Basic Information

Team Number
997

Team Name
Spartan Robotics

Programming Language

What programming language do you use?
Java (Hopefully Kotlin starting 2021)

Public Code

Is your code public?
Yes

What is your team's GitHub account?
Team997Coders

Vision

What camera do you use?
Limelight 2

What do you like about your camera?
Plug and play but also has plenty of customization

What do you dislike about your camera?
Sometimes the web server will freeze

How would you compare this camera to other cameras you've used in the past?
Comparing to one that doesn't have built in vision processing, much easier to use for vision

If you could do vision differently, what would you change?
A little more settings to change

How are you planning to do vision next year?
Same

Path Planning

How do you design your paths?
Path weaver

What library(ies) do you use to make your paths?
WPI's new trajectory stuff

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?
Tried circle but found it kinda annoying to do

How do you integrate sensors with your paths?
Get an error for heading using the gyro and make small corrections

If you could do path planning differently, what would you change?
Make it be able to continue the path based on position and not time

Training

How do new programmers get trained?
Throw them in the deep end and then forget about them until half way through their sophomore year

Do new programmers have to work outside of practice?
If you don't you fall behind real fast

What is your general training order? (ex. Classes, functions, data types, reading documentation)
data types/syntax, functions, classes

What do you do if there is not enough work for all the programmers?
Make up something for them to do (Make a calculator, code a text adventure, etc.)

On average, how many programmers do you have?
Too, too many. (6)

GitHub

How do you control access to the team GitHub?
Whoever is added to the repo can contribute.

How do you delegate using GitHub?
We don't

How do you handle merge issues and multiple people working on the same file with GitHub?
Don't have people work on the same file and if they do, resolve the conflicts and test it before pushing to master (or handle merge conflicts on a separate branch)

If your team uses private repositories: what are the advantages of this/why did you start doing it?
N/A

How does your team make ReadME.md documents?
Ones that say the title of the repo and thats it

Other Sensors

What other types of sensors do you use?
Everything: Beam Break, IR (Digital and Analog), Ultrasonic, Limit switches, leaf switches, Absolute encoders, Mag encoders, Integrated brushless encoders, Navx (The one they use in FTC for whatever reason)

How do these sensors help your robot?

They help with alignment most. Some specifically how far are you into or away from something. Leaf and Digital/Analog IR for gamepiece detection, Integrated brushless encoders and Mag encoders for position and velocity control. Analog IR and Ultrasonic for distance sensing, Navx for rotation of robot, and The absolute encoders for rotation control on an arm or swerve module.

Of those sensors, which are you planning to use again in the future (if any)?
All

How do you learn what new sensors to try and how to use them?
Google. The store you got the sensors from will probably have all the links you need (Or at least the manufacturer's website)

Off Season
What do you do in the offseason to prepare for build season?
Trying coding the bot in other languages, code non existent bots, random programming projects.

How does programming interact with mechanical for off season activities?
We bother them to make stuff faster so we can test our code. Or do their job for them

Documentation
How do you document your code?
Very poorly

Have you documented differently in the past? What do you like better now vs then?
I like that we can sometimes attempt to document where as we didn't even in the past

Build Season
What do your programmers do at the start of build season?
Code subsystems, plan the bots architecture

How useful are the tasks that they do at the start of build season? (from 1 - 10)
8

How much time does programming get to program the robot (without mechanical intervention)?
To program, 6 weeks. To test, the amount of time between when pits open and opening ceremonies.

How do you divide up the time programming gets on the robot between different mechanisms, tuning, and autonomous?
We code all the subsystems and basic control layout (Sometimes a half-assed auto) then test. We tune for as much as we can and then usually during comp we test auto

During programming's time on the robot, how does your team handle mechanical failures and imperfections?
Fix them or get someone else to fix them. If we break something on the bot, but can still test other things, we will keep testing, otherwise it is suddenly mechanical's turn

How do you make the schedule for programming?

I don't. I wait until we are about to get the bot then got over what we have and fill in any blanks within about an hour or two at home

How does your team use gearbox ratios with encoder counts?
I'm trying to get in the habit of calculating them using the ratios but if we can't or don't want to we just record markers and develop some conversion off the data

How does your team define code standards?
I threaten their lives, and then go through all of their branches fixing it for them

Creating from Scratch vs Inheritance
How does your team balance inheriting WPILib functions with writing custom functions?
We generally don't use WPILib functions just because we always find something to tinker with them. We do use the path following and some kinematics ones tho

What are some examples of custom functions that your team has made?
Drivetrain mixers

Interesting WPILib Functions
Are there any WPILib functions that are unusual and make your life a lot cooler or easier?
Kinematics ChassisSpeed to WheelSpeed is the heart of the pathfollowing library I have

What class do you use for joystick control?
Our OI class that we make

What class do you use for automating actions?
We don't, we jank it

Joystick Layout
Who determines the layout of the joystick for your team?
Whoever made the subsystem and then usually countered with driver input

How do you manage changes to the joystick layout?
Just change the binding in OI (We use command base btw)

How do you test the joystick layout?
Turn the robot on?

PID Tuning
When you get the robot, what is the first thing your programming team does with it?
Test manual control of all subsystems

How does your team determine if motors should have encoders or not?
If we want closed loop control and it isn't a hassel to add

When you PID tune a motor for position control, what is your procedure?
Wing it every time. Generally code some helper class so we don't have to re build and deploy every test we do

When you PID tune a motor for velocity control, what is your procedure?

Find an F using big brain maths, then tune the rest accordingly (Also protip, if your F is being garbage even tho it shouldn't, record what speed it runs at at what percentage, solve for a function, then use that as an ArbF whenever you we the velocity setpoint)