

Dynamic Documentation & Potentially Perfect Portfolios

#16461 Infinite Turtles
Sanjita Srinath & Devan Shah



Who Are We

Infinite Turtles:

- 2x North Carolina State Championship Inspire Award Winner
- 2022 World Championship Innovate Award Winner
- 2023 World Championship Division Inspire Award Finalist
- 5th year team

FIRST[®] TECH CHALLENGE



Sanjita and Devan

- Senior founding member of Turtles
- 5 years of FTC
- 7 years of FIRST
- Senior founding member of Turtles
- 5 years of FTC
- 8 years of FIRST



Agenda

What is a portfolio and why is it important?

General Tips

Timelines for Documentation

Publicly Released Resources

We've released our Freight Frenzy Portfolios!:

[North Carolina State Championship Inspire Award Winning Portfolio](#)

[Worlds Championship Innovate Award Winning Portfolio](#)

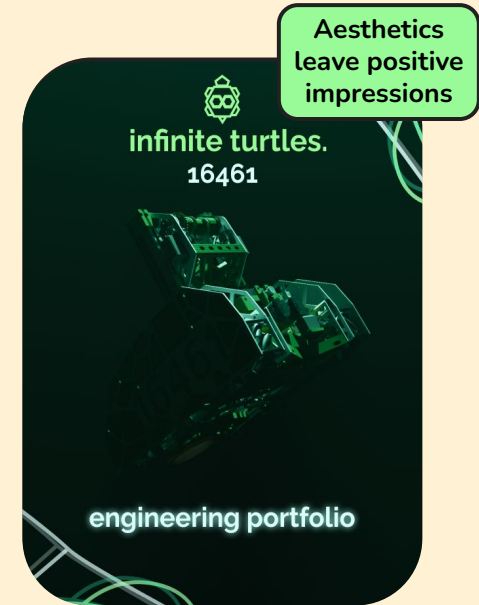
FIRST's Resources

The manual that dictates how FTC's judging process works is public: **USE IT**

Pore over every single word in the GM1 award descriptions, and use that vocabulary to describe your accomplishments.

Check out what GMO says:

<https://gmo.org/en/latest/docs/awards/portfolio.html>



What is a Portfolio?



The Basics of your **MOST IMPORTANT** document!!!!!!!!!!

What it is:

- Most important document you will prepare
- Detailed overview of your team, season, & accomplishments.
- Shows your decision-making, progress, and hard work.
- Only 15 pages long + 1 cover page

Why it is important:

- First reference for judges to get info on your team
- The only documentation used for award consideration (Notebook is no longer used)
- **MOST MOST MOST** important document you will submit

General Tips



Judges Manual

As we mentioned earlier, the FTC judging manual is publicly available. It is useful to have a few students read this manual cover to cover to understand how judging works and what judges are taught to look for.

https://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/judge-manual.pdf

Providing Judges Context

Judges have no context. Even if they were your judge at a previous competition, every competition they see you for the “first time” in order to judge everyone fairly.

They don't know your team. They don't know what you've done and they don't have ANY background knowledge on your decisions, your actions, or your designs.

You have to make it reader accessible. This means you might have to simplify concepts that are really simple to you. But striking a balance between detailed and reader-friendly is super important. (Hint: this slide isn't very reader-friendly)

Context Example (16461 FF Worlds)



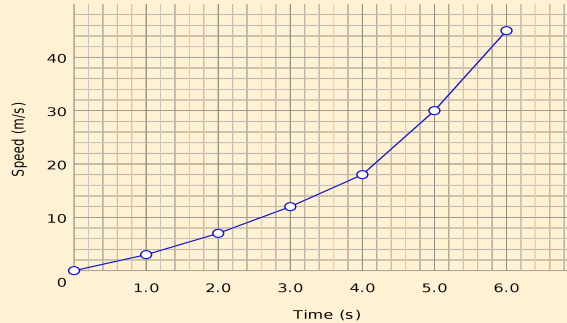
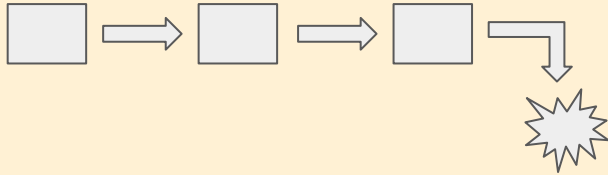
Introduction

Team Intro

We're team #16461, Infinite Turtles, from Matthews, North Carolina. We're a student-led, veteran team which first competed in Skystone (2019-20). Our team has **63 years of FIRST experience**, winning 1st place NC Inspire and Winning Alliance this year, 3rd place NC Inspire last year, and members have won states (9548) and the Maryland Tech Invitational (18253). **We strive to broaden perspectives on our team, evident in our diversity this year!**

Information Density

The judges don't want to read an essay on every page, so in order to make it interesting, add pictures, graphics, and charts!



Another thing to do is padding your sections, don't have everything side by side all congested space out your information. So it's easier to read. Flow charts are always interesting

Information Density Example (16461 FF States)

Chassis

16461

Drivetrain

- 7.5ft/s free speed, 6.5ft/s simulated and match speed
- 12.47" wide to fit through the gap
- Mecanum and Locking Mecanum (content pg. 11)
- Fully custom aluminum structure with weight optimization and static analysis
- Deadwheel Odometry for Motion Tracking

Lessons Learned



This drivetrain taught us our biggest lesson this year- simulate everything. We wasted many months and lost a lot of points to a very slow ratio, and didn't get around to updating it til v3 (**design process**, pictured right). If we had done this when starting out, we would have performed much better, earlier, so **we've resolved to simulate drivetrain speed profiles at the very start of the season every year from now on.**

Terrain Handling

- Servo retractable sprung odometry using string linkages
- High clearance and Sealed drivetrain base to not catch
- Locking Mecanum for a traction boost

Design Process

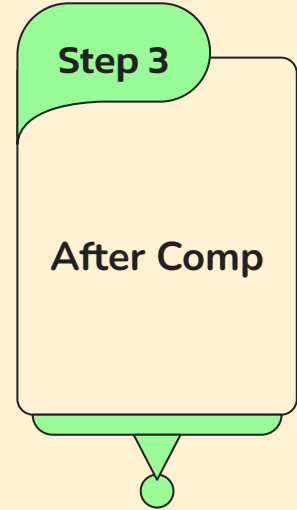
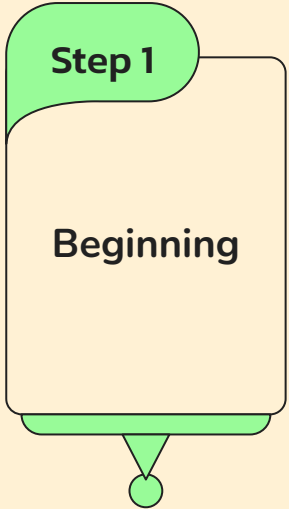
- Offseason DT**
Low clearance, high acceleration drivebase for offseason.
(No Terrain Capabilities)
- V1 FF-DT**
12.47" drivetrain with clearance and retractable odo for the barrier.
(No Numbers/Mounting)
- V2 FF-DT**
Updated outer plates for more mounting and inspection legality.
(Vulnerable to Terrain)
- Triangle Guards**
Added guards to protect against the "death triangles" (during scrimmage) **(Too Slow)**
- V3 FF-DT**
Updated ratio from 16.3 -> 13.1 and finalized proper guards. Updated pocketing.
(Working)



Timelines for Documentation



Season Timeline



Right Around Kickoff (or before): Team Structure & Goals

Questions your team should figure out:

Who is your team?

What is your brand image?

What do you represent?

What are your goals?

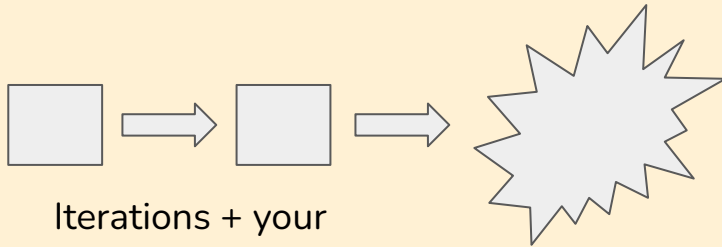
These are all super important questions to have answered before you get overwhelmed with all the technical details and work that begins to flood in after kickoff. Know your team, know your goals, and start filling those parts of your portfolio out.

Once you have these questions answered, it's time to start building the structure of your portfolio. Remember you only have 15 pages to share your entire story.

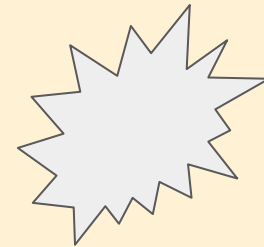
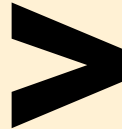
During the Season

Prime Portfolio Updating Time:

Your team is working super hard and you're SUPER proud of the robot you've made so far. It's amazing. Your intake/drivetrain/insert part has gone through so many iterations and you think this just may be the one. However, as the season progresses, it's important not to leave everything till the week before to update your portfolio. Judges want to see progress and when you rush stuff at the end, you WILL miss something.



Iterations + your
amazing robot!!



Just your amazing robot :(

During the Season

Key Components:

Software:

1. Goals
2. Design Process
3. Unique techniques you use
4. Vision, Controls Engineering, Code structure, etc.
5. New things you've learned
6. Highlight what makes **you** special!

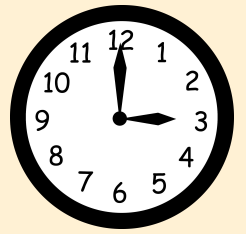
Mech:

1. Goals
2. Design Process
3. Iteration
4. Breakdown on drivetrain
5. Breakdown on scoring
6. Lessons learned
7. Highlight what makes **you** special!

Outreach:

1. Not just the numbers...
2. Why was what you did impactful and what exactly was your impact?
3. Who did you reach out to and what did you learn?
4. **QUALITY OVER QUANTITY**

Right Before Competitions



Your Team should Figure Out

What are the best parts on your robot

How did you design those parts

What is your overall design process

What is cool about your code

What have you done for outreach

Who have you connected with in the field

Remember... stick to your brand image. You need to be able to present to the judges as a cohesive team, and your brand image and portfolio is a HUGE part in that!

It's time to start editing all this information in your portfolio. Over the last couple weeks of the season, you'll have stored this information. Now it's time to make it pretty!

After Competitions

Your Next Steps:

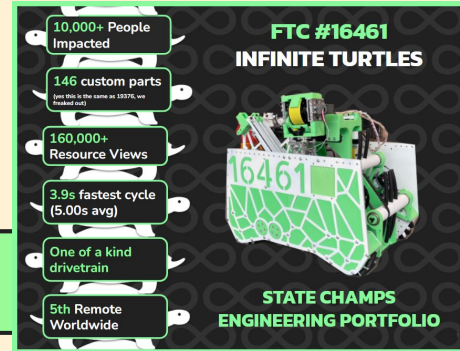
How were you received?

Did judges like your portfolio?

What feedback did they have?

What do you want to improve?

Congratulations! You just competed! Whether this means the end of the season or there's a next step waiting, it's time to evaluate your portfolio. You will receive feedback from your judges so look at it! You can utilize this feedback for your next portfolio.


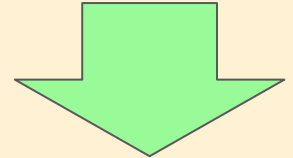


FTC #16461
INFINITE TURTLES

- 10,000+ People Impacted
- 146 custom parts
(and this is the same as 1575, we tracked out)
- 160,000+ Resource Views
- 3.9s fastest cycle (5.00s avg)
- One of a kind drivetrain
- 5th Remote Worldwide

STATE CHAMPS
ENGINEERING PORTFOLIO

16461



FTC 16461 INFINITE TURTLES

ENGINEERING PORTFOLIO

16461

Rapid Fire Tips

- **Wording is everything**, and how you frame something can change how it is perceived entirely. Don't say that you just *“started a new FLL team and mentored them”* when you *“took them through their entire registration process, got them started as a team, supported their weekly meetings, made yourself available for questions any time of day, and cheered them on at competition”* (of course keep space in mind). A portfolio is not a place to undersell what you have accomplished (but it is also not a place to oversell).
- **Make Things Stand Out:** Numbers, statistics, and cool things you've done should **pop** on your page and be the first thing judges have their eyes drawn to. Hook them into a page with a number, then back that number up with a solid description. (Example on right)
- **Put the Engineering in Engineering Portfolio:** Part of quite a few awards is engineering content. Think, Design, Control, and Innovate all award various forms of this. Document your engineering process, and most importantly, show how you used your other STEM skills like Math to make informed decisions throughout this process.

We are the **first FTC team** to create a **“Locking Mecanum”**, a modified mecanum wheel that can function as both a traction and holonomic wheel. It does this with **six linkages made with some of the most advanced manufacturing and 3d printing post processing methods in FTC**. The rollers are **“locked”** in place by this **custom servo driven mechanism** and the wheel becomes an effective traction wheel at our will, giving us the benefits of such!



Full Holonomic Capability
1.4x Tractive Force
1.2x Acceleration

Contacts and Help

We are both from 16461, a team based in Southeast Charlotte, and are occasionally able to help in-person in the Charlotte Metro area.

We can be contacted with our emails at **sanjita@mcr.club** and **devan@mcr.club**, please CC a coach on your communications.
We can be contacted on discord **@sanjita** and **@savck** , preferably being pinged on the NCFTC or 16461 discord.

Teams can join our discord and gain access to a help channel at <https://discord.gg/nEFb7X5BUR>

We recommend teams join the NCFTC discord for help from other state teams at <https://discord.gg/cEhWHYBmvU>

We also recommend teams join the global FTC discord, partially moderated by our team, at <https://discord.gg/first-tech-challenge>

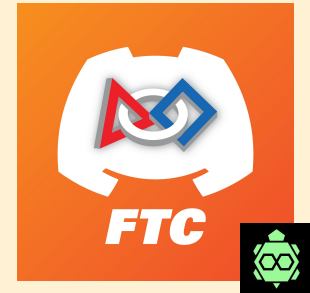
This presentation and all other 16461 kickoff presentations can be found on 16461's website at <https://16461.mcr.club>



<https://discord.gg/cEhWHYBmvU>



<https://16461.mcr.club>
<https://discord.gg/nEFb7X5BUR>



<https://discord.gg/first-tech-challenge>