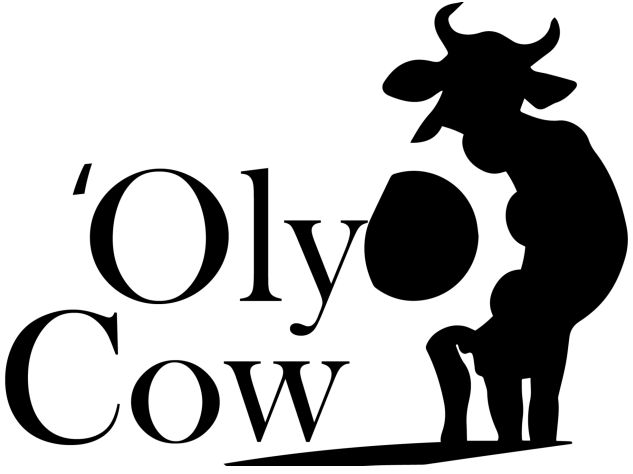
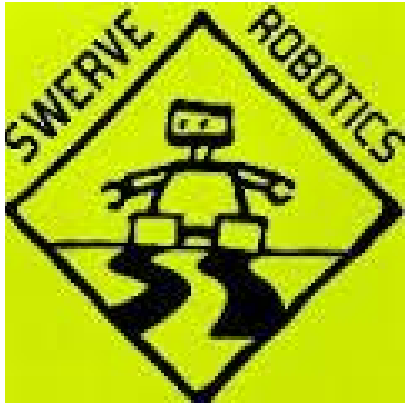
v1.0

Swerve
FTC Library and Tools





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Introductions

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- Darrell Ross
  - Software Engineer for Milsoft Utility Solutions
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Swerve Robotics FTC Library

Augments the existing library to simplify programming for FTC teams

- Isolated Code Organization - Use your own library
- Annotations which eliminates need to update FtcOpModeRegister()
- SynchronousOpMode
- Enhanced Telemetry containing a *dashboard* and a *log*.
- *I2cDeviceClient* class that wraps I2cDevice instances
- A class built on the *I2cDeviceClient* for the *Bosch BNO055 absolute position sensor*.

Available Online: https://github.com/SwerveRobotics/ftc_app

FTC Library: Isolated Code Libraries

- Numerous Benefits
  - Isolated code
  - Reduces merge conflicts
  - Allows for easier sharing between teams.
  - Reduces name conflicts
  - Aligns better with professional coding
- Initial Libraries Include:
  - FtcRobotController: FTC’s Library
  - SwerveRoboticsLibrary: Swerve’s Library
  - YourCodeHere: Your Library
  - [Code]

FTC Library: Annotations

- No need to edit FtcOpModeRegister() file.
- Register Your OpModes by annotating them with
  - @TeleOp
  - @Autonomous
  - @Disabled (disables)
- No need to include your files in the main library. Put them anywhere.
- Original registration mode can still be used.
- [Code]

FTC Library: Synchronous Op Modes

- Similar to LinearOpMode except
  - Automatic handling of multi-loop-cycle delay management for switching between reading and writing operations (eg: getPosition() vs setPower()) when using legacy motor controllers.
    - *[Code] SynchMotorLoopPerf.java*
  - Precise control of gamepad state updating so you can safely read from the gamepad
    - Without this, the gamepad state could change unpredictably
    - *[Code] K9TankDrive.java vs SynchTeleOp.java*
  - Easy Autonomous Reminiscent of Previous Years
    - *[Code][Demo] SynchAuto1.java*

FTC Library: Telemetry Dashboard and Log

- Dashboard
  - Written Once
  - Maintained at the top of driver station text area
  - Simply Update
- Log
  - can be written to at any time
  - automatically scrolls
  - doesn’t need to be maintained
- *[Demo “SwerveTelemetry”]*

FTC Library: I2cDeviceClient

- Wraps I2cDevice instances
- Handles read-vs-write mode switches
  - just call read8() or write8() and don’t worry about switching modes
- Decoupled from SynchronousOpModes
  - can be used with all normal ftc_app OpModes
- *[Code] SynchIMUDemo.java*

FTC Library: Bosch BNO055 absolute position sensor

- Sensor Features
  - gyro that does rate integration in hardware
  - robust and accurate angular position indications
  - separates accelerometer output into gravity and linear-motion-induced components
- *[Code] SynchIMUDemo.java*

Swerve Tools: BotBug

- Updating code is a big process
- Automatic configuration of Wireless Debugging
- Remembers last connected device
- Automatically restores when Android Studio is closed and reopened.
- Windows toolbar icon for interaction
- Open source: https://github.com/SwerveRobotics/tools
- Installer: https://github.com/SwerveRobotics/tools/releases
- [Demo]

Looking Back

- Swerve FTC Library
- Robot Controller connected via Wireless Debugging to Android Studio
- Driver Station connected via Wireless Debugging to Mobizen
- Isolated Code Libraries
- Annotation Enhancement
- SynchronousOpMode
- Telemetry Enhancement
- I2c Library with IMU functional
- Swerve BotBug Tool

Questions?

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