

Business Tips and Tricks



Introductions

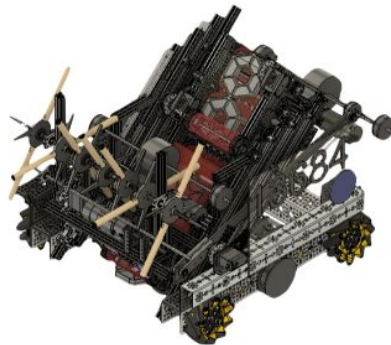


Engineering Portfolio 101



What is the Engineering Portfolio?

- A summary of the team's journey during the season
 - May include:
 - CAD/Sketches, Prototypes, Mechanisms
 - Autonomous, Programming Enhancements
 - Outreach Events, Community Service, Fundraising
- Must submit in order to win awards
- Can be handwritten or electronic documents

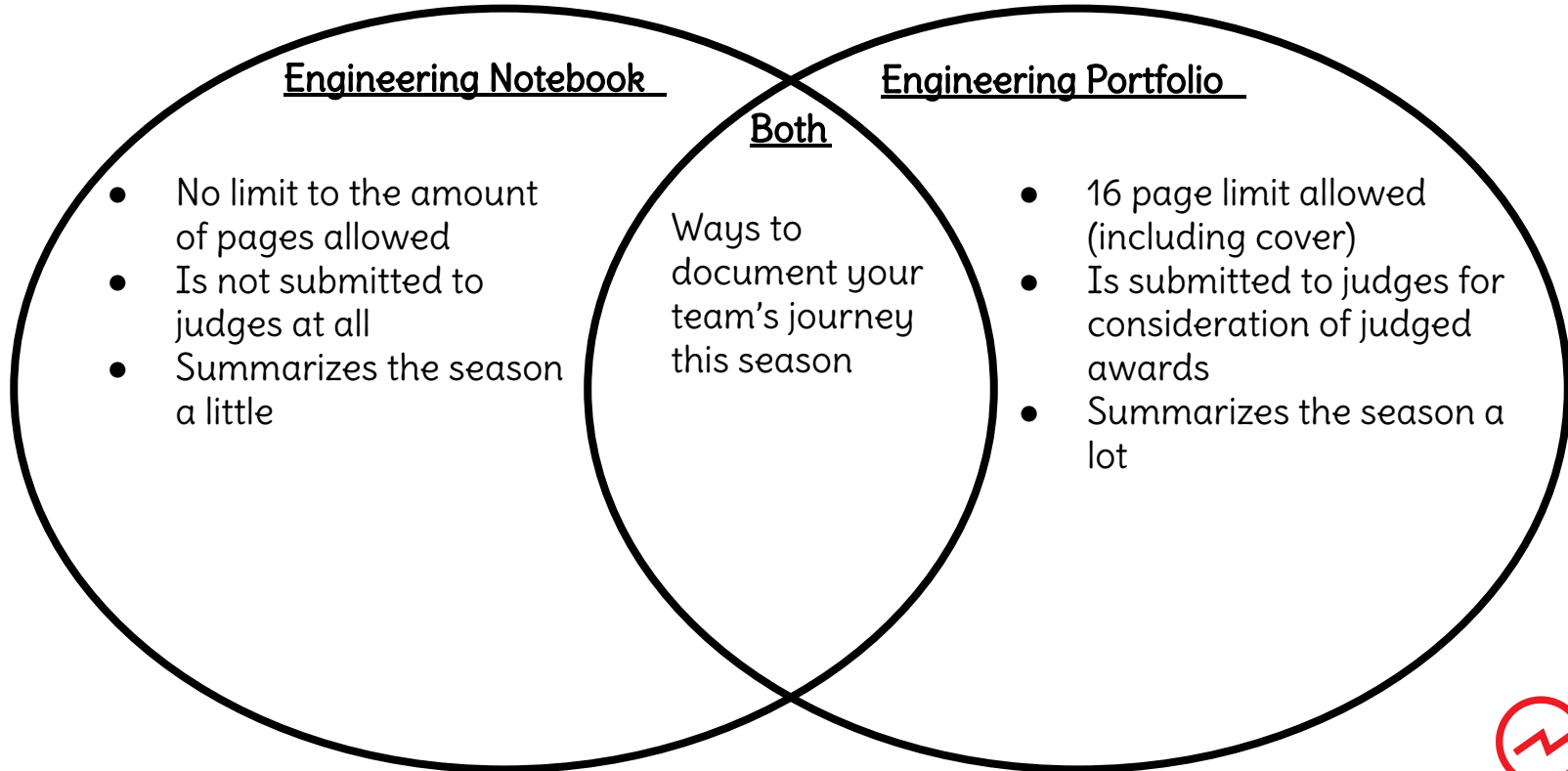


What is the Engineering Portfolio Requirements?

- Maximum of 16 pages
 - 15 pages of content
 - 1 cover page with only table of contents, team information(e.g. team number, name, etc.)
- Cannot include links to other documents, videos, etc.
- Pages numbers and team name (recommendation)



How is it different from the Engineering Notebook?



Engineering Portfolio Tips



Write short blurbs!

-It is important to summarize your team's journey!

How can you do this?

1. Write all the information that you want to include
2. Reread your work, think about each sentence if it is really important, if not delete it!
3. Then slowly delete words/sentences that don't change to sentence's meaning.
4. See if you can rearrange sentences to decrease the size of your paragraph.

We used a claw to help pick up cones. This is efficient because it picks up the cones faster.

We used a claw to pick up cones faster.



Ways to organize your portfolio neatly

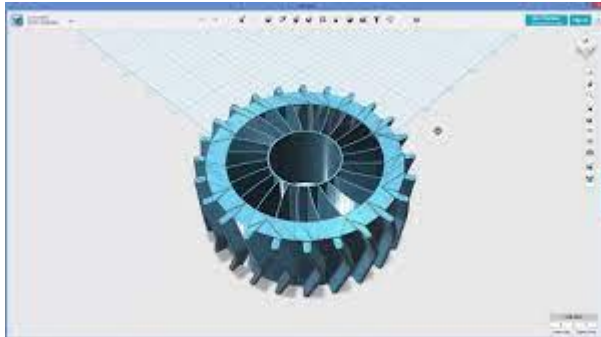
- Accents and borders
- Have a couple pages for each aspect of the robotics (intro, building, programming, design, business)
 - Building/design- Can organize by mechanism or by your team's design process
 - Programming- Can have a section for autonomous, robot enhancements, sensors
 - Business: Can organize by events or calendar year
- For all of these, we recommend putting your team's most important information first!



Pictures

Pictures are a good way to share a part of the team's journey!!

- Diagrams and CAD designs will be helpful for judges to see how the robot evolved
- Pictures of outreach events help show the scale of the event
- Helps the judges visualize whatever you are writing about!



Tell the story of your team, not just facts!

Judges are humans too, it may be easier to read a story, while fact could go over their heads.

Example: Our team talked about how we've helped grow our robotics community.



Portfolio examples

Outreach

Gallimore Robotfest

The Gallimore's robotics lead reached out and invited us to mentor the Gallimore Robofest robotics teams. We helped the teams with programming and building their robots. We also volunteered at the Gallimore & World Championship (virtual) Robofest competitions. During Gallimore's Robofest season, we talked to 12 teams/~48 students about middle school robotics and had a form for those interested in robotics next year.



Caresoft Events

We visited Caresoft in Livonia and learned about benchmarking cars. We invited 2 of the rookie teams we created, but unfortunately they were unable to attend. 11 people from our team were able to attend the event. We learned about how they benchmark cars and use virtual reality (VR) to see how cars were designed. We also got a tour of their facility.



Family Robotics Event

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We co-hosted an event with N.E.R.D. Bots #14353 and the Blue Googles(an FLL team). We informed families about FIRST robotics and had activities for the kids to do like driving the robot and getting a robot driver's license (Thank you Dark Matter #14374!) and making paper rockets (Thank you NASA for the template!).



Robot Driver's License

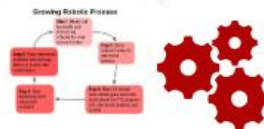


Inspired by
Dark Matter
#14374

Name _____
Date _____
Signature _____

Operations Manual

We created an operations manual for future Infinity Tech members to help them recruit new members and grow robotics in the Plymouth-Canton community. It provides step-by-step instructions and templates to reach out to schools to share a video, host workshops, start new teams, and share lessons we've learned over the years.



Portfolio examples

Problems and Solutions of Mechanisms Lessons Learned				8
Mechanism	Problems	Solutions	Lessons Learned	
Chassis	1. The motors took up too much room when horizontal. 2. When we put the mechanism on the smaller chassis it raised the center of gravity and pushed it to whatever side the 4-stage slider is on. This could cause the robot to tip over. 3. Cones can get stuck under/on the robot.	1. We made the motors go vertical like pillars. 2. Can power down the motors so the robot stops slower & adding a weight at the bottom to lower the center of gravity. Moved the four-stage slider as close as possible to the center 3. Installed body panels	There is always a way to improve the robot.	
Pick-Up Grabber	1. After we prototyped this mechanism, we realized that the forward-facing shafts didn't have much room to be misaligned when we were driving. 2. During prototyping, the mechanism was too large to fit on the robot. The cone would not stay between the two gears when we picked the cones off the ground. 3. The foam on the grabber wasn't grabbing the top of the cones well 4. The servos were a little slow	1. We made the rubber band pick-up mechanism so that the axles were facing left and right so it would allow the driver to have a little more tolerance when driving the robot. 2. We made a more compact version of the mechanism so the cones would stay in the mechanism when it moved. 3. Changed to a fin-ray compliant grabber from 3D TPU filament 4. We updated the servos and increased the speed by 36%.	Try different solutions, there is always more than one way to solve a problem	
Cone & Junction Positioned	1. We needed something on the sides of the cones for the mechanism so we could position the cones on the ground junctions correctly.	1. We put cardboard on the side of one pusher and metal on the other one. 2. Experimented w/ 3D printing & tried to find the best thickness for picking cones	Experiment to optimize your solution	
4-Stage Slide	1. Can't pull it down the slider b/c the motor is far from the base 2. The height needed to put the 4-stage slider on the turret to move the cone around without having to move the chain bar up increases the chance of tipping over if we brake too fast. 3. The goBilda 4-stage cascading slider wasn't strong and balanced 4. The 4-stage we used at the qualifier was slow & rigged continuously	1. Can't use pull-down feature 2. Tuning the software to brake softer, putting weight low on the chassis to lower the center of gravity. Move the slide closer to the center of the turret to reduce the risk of tipping over. 3. We removed the goBilda 4-stage, replaced it with a Misumi slider, and mounted it more in the center 4. Used cascading rigging & added gears to increase torque to lift cascading rig	There are many solutions to a problem.	



Recap

Don't need to overload judges with too much information!

- Minimize words to what you really need to explain what your team has been up to during the season
- A picture is worth a thousand words
- Use frames and borders to give to judges bite size pieces to read instead of really long and dense paragraphs.



Scouting

Get the teams done!



What is scouting?

Scouting is a process in which teams learn about fellow competitors whether it be digital or in-person, in order to make decisions regarding play-offs in competitions.



Why scout?

- Learn about your alliances and opponents
 - a. Records
 - b. Mechanisms
 - c. Achievements
- It comes in handy during alliance selection
- Scouting is helpful for talking with other teams, creating relationships, and making bonds
- Split into two parts, Pre-scout and Competition Day scout



Pre-Scout

What to do before the competition

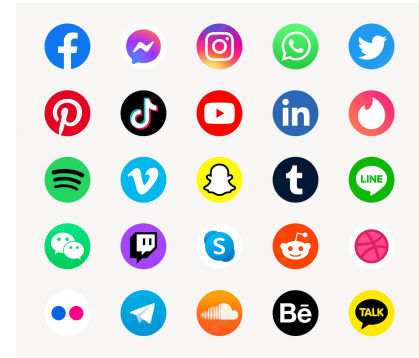


Do your research before

- Know who your team will be facing off against
 - Orange Alliance
 - Social Media
 - Websites
 - Team High Score
 - See prior competition performance
 - Competition Record
 - Alliance Picks
- Find out what teams are candidates for each award



The Orange Alliance



Social Media



Organize your scouting sheets

- Maps and Charts contain useful information
 - Pit Location
 - Division Name
 - Name and Number
 - Find a formatted system
 - Digital
 - Paper surveys
- More time to make decisions



Competition Day Scouting

What to do the day of the
competition



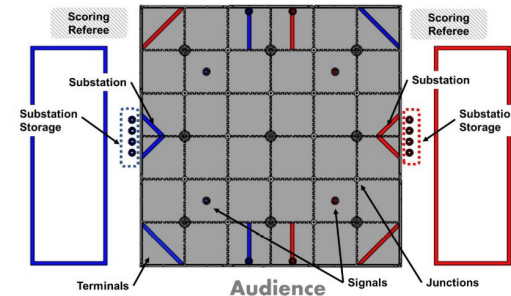
Split up to scout

- More efficient use of time
 - Teams help speed up scouting
 - Certain areas are taken by certain teams of scouts
- Let teams get to know more than just one person for your team
 - Good representation of your team
- Have more than one person provide input into your team
 - The more opinions the better!



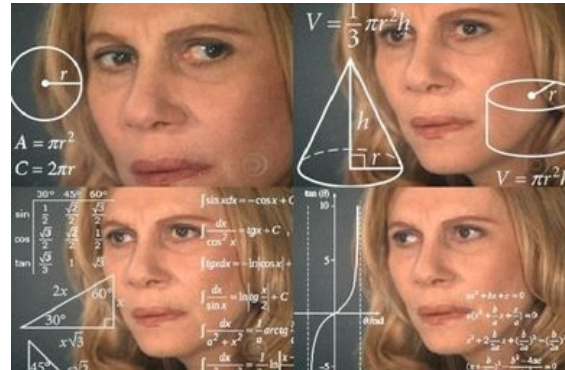
Learn about your alliances and opponents

- Abilities
 - Full capabilities
 - Cycle time
- Preference
 - Game element collection area
 - Strategy
 - Range of motion



Find the best fit for your team

- Some teams compliment each other
 - Find a team that will fit your strategy
 - Compatibility is important!
 - Do you both stay stationary
 - Two teams that specialize in defense isn't good either



Sample Scout

Team #13684 - Infinity Tech

East Middle School

- 📍 From [Canton, MI, USA](#)
- 🏆 Part of the FIM Region
- 🏆 Rookie Year: 2017
- 📊 Top OPR: 72.9 ([MI Lake Orion Qualifier](#))

Gibraltar Spring Showdown

Gibraltar, MI, USA on May 5, 2023

Qual Rank #7 with a record of 4-1-0 and an OPR of 26.9

🏆 Connect Award Winner

Semifinals							
🔄	SF1-1	131 - 125	10210	18474	11520	12379	13684 12549
🔄	SF1-2	133 - 98	10210	18474	11520	12379	13684 12549
Qualifications							
🔄	Q-3	97 - 45	8487	13684		22886	22235
🔄	Q-11	43 - 6	15719	13684		22602	14771
🔄	Q-18	64 - 68	12549	22395	13996	13684	
🔄	Q-24	76 - 17	8987	10210	14003	13684	
🔄	Q-30	91 - 40	20282	13684	20682	12303	

Michigan State Championship-SE - Woodie Flowers Division

Warren, MI, USA on Dec 8, 2022

POWERPLAY

Team Information

Event Results

Gibraltar Spring Showdown

Michigan State Championship-
SE - Woodie Flowers Division

Michigan State Championship-
SE - Finals Division

MI Lake Orion Qualifier



Presentation



What is the presentation?

- A 10-15 minute interview/presentation with judges
 - A 5 minute presentation that is uninterrupted
 - 5-10 minutes of judge Q&A
- The presentation takes place before matches in the morning
 - Generally ~8-10AM
- Make different ways to display your presentation
 - Skit, story, musical



Intro

- Pleasantries are important!
- Basic Information
 - Team Name
 - Team Number
 - Hometown
- Robot Information
 - Overview
 - Robot Name



Building

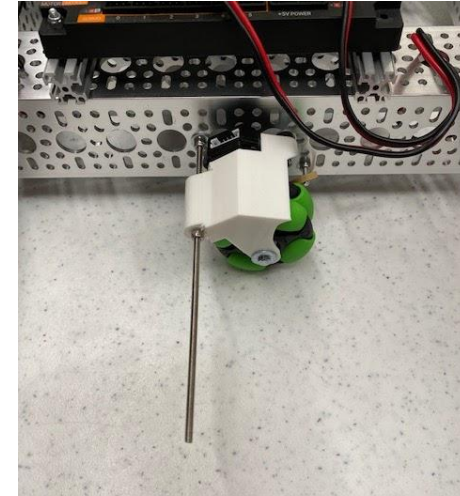
Can talk about the engineering process:

- Prototype and Design
 - Show to judges visuals in possible!
- How you team decided which mechanisms to use
- Problems and solutions of the robot
- Lesson learned while building the robot!
- Mechanisms
 - How many versions you went through
 - How a mechanism works



Programming

- Autonomous Period
 - Strategy for autonomous
 - How your team track where the robot was on the field
- Robot enhancements
 - How your team made your robot easier to drive
- Sensors
 - How sensors improves to robot's performance



Business

- Outreach
 - Community events
 - Talking with the engineering community
 - Mentoring
 - Other
- Fundraising
 - Did you have sponsors?
 - Dine to donates
 - Other
- How you recruited mentors and students!



Outro

- Closing statements
 - Thank your judges
 - Remind them who your team is
- Open your presentation to questions



FAQs

- What do I need to bring to my judging appointment?
 - Your engineering portfolio, control award submission, and feedback request form (in some competitions, this may be collected at check-in)
 - Your robot
- What do I do if I think the judges scored our match wrong?
 - One student representative must wait patiently in the designated Question box area
 - Without interrupting a match, talk to the head referee
 - If they agree about the error, they will change it; if not, you must respect their decisions.
- What is gracious professionalism?
 - Gracious professionalism is, in a nutshell, having gracious attitudes, respect, and gracious behaviors within and outside your team
- What do I wear to my competitions?
 - It depends on each team, but something that shows uniformity and team spirit with your team would be best (this could mean everyone on the team wearing something matching)



**Thank you for listening to my
presentation!**

Any questions?



Into the Deep: Game Predictions



Resources

Youtube Page (Tutorials): <https://www.youtube.com/@infinitytechteam7332>

Engineering Notebook Template:

https://docs.google.com/document/d/1Y56DCKIXScTYDzEh85U6ILBt7MkOI2x_Lzkxppn9u8/edit

Game Manual Part 1 Blooket:

<https://dashboard.blooket.com/set/62fbb4fe565b62c1f6ceb3f3>

Infinity Tech Website(regularly updated): <http://www.infinitytechrobotics.com/>

