<u>Basic Information</u>
Team Number
4557

Team Name
FullMetal Falcons

<u>Programming Language</u>
What programming language do you use?
Java

<u>Public Code</u>
Is your code public?
Yes

What is your team's GitHub account?
https://github.com/FullMetalFalcons

<u>Vision</u>
What camera do you use?
Raspberry Pi running Chameleon Vision on a Microsoft Lifecam 3000

What do you like about your camera?
Super cheap and just as effective

What do you dislike about your camera?
Doesn't have the featureset and also slightly more difficult to set up but relatively simple

How would you compare this camera to other cameras you've used in the past?
First time we've ever gotten vision processing to work so thats a plus

If you could do vision differently, what would you change?
Run it on a jetson nano instead (just didnt have the time yet) or just simply buy a limelight if we had the money

How are you planning to do vision next year?
depends on what the underclassmen feel is necessary and they are capable of

<u>Path Planning</u>
How do you design your paths?
We attempted to use pathweaver

What library(ies) do you use to make your paths?
WPILib

What geometry do you use for your paths? (Splines, piecewise, circle, etc)
Splines

What forms of path planning have you done in the past and if you have changed them, why?
None, first time attempting and slightly failed but nothing some more time can't fix

How do you integrate sensors with your paths?
We use a NavX MXP and CTRE Mag Encoders on Talon SRX's on the drivetrain

If you could do path planning differently, what would you change?
get it to actually work lol

Training
How do new programmers get trained?
This is our second year of using java after switching from labview so I was still generally figuring it out. We have two ftc teams that the underclassmen use to learn how to code and I took two underclassmen with me to FRC and had them follow what I was doing

Do new programmers have to work outside of practice?
Yes, they have to have completed all of the Java Code Academy practice for a baseline

What is your general training order? (ex. Classes, functions, data types, reading documentation)
Code Academy, FTC, FRC

What do you do if there is not enough work for all the programmers?
Have them follow along what I am doing

On average, how many programmers do you have?
Doing the majority of the work, just 1, but technically 3 on FRC

GitHub
How do you control access to the team GitHub?
I am an admin along with our mentors

How do you delegate using GitHub?
Make teams

How do you handle merge issues and multiple people working on the same file with GitHub?
We just try to avoid it all together but it can happen from time to time

If your team uses private repositories: what are the advantages of this/why did you start doing it?
We like to keep our code private then release it after the season is over so that other teams cannot see what we are doing with our robot.

How does your team make ReadME.md documents?
Just throw one together explaining programming features

Other Sensors
What other types of sensors do you use?
So many encoders on everything

How do these sensors help your robot?
We try to automate as much as possible

Of those sensors, which are you planning to use again in the future (if any)?
Absolutely the Rev Through Bore encoders as they were so easy to work with

How do you learn what new sensors to try and how to use them?
This was the first year we used Rev through bore encoders, talon through bore encoders and also neo's and they all worked great. Reading through the documentation and example code from previous years really helps.

Off Season
What do you do in the offseason to prepare for build season?
We built a 6 mini cim practice WCD

How does programming interact with mechanical for off season activities?
Absolutely, we are planning on putting a bunch of sensors on it to do programming features

Documentation
How do you document your code?
Not too much yet but we will soon

Have you documented differently in the past? What do you like better now vs then?
We have actually documented in the past but it was pretty vague

Build Season
What do your programmers do at the start of build season?
We figure out the general manipulators and plan out a schedule with deadlines

How useful are the tasks that they do at the start of build season? (from 1 - 10)
3

How much time does programming get to program the robot (without mechanical intervention)?
2 days this past year

How do you divide up the time programming gets on the robot between different mechanisms, tuning, and autonomous?
We try and give our build team a deadline which typically goes over by a few days but went over significantly more this year for some reason

During programming's time on the robot, how does your team handle mechanical failures and imperfections?
We tell mechanical and if they can't do anything, we try our best and work around it.

How do you make the schedule for programming?
We prioritize what build can finish first so that we can test

How does your team use gearbox ratios with encoder counts?
We use the CTRE Mag Encoder on our gearbox which has worked really well

Creating from Scratch vs Inheritance
How does your team balance inheriting WPILib functions with writing custom functions?

We aren't very experienced so we haven't created many custom functions

What are some examples of custom functions that your team has made?
None

Interesting WPILib Functions
What class do you use for joystick control?
We use the xbox controller class for a playstation controller and map buttons through the getrawbutton function

What class do you use for automating actions?
We just create command groups, similar to an autonomous

Joystick Layout
Who determines the layout of the joystick for your team?
Whatever the driver thinks is most comfortable

How do you manage changes to the joystick layout?
Do it as fast as possible before comp

How do you test the joystick layout?
By actually driving the robot

PID Tuning
When you get the robot, what is the first thing your programming team does with it?
We test our code and each function

How does your team determine if motors should have encoders or not?
Depends on what we are using it for. If we are doing precise control of it, of course we need encoders

When you PID tune a motor for position control, what is your procedure?
We typically start with very very low numbers and it generally stays low

When you PID tune a motor for velocity control, what is your procedure?
Same procedure as above, as its a big guess and check game