



Our Future:
Built Better Together

Zero To Hero: Rookie to Pro-programmer

Addy Famuyiwa
SBoD Member

Agenda

- Where to start?
- Choosing a programming language
- Choosing a programming framework
- Accessing programming resources
- Going above and beyond
- Last but not least: Documentation

Where to start

Recruitment

External

- Advertisement in programming classrooms or coding clubs

Internal

- Programming based activities help teach programming concepts
 - Human Programming: Groups of students write pseudo-code to help a teammate complete an obstacle course.
 - Paper Planes

Learning to Code

New to Programming

- Codecademy
- W3Schools

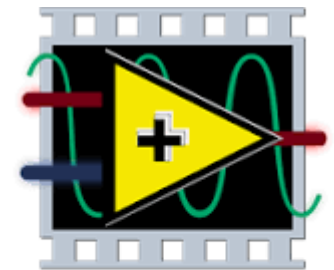
New to FRC Programming

- Nearby FRC teams

Languages & Code Structure

Choosing a language

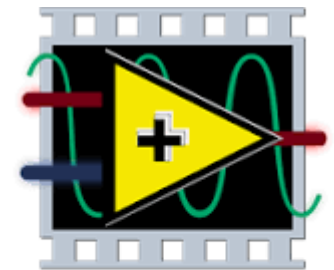
- Java
 - Widely used in FRC
 - AP Comp Sci A
 - Recommended for new/inexperienced users
- C++
 - Also widely used
 - Not as common in Indiana as Java
 - Offers better high-end performance
- Python
- LabView
 - Native to NI hardware (roboRIO)



LabVIEW

Choosing a framework

- Iterative Robot
 - The iterative robot base class handles the state transitions(Autonomous, Teleop, Disabled, Test)
- Command Based Robot
 - Design pattern that allows reuse year-to-year
 - New: Commands and Subsystems are interfaces granted extra flexibility
- TimedBot
 - Uses a timer to execute commands



LabVIEW

Accessing and Utilizing Resources

Resources

WPILib:

<https://docs.wpilib.org/en/stable/index.html>

- Standard Software library provided for teams to write code for their FRC robots.
- Documentation for Java and C++
- Also offers guides for FRC LabVIEW Programming

RobotPy:

<https://robotpy.readthedocs.io/en/stable/>

- Created by a community of FIRST mentors and students

LabView Robotics Guide: <https://www.ni.com/pdf/manuals/372668d.pdf>

Additional: <https://frc-pdr.readthedocs.io/en/latest/vision/introduction.html>

Above and Beyond

Advanced Topics

Sensors

- Allows for the tracking and measurement of different robot subsystems

PID Control

- Proportional, Integral, Derivative Loops that correct for error caused by sensors

Vision

- Cameras + Vision Tracking

Packages

- Organize classes and interfaces for easier year to year use

Documentation

Git and GitHub



- Git is the most widely used Version Control System
 - Code Collaboration and Version Control
- GitHub is a service that hosts remote repositories for Git version control

Javadoc

Specific to the Java programming language

- Javadoc allows you to provide documentation while you program
 - Easier to have up to date documentation
 - Not an alternative to a manual or tutorial
 - Generates HTML files of API documentation