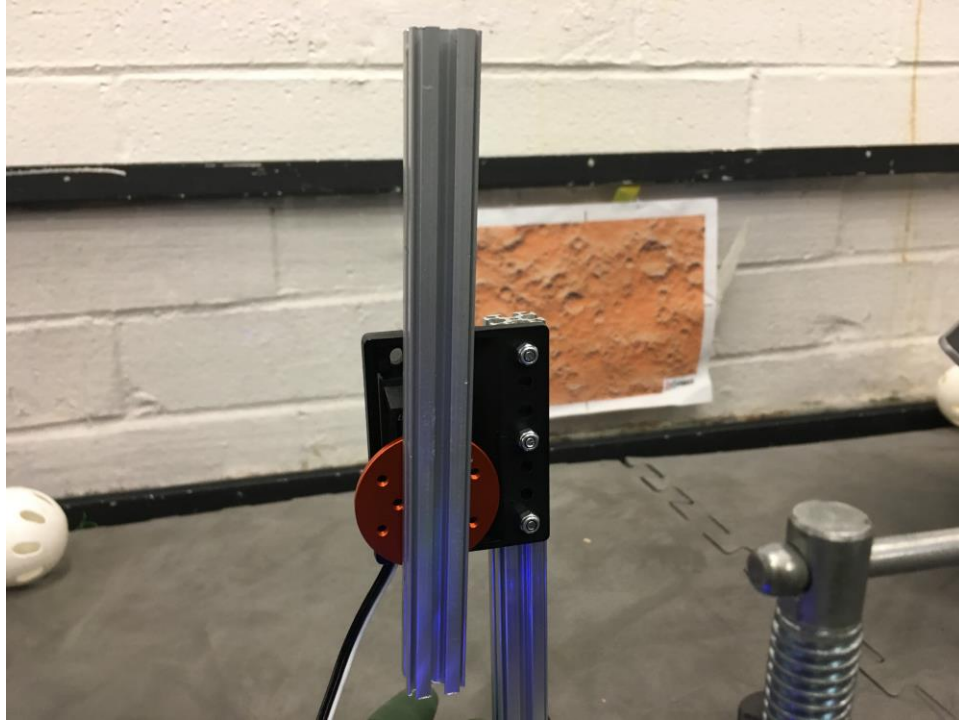
Linear Actuator	
Problem: Assemble the Linear Actuator	Use the kit and the assembly instructions to build Actobotic's Linear Actuator
Fabricate the Solution: Following the instructions	I just followed the instructions to build the Linear Actuator

Chemistry Week at the Independence School

Attendees: Paige Morrill, Clare O'Dwyer, Marcus Scena, Ian Picho

Date: 11/3/18

Event Description

      MOE 365 FTC showcased the Batter Bot during Chemistry Week at the Independence School. We set up a demo where we taught the kids how to drive the robot, and they were then able to use the robot's bat to hit balls off of tees. While they were waiting to try the robot, we showed the kids an example of a 3D print, our team marker, and explained how this technology worked. Many of the kids expressed interest in learning robotics, so we talked with them about our experiences and the FTC competition format. In addition, we discussed with parents about different FIRST programs and the various skills and values we learned through being on a FIRST Tech Challenge team. We were happy to see how enthusiastic both the kids and the parents were about robotics, and we were glad to share our thoughts and experiences with them.

JP Morgan Generation Tech Outreach

Attendees: Katy Gu, Patrick Tiamson, Bryan Tiamson, Karthik Kona

Date: December 7th, 2018

**Time: 3:30-8:30 PM**

Event Description

In general, Generation Tech is an event where students from grades 9 through 12 have the opportunity to work with other students and create a technical solution for a problem that benefits the social welfare of the community. Additionally, JP Morgan Chase employees overview each team to mentor the students while they work on creating a visionary panacea. As the students are working, the parents will also participate in an informative session on how to aid their children in pursuing a STEM related career.
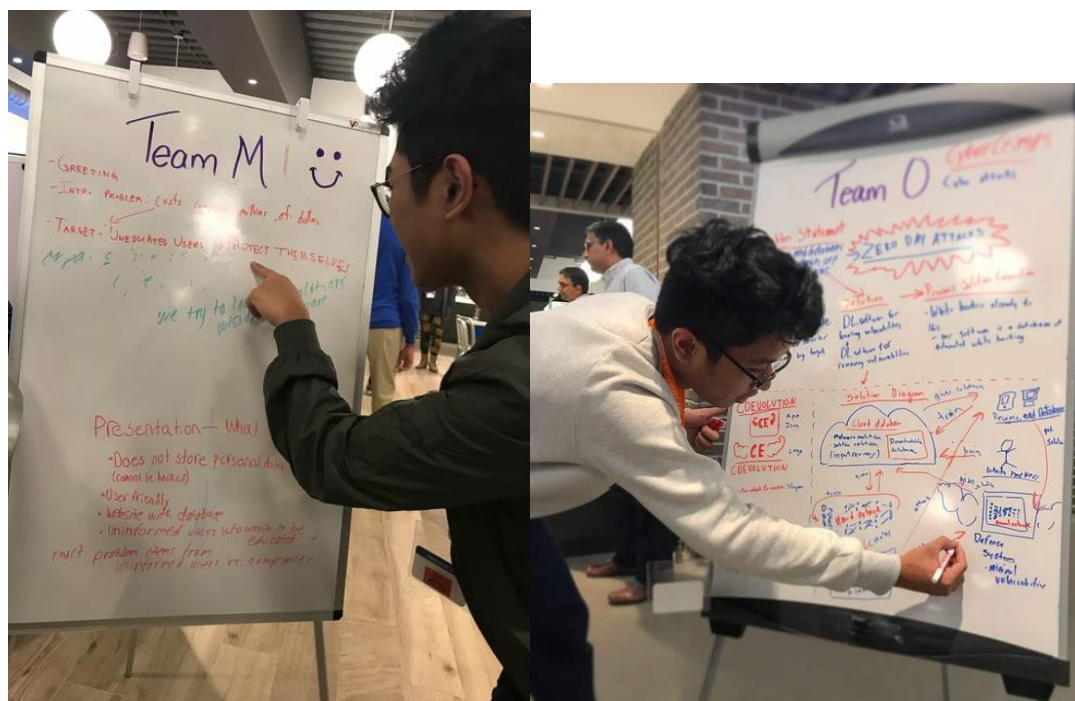
This year, the student teams were divided into 4 topical categories including cyber crimes, cyber bullying, privacy, and social engineering, where we had to create an app or a

website describing our idea on how to ameliorate or resolve the problem. After 2 hours of working on an idea, the teams presented their solution to a group of judges consisting of JP Morgan Chase employees who decided which design was the most creative and had the greatest potential for success. After selecting the best idea in each of the four categories, these four teams then went on to present their ideas once again for the judges to choose the best idea overall. MOE FTC members were all spread out in different groups, and a fellow Delaware FTC team Flaming Phoenix was at the event as well. In the end, one of our team members ended up qualifying for the final round of judging
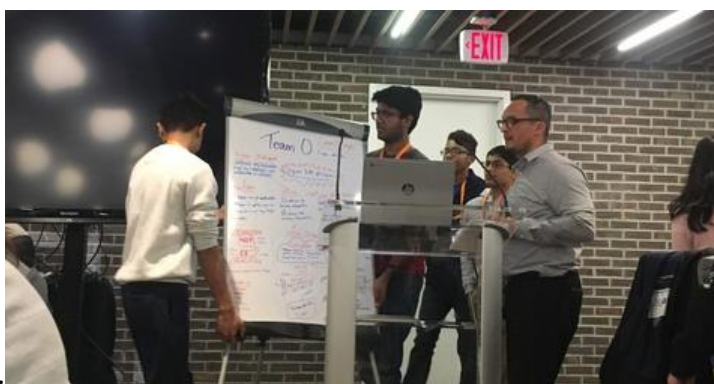
Reflection:

All in all, this opportunity was very helpful for the team as whole. During the event, I (Katy) learned more about the given topics (cyber crimes, cyber bullying, privacy, and social engineering) from my own background research and from the other teams' presentations. Additionally, it was nice to be put into a group without anyone I knew; even though I was out of my comfort zone, it was a good simulation of the real world where I would have to work with new people. The presentation portion was beneficial as well because it exercised my social skills. The process of fabricating a creative idea in such a short amount of time was also an interesting experience, and seeing that so many teams came up with really good ideas was extremely promising in regard to the future of the STEM industry. Although this was not a standard outreach where the robotics team would inspire others to recognize the importance of STEM, Generation Tech taught me and served as a prime example of an event that could inspire a group of kids in just a few hours. Furthermore, I thought that the information session

for the parents was another great idea since it is important for kids to be aware of STEM, but just as important for the parents to cultivate this interest so it can grow into something more. While for the most part this event was organized well, one area JP Morgan could consider improving upon for the future is more experienced mentors; in my case specifically, the mentor did not explain our group's topic very clearly, and while his intentions were good, he was not able to help us when we asked for it. Generally, this outreach event reaffirmed the impact of educating the students on STEM. We as a team strive to further the efforts made by those such as GenTech.

Mentoring FLL Team #34670 Starstruck Tsunamis

Attendees: Clare O'Dwyer

Date: January 17-18, 2019

    I met with FLL team #34670 Starstruck Tsunamis in order to help them prepare for their upcoming competition and to explain to them what the transition from First Lego League to First Tech Challenge was like. The team was made up of fourth and fifth graders from the Independence School.

    For the project portion, they devised a virtual reality device where astronauts on the International Space Station could exercise on a bike while watching a VR video of their family and friends. I gave them feedback on their solution and asked them questions in order to prepare them for their judging presentation. In Core Values, I discussed with them about the importance of showing Coopertition and Gracious Professionalism in and outside of robotics. We agreed on the importance of teamwork, respect, and good sportsmanship. I then watched their presentation and asked them sample questions. For the robot game, I talked with them about what they should expect and what they should make sure to do before every match.

    The kids were enthusiastic and excited for their competition, and I was happy to be able to provide advice and guidance along the way.

FebFest at the Independence School

Attendees: Clare O'Dwyer, Jonas Ho, Karthik Kona

Date: 2/8/19

Event Description

MOE 365 FTC brought a robot to the Independence School's FebFest event, which included many arcade games. We were able to talk with many parents and kids about what First Tech Challenge is, what our robot does, and why our team attends events such as this. There were many kids and parents involved with First Lego League at the event, so we explained why they should continue on to participate in FTC in middle school and high school.
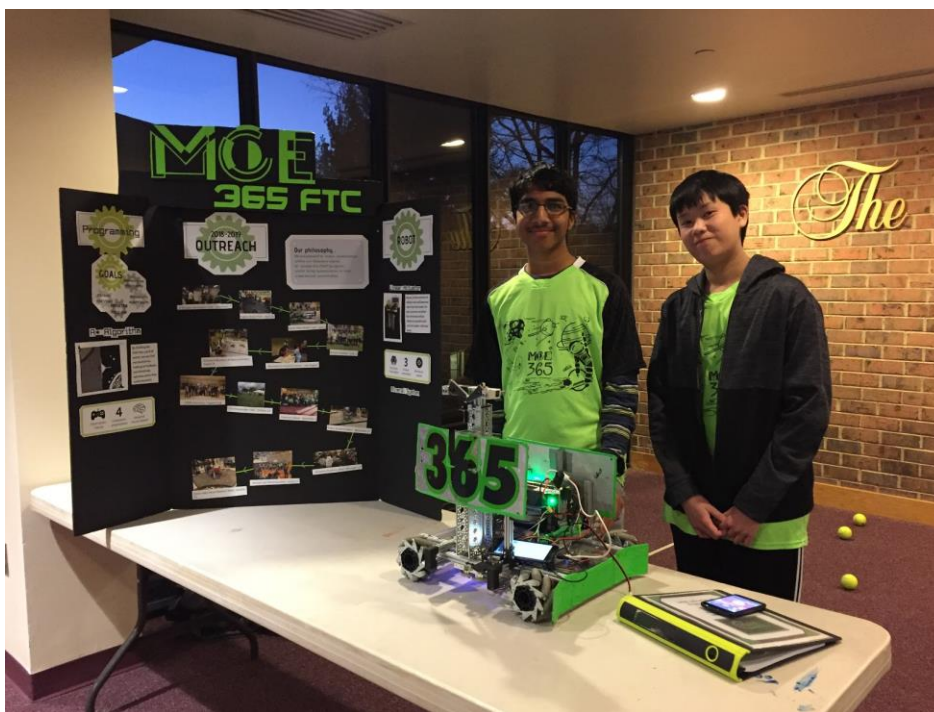
Reflection

We were happy to be able to share our robot with a wider audience. Many of the kids and parents were very interested in what we were doing, and we discussed with them about the importance of STEM and engineering in our lives.

One issue we faced was that we forgot to bring an OTG cable, which meant that we couldn't run our robot. Fortunately, we decided to spend more time talking to those in attendance and showing them our engineering notebook rather than running a demo. In the future, we will be more careful about bringing all important components to outreach events.

Meeting with #14541 Dragonators

Attendees: Clare O'Dwyer, Jonas Ho, Karthik Kona, Paige Morrill, Rohan Kanchana, Bryan Tiamson, Patrick Tiamson, Katy Gu, Connor Nagle, Ian Picho

Date: 2/16/19

Event Description

Team 14541 Dragonators came to meet with us from 9:30 to 1:30. We helped them with many aspects of their robot, their notebook, and their plans for the World Championships.

Katy and Clare looked through their notebook with them. We advised them about the organization of their entries in order to avoid confusion, and we suggested that they place a larger emphasis on reflection and lessons learned. We also compared summary pages and encouraged them to compile a Control Document submission.
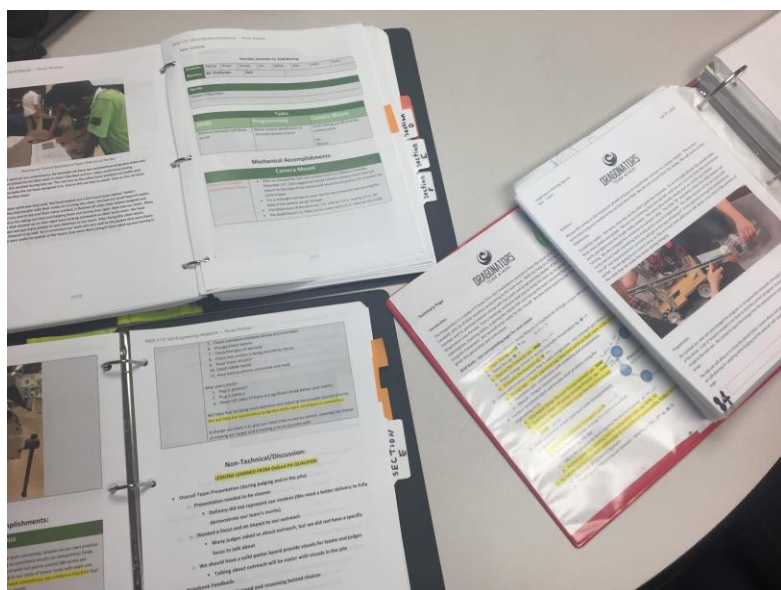
Patrick and Jonas talked with them about their programming and autonomous routines. We explained how our autonomous is organized, how our turn corrections work, and how our programming team functions together. We also set them up with a webcam so that they could begin sensing colors to complete mineral sampling instead of always guessing that the gold mineral would be in the center.

We gave the Dragonators a tour of our lab and Connor showed one of their team members how he completes his CAD. Paige showed them how to make buttons, and we helped them make a few buttons with a Dragonators' logo on them. We also taught them some simple math concepts and explained how our neural network works.
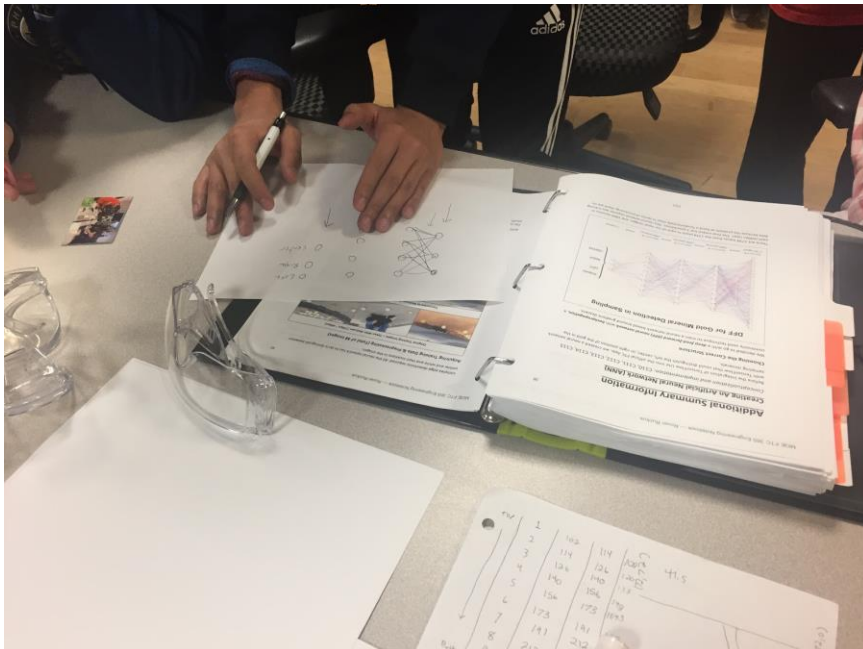
Fundraiser at Panera Bread

Attendees: Patrick Tiamson, Bryan Tiamson, Karthik Kona, Katy Gu

Date: 3/10/19

Duration: 4 PM – 8 PM

Event Description

Panera Bread was hosting Panera Fundraising, where people can sign up to get funded by Panera. We signed up for Sunday, March 10th at Newark, DE, so we would be near the University of Delaware campus, so that we can get the interest of college students. We advertised the event on various social medias and handed out flyers at different schools. We planned to pass out more flyers on Main Street, as well. The fundraiser required that people showed the flyer (either electronic or paper versions) and we get 20% of the sale.

Panera FUNDRAISING

HELP SUPPORT

FIRST STATE ROBOTICS

WHERE 140 East Main Street, Newark, DE

WHEN Sunday, March 10th   **FROM** 4:00pm - 8:00pm

Bring this flyer or show an electronic version to the cashier when you place your order and we'll donate a portion of the proceeds from your purchase. Gift card purchases and catering are not counted towards the event.

Learn more at **Fundraising.PaneraBread.com**

Ordering Online? Try Rapid Pick-Up or Delivery.
Enter promo code "PRFUND" at checkout to have a portion of your proceeds donated to your organization.

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During the event, Mr. Prettyman and Karthik started handing out flyers at the beginning. They ran out of flyers but went out and printed more. Then, Patrick, Bryan, and Katy came and brought more flyers. Also, in a previous outreach event, we handed out more flyers so people who were interested in our robot can help us fundraise. All in all, we handed hundreds of flyers that day as well as reaching even more people through social media beforehand.

We think we generated hundreds of dollars from the event, but we do not know the exact amount as of yet

Reflection

The event felt like a success! Many people were happy to contribute to the fundraiser while enjoying a nice meal at Panera Bread. We got to see some friends and familiar faces that came to eat, as well as meeting new people. To improve, I think that events similar to this would be more effective with a larger social media presence and more outreaches event leading up to the fundraiser so we can pass out flyers more effectively.