Configuring a Robot

- Setting steer offsets for a Mk 4i drivetrain
- Setting the magnet offset for a CANcoder
- Flashing an Radio (pre-2024 Champs Radios)
- Testing Robot Code

Setting steer offsets for a Mk 4i drivetrain

1. Put the robot up on blocks
2. Begin with the bevel gear (the black ring on one side of the wheel) on the modules all facing inward
    1. Use a straight edge to ensure the modules on each side are all facing the same direction
3. Deploy code that sets the angle offset to `Rotation2D.fromDegrees(0.0)`
4. Open the driver station and pull up the labview (default) dashboard. go to the variables tab
5. The value you are looking for could have any name. It will be derived from something like `Rotation2D.getDegrees()`
6. Set this value to the angle offset for each module exactly
    1. e.g. `Rotation2D.fromDegrees(12.3243)`
7. Deploy code
8. Test
9. If a wheel is spinning the opposite direction of what it should be, add 180.0 to the angle offset

Setting the magnet offset for a CANcoder

1. Move the encoder's mechanism to the desired home position
2. Reset the magnet offset of the CANcoder to 0 in phoenix tuner
3. Apply config (hit the button with the down arrow next to **CANcoder Configs**)
4. Hit the green refresh button
5. Check the absolute position of the CANcoder
    1. This will appear in a table under **Self Test**
6. Set the magnet offset to the absolute position multiplied by -1
7. Apply config
8. Hit the green refresh button
9. Confirm that the absolute position now reads 0
    1. If it is still significantly far off from 0, adjust the magnet offset number until the absolute position gets as close to 0 as possible. Remember to hit apply config and the green refresh button every time you change the magnet offset
10. Set this new value in the code
11. Reboot the robot
    1. This is needed so the updated values in the CANcoder are properly distributed to the other CAN devices
12. Confirm that the absolute position still reads 0 at the desired position

Flashing an Radio (pre-2024 Champs Radios)

Prerequisites

- Windows PC with WPILib Tools Installed

Steps

1. Windows search for "Manage Network Adapter settings"
2. Disable Wifi
3. Connect the Ethernet from the port closest to the power (18-24v POE, image included below) to the Radio Power Module (RPM). Connect the RoboRio side of the RPM to the computer.

4. Open the Radio Configuration Utility application
5. Set the team number to 3506 (or the number of the team you are configuring the radio for)
6. Set the robot name. This is optional, but HIGHLY recommended. The name, if specified, will be put in the Wifi network name, and makes it easier to differentiate between robots.
7. Go back to Network Adapter settings and re-enable Wifi
8. Reboot the robot

If you encounter any issues, check out the "Programming your Radio" guide on WPILib (https://docs.wpilib.org/en/stable/docs/zero-to-robot/step-3/radio-programming.html)

Testing Robot Code

Testing code before merging it is important to ensure it works as intended. This page discusses how to checkout the correct branch, deploy the code, test it on the robot, and merge changes.

Checking out your branch:

Go to the terminal in Intellij by clicking on this icon in the lower-left corner of your screen:

When open, type "git fetch origin" to fetch to your local repository. Then, type "git checkout [branch name]" and insert the name of the branch that contains the code you want to test. It should look like this:

```
SHIKHAs-MacBook-Air:RoboWS shikhagaurav$ git fetch origin
SHIKHAs-MacBook-Air:RoboWS shikhagaurav$ git checkout [branch-name]
```

You should now be on the correct branch. To ensure all of your changes are on it, type "git pull" to update your branch. It should look like this:

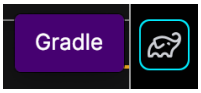
```
SHIKHAs-MacBook-Air:RoboWS shikhagaurav$ git pull
Updating 46b32d3..c1e0a29
Fast-forward
 src/main/java/frc/robot/RobotCommands.java           | 32 ++++++++++++++++++++++++++++++++-
 src/main/java/frc/robot/RobotContainer.java          | 35 ++++++++++++++++++++++++++++++++---
 src/main/java/frc/robot/subsystems/ArmSubsystem.java |  4 ++--
 3 files changed, 44 insertions(+), 27 deletions(-)
```

Congrats! You now have all the code that needs to be tested.

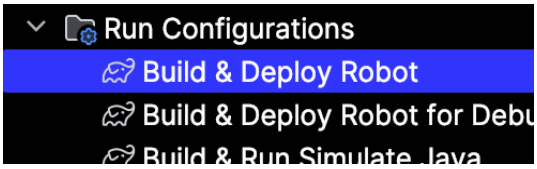
Deploying the code:

Now, you need to deploy the code to the robot. First, connect to the robot's WiFi. For our team, the network name will be in this format: 3506_robotName. Once connected, go back to IntelliJ and look for this in the top-right portion of your screen:

Ensure the dropdown is set to "Build and Deploy Robot." If that option is unavailable, you may have to scroll through the Gradle stting which you can find by clicking this icon:



You'll find the Build and Deploy Robot option in the Run Configurations folder:



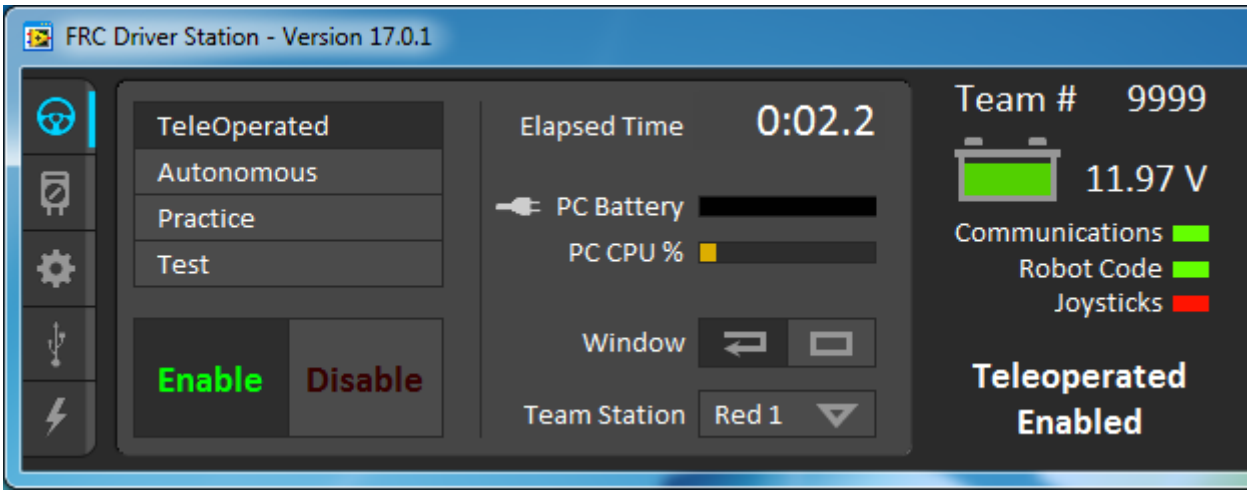
Once you've selected Build and Deploy Robot, hit the green play button. After about 30 seconds, the deployment will be complete.

Note that the Communications and Robot Code bars will turn red on the FRC Driver Station Application while deploying, but will return to green after deployment is complete. Also, if the Communications and Robot Code bars begin to cycle red and green, it means your code is crashing and there is an issue.

Hooray! The code is on the robot!

Test it out:

To run the code on the robot, go to the FRC Driver Station application. It should look something like this:



Ensure that the settings are correct. All three of the bars (Communications, Robot Code, and Joysticks) should be green. The battery should be sufficient. Ensure that you are on the correct drive setting (TeleOperated, Autonomous, Practice, and Test).

If it is in TeleOperated mode, you will need to manipulate the controller to test. If it is on Autonomous mode, ensure that the robot is placed correctly and the correct autonomous program is selected prior to enabling. Hit the green enable button to start the robot and test.

If it does not work as intended, then you will need to change some code and try again.

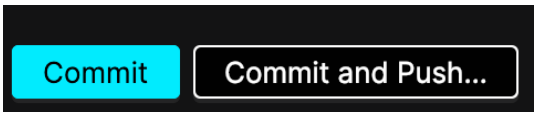
Nice! Your code has been tested and verified!

Merging changes:

Now that you've tested out your code and it works, you'll need to get it merged to make sure it's part of the **offical robot code™**.

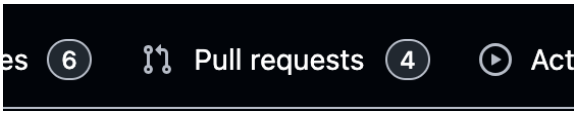
Begin by commiting and pushing your changes. You can do this from the terminal, but it's easier to do through the IntelliJ menu bar. Click on this icon:

This will show you all of your changes. Type a commit message that details the changes made and their purpose. Make sure your changes are checkboxed. Then hit the commit and push button:



If a box pops up telling you that there are warnings, don't worry about it. However, if the box says that there are errors, then there are problems in your code that you need to fix (and maybe test) before pushing.

Your changes should now be pushed. Go to GitHub and open the repository. Then go to the Pull Requests tab:



Hit the New Pull Request Button in the top right:

This bar should pop up:

Keep the base branch development, but select the dropdown on the compare branch and change it to the branch with the the changes on it. Then hit the Create Pull Request Button and fill in the necessary information. Once completed, submit your pull request.

Once checks are completed, it may mention merge conflicts. GitHub provides ways to resolve these, so make sure those are fixed and any changes are pushed.

Once a mentor has reviewed it, they may request changes that you will need to go in and complete (and maybe retest). Once it is approved, it will be merged and will be part of the **offical robot code™.**

Yay! Good job testing!